13 CONDUCT OF OPERATIONS

13.6 Physical Security

13.6.1 Introduction

NuScale Design Certification Application (DCA) Part 2, Tier 1 and Tier 2, and the referenced TR-0416-48929, “NuScale Design of Physical Security Systems,” Revision 1 (January 8, 2019), describe the physical security systems, hardware, and features (hereafter referred to as PSS) that are within the scope of the NuScale power plant design. The DCA Part 2 establishes a design standard for PSS that will provide detection, assessment, communication, delay, and response functions to protect against malevolent acts up to and including the design-basis threat (DBT) for radiological sabotage.

The NuScale design, along with the site-specific design of a physical protection system, physical protection programs, management systems, and organization that are described by a COL applicant, must demonstrate how a COL applicant will meet the performance and prescriptive requirements of 10 CFR Part 73, “Physical Protection of Plants and Materials.” The NuScale design provides the design descriptions for engineered PSS and credited design features (e.g., structural walls, floors, and ceilings and configurations of the nuclear island and structures); descriptions of intended security functions and performance requirements; design bases for the detailed design; and supporting technical bases that a COL applicant will incorporate by reference as part of its design and licensing bases.

The COL applicant that references the certified NuScale design will address the PSS designs that are not included in the scope of the NuScale design. DCA Part 2, Tier 2, Section 13.6, “Security,” includes COL Items 13.6-1 through 13.6-4, which address the establishment of a physical security program for operations, site-specific PSS designs, and site-specific security Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). These COL items direct a COL applicant that references the certified NuScale design to establish operational programs and to provide security plans, address requirements involving central alarm system consistent with TR-0416-48929, to provide a secondary alarm station, and ITAAC for site-specific physical security structures, systems, and components. COL Items 13.6-5 and 13.6-6 direct a COL applicant to develop an access authorization program and a cybersecurity program, respectively. In some cases, the programs may be implemented in phases, where practical, and the COL applicant is to include the phased implementation milestones. COL Item 14.3-2 directs a COL applicant to provide the site-specific physical security ITAAC and verification requirements.

13.6.2 Summary of Application

The sections cited below of DCA Part 2, Tier 1 and Tier 2, and the referenced TR contain the applicant descriptions of PSS and physical security ITAAC for the NuScale design and describe how they meet regulatory requirements.

DCA Part 2, Tier 1: DCA Part 2, Tier 1, Section 3.0, “Shared Structures, Systems and Components and Non-Structures, Systems, and Components Design Descriptions and Inspections, Tests, Analyses, and Acceptance Criteria,” includes design descriptions and ITAAC for portions of the plant that are common or shared by multiple modules for the NuScale power

plant. Tier 1, Section 3.16.1, “Design Description,” describes the NuScale design commitments for PSS that provide capabilities for detection, assessment, and delay functions for protecting threats up to and including the DBT for radiological sabotage and provide defense in depth through the integration of systems, technologies, and equipment. DCA Part 2, Tier 1, Section 3.16.2, Table 3.16-1, “Physical Security System Inspections, Tests, Analyses, and Acceptance Criteria,” establishes design commitments and ITAAC to verify PSS that are within the scope of the NuScale design. The staff’s review of these ITAAC is documented in Section 14.3 of this SER.

DCA Part 2, Tier 2: DCA Part 2, Tier 2, Section 1.2, “General Plant Description,” through Section 1.9, “Conformance with Regulatory Criteria,” describe the scope of the NuScale design. DCA Part 2, Tier 2, Section 1.8, “Interface with Certified Design,” addresses the interface requirements between the NuScale certified design and site-specific design. DCA Part 2, Tier 2, Figure 1.2-2, “NuScale Function Boundaries,” provides a figure depicting the general boundaries of structures or components between the certified design and site-specific design. DCA Part 2, Tier 2, Section 1.8.1, “Combined License Information Items,” identifies information that must be provided in order to license and operate a site-specific NuScale power plant but is not included in the certified design. DCA Part 2, Tier 2, Table 1.8-2, lists the descriptions of COL information items that are addressed by the COL applicant. The table includes COL Items 13.6-1 through 13.7-2 that address physical security.

DCA Part 2, Tier 2, Section 13.6, provides design descriptions of PSS for the capabilities to detect, assess, impede, and delay threats up to and including the DBT and to provide for defense in depth through the integration of systems, technologies, and equipment. TR-0416-48929 (Reference 13.6-1), which is incorporated by reference, describes the designs of PSS within the nuclear island and structures.

The applicant describes conformance with the NRC regulatory guides in DCA Part 2, Tier 2, Section 1.9. DCA Part 2, Tier 2, Tables 1.9.1-1 through 1.9.1-4 identify conformance to regulatory guides, standard review plans, design-specific review standards, and interim staff guidance. DCA Part 2, Tier 2, Table 1.9-2, “Conformance with Regulatory Guides,” identifies the applicant’s conformance with Division 5, “Materials and Plant Protection,” regulatory guides that apply to security and lists guidance that includes RG 5.7, “Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas”; RG 5.65, “Vital Area Access Controls, Protection of Physical Security Equipment, and Key and Lock Controls”; and RG 5.79, “Protection of Safeguards Information,” for elements of the site-specific physical security program that the COL applicant will address and that do not apply to design certification. DCA Part 2, Tier 2, Table 1.9-3, “Conformance with NUREG-0800, Standard Review Plan (SRP) and Design Specific Review Standard,” specifically describes the applicability of standard review plans to the NuScale design.

Technical Specifications: There are no TS established for PSS or operations.

Technical Reports: By letter dated January 8, 2019, the applicant submitted to the NRC TR-0416-48929, Revision 1, which describes the security considerations in the NuScale design. TR-0416-48929 describes the design bases for the PSS designs, including plant layout and building configurations, results of evaluations, and identified vital equipment and areas for the NuScale design. The scope of the PSS described in the NuScale design is limited to the PSS related to the nuclear islands and structures that are within the scope of the NuScale design. TR-0416-48929 contains Safeguards Information (SGI), security-related information, and proprietary information; therefore, it is protected in accordance with 10 CFR 73.21, “Protection

of Safeguards Information: Performance requirements," and 10 CFR 2.390, "Public inspections, exemptions, requests for withholding."

Section 4.1, "Design Element No. 1," through Section 4.24, "Design Element No. 24," of TR-0416-48929, provide design descriptions and system performances that support the DCA Part 2, Tier 1 physical security ITAAC. The descriptions correlate to each of the physical security hardware ITAAC in SRP Section 14.3.12 and DCA Part 2, Tier 1, Section 3.16.2.

The TR-0416-48929 identifies PSS that are not within the scope of the NuScale standard plant (e.g., the protected area (PA) barrier systems, unattended openings, isolation zones, vehicle barrier systems (VBSs), PA security lighting, perimeter defensive fighting positions, personnel and vehicle access control portals, PA penetrations). The COL applicant must address the design descriptions of the PSS consistent with COL Item 13.6-1, which directs the applicant to describe site-specific PSS designs (i.e., outside of the scope of the NuScale standard plant) and security plans that indicate how engineered and administrative controls, management systems, and organization will meet the requirements of 10 CFR Part 73 that apply to an operating nuclear power reactor.

13.6.3 Regulatory Basis

Under 10 CFR 52.47, the NRC requires information submitted for a design certification to include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the staff and procurement specifications and construction and installation specifications by an applicant. The provisions in 10 CFR 52.48 require applications that are filed to be reviewed for compliance with the requirements in 10 CFR Part 73. The provisions in 10 CFR 52.47(b)(1) require the application to contain proposed ITAAC that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification; the provisions of the Atomic Energy Act of 1954, as amended; and the Commission's rules and regulations.

The security regulations in 10 CFR Part 73 include performance and prescriptive requirements that, when adequately met and implemented, provide protection against acts of radiological sabotage, prevent the theft or diversion of special nuclear material, and protect SGI.

Under 10 CFR 73.55(b), the NRC requires the COL applicant to describe a physical protection system and security organization whose objective will be to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to public health and safety. A physical protection system (i.e., detection, assessment, communication, and response) with capabilities to detect, assess, interdict, and neutralize shall be designed to protect against the DBT of radiological sabotage.

The regulations in 10 CFR 73.55(b)(2) establish the performance requirements to protect a nuclear power plant against the DBT for radiological sabotage as described in 10 CFR 73.1(a)(1). The COL applicant must describe how it will meet regulatory requirements, including achieving the high-assurance objective for protection against the DBT of radiological sabotage. The provisions in 10 CFR 73.54, "Protection of digital computer and communication systems and networks"; 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage"; 10 CFR 73.56, "Personnel

access authorization requirements for nuclear power plants"; 10 CFR 73.58, "Safety/security interface requirements for nuclear power reactors"; and Appendix B, "General Criteria for Security Personnel," and Appendix C, "Licensee Safeguards Contingency Plans," to 10 CFR Part 73 establish performance and prescriptive requirements that are applicable to PSS designs, operational security, management processes, and programs.

The applicable requirements for design certification are limited to PSS within the scope of the NuScale design. According to 10 CFR 52.79, the COL applicant addresses the operational or administrative controls, programs, procedures and processes (e.g., management systems or controls), but these areas are not in the scope for certification of the NuScale design.

An applicant may apply the latest revision of the following regulatory guidance documents and accepted industry codes, standards, or guidance to meet regulatory requirements:

- RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Revision 0, issued June 2007.

- NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP). In particular, SRP Section 13.6.2, "Physical Security—Review of Physical Security System Designs—Standard Design Certification and Operating Reactor Licensing Applications," Revision 2, issued June 2015, and SRP Section 14.3.12, "Physical Security Hardware—Inspections, Tests, Analyses, and Acceptance Criteria," Revision 1, issued May 2010, are relevant to this review.

The NRC guidance, approaches, and examples described above and in other guidance for methods of compliance are not regulatory requirements and are not intended to be all-inclusive. The applicant may use methods or approaches for implementing NRC regulations other than those discussed in agency guidance as long as such measures satisfy the relevant and applicable NRC regulatory requirements.

13.6.4 Technical Evaluation

The staff reviewed the design descriptions of PSS within the scope of the NuScale design certification application to determine whether they satisfy the requirements of 10 CFR Part 73 that apply to a nuclear power reactor. For the PSS that have been incorporated in the scope of the design certification application, the staff's review consists of determining whether the applicant has provided adequate and reasonable descriptions of design and technical bases and has reasonably described how the proposed design will achieve the intended security functions. The staff's review does not include the security programs or integrations of engineered systems with administrative controls and management measures and organization to determine whether they would provide high assurance of adequate protection and a finding of an adequate physical security program, as specified in 10 CFR 73.55(a) through 10 CFR 73.55(r) for a combined license. The NRC staff reviewed the identified COL information items to determine specific actions required for the design of site-specific PSS and the establishment of security programs that COL applicants that reference the certified NuScale design will address.

The staff's review was limited to the adequacy of the design and bases for the PSS that are relied on to perform security detection, assessment, communication, delay, and response functions. The COL applicant that is seeking a COL for a nuclear power plant must

demonstrate high assurance of adequate protection against the DBT and compliance with the programmatic requirements of 10 CFR Part 73 (including administrative controls such as people and procedures). The NRC will not make a regulatory determination on the adequacy of planned programmatic or administrative controls for meeting 10 CFR Part 73 during a design certification review. Such a determination will be reserved for the review of a combined license application.

The staff's review includes the following:

- the applicant's response to RAI 8902, dated October 10, 2017 (ADAMS Accession No. ML17283A273);

- the applicant's response to RAI 8998, dated December 8, 2017 (ADAMS Accession No. ML17345A513); and

- TR-0416-48929, NuScale Design of Physical Security Systems," Revision 1 submitted by letter to the NRC on January 8, 2019. TR-0416-48929 is incorporated by reference in Tier 2, Section 13.6.

The staff conducted a licensing audit for the design of PSS described for the NuScale design on December 5 – 6, 2017, at the NuScale Power Corvallis Office at Corvallis, OR. The audit plan is available at ADAMS Accession No. ML17318A512. The audit report in available at ADAMS Accession No. ML18031A454. Enclosure 3 of the audit report contains a list of documents made available to the NRC staff during the audit. These documents encompass engineering calculations, assessments, analyses, reports, and drawings supporting the design of the PSS and the results and conclusions in TR-0416-48929.

13.6.4.1 Design Considerations for Physical Security

In DCA Part 2, Tier 2, Section 13.6, and TR-0416-48929, the applicant described how engineered PSS, including their configurations, are designed for performing security functions to detect, assess, communicate, and delay malevolent acts and to respond to such acts.

The TR-0416-48929 describes the design and performance of systems and configurations of the security design features identified in DCA Part 2, Tier 1, Section 3.16.2. The TR-0416-48929 descriptions of the PSS design conform to SRP Section 13.6.2, Revision 2, which was in effect when the NuScale DCA was docketed. Conforming to guidance, the applicant's design descriptions address design elements identified in SRP Section 13.6.2, Table 13.6.2.1, "Design of Physical Security Systems within the Nuclear Island and Structures," and the applicant considered additional PSS identified in Table 13.6.2.2, "Designs of Physical Security Systems for Plant Area Beyond the Nuclear Island and Structures," which may be included within the scope of the design certification or reserved for the COL applicant that references the certified NuScale Power Plant design. Section 7, "Figures," of TR-0416-48929 provides the plant layout diagram that identifies SSCs and design configurations of PSS that are within the scope of the design certification application.

TR-0416-48929 states that "the NuScale Power Plant nuclear island and structures physical security design provides features to detect, assess, impede, and delay threats up to and including the design basis threat for radiological sabotage in compliance with the requirements of 10 CFR 73.55."

TR-0416-48929 supplements the information in DCA Part 2, Tier 2 with design and related information, results of evaluations or analyses, and design and performance requirements. The applicant's descriptions of security design elements and concepts (e.g., engineered systems, technologies, and equipment) address the following for the nuclear island and structures within the scope of the NuScale design:

- the design of PSS for interior detection, assessment, access control, and security response;
- physical barriers (e.g., control (or denial) of access, interior security response, deterrence and delay, securing and monitoring of openings, bullet-resistance, protection of vital equipment);
- vital equipment, vital areas, and intrusion detection and control of access systems;
- minimum safe standoff distances (MSSDs);
- interior detection and assessment systems;
- central (security) alarm station;
- illuminations; and
- communications.

The staff concludes that, consistent with SRP Section 13.6.2, the applicant has adequately considered physical security in the NuScale design by including design information on PSS within the nuclear island and structures to address security functions that meet the applicable requirements of 10 CFR 73.55. A detailed explanation of how the PSS specifically meet the applicable requirements is given below in Subsections 13.6.4.2 to 13.6.4.4 of this report.

TR-0416-48929, Table 5-1, "COL Applicant Responsibilities," states that "the COL applicant will be responsible for addressing design elements involving site-specific conditions unable to be addressed in NuScale's SMR [small modular reactor] standard plant design (e.g., programs, personnel, plans, and procedures) and design elements exempted in accordance with Criterion 3(a) or 3(b) [described in SRP Section 13.6.2]. A COL applicant that references the NuScale certified design will be responsible for the items listed in Table 5-1 below." The items identify information that the COL applicant provides to satisfy COL Item 13.6-1. Table 5-1 includes the COL applicant's responsibilities for providing design details that address PSS outside the scope of the NuScale design and program descriptions and security plans in accordance with the requirements in 10 CFR Part 73. A COL application that addresses COL Item 13.6-1 would include site-specific PSS design details such as the following:

- location and design details for the secondary alarm station;
- physical security barriers outside the nuclear island and structures;
- isolation zones, PA, and associated intrusion assessment systems;

- VBS;
- exterior personnel, vehicle, and material access control portals;
- secondary alarm station and main security building;
- secondary power supply for the communication system;
- secondary security power system;
- bounding MSSD, alarm station survivability, and protection against vehicle bombs;
- alarm station functions and redundant capabilities;
- detection and assessment functions;
- illumination of isolation zone and PA;
- secondary alarm station communications; and
- uninterruptable power system and in-line generators or other sources of backup power.

Table 13.6-1 of this report lists the COL items for physical security.

The staff concludes that the applicant adequately established the COL applicant's responsibilities for providing the design of PSS that are not located within or integral to the construction of the nuclear island and structures and providing security programs that are outside of the scope of the NuScale design.

13.6.4.2 Security Evaluations and Analyses

Vital Equipment Identification Process

TR-0416-48929, Section 4.8, "Vital Areas and Equipment (Element 8)," lists vital equipment for the NuScale standard power plant. The applicant indicated that a multidisciplinary team identified the vital equipment. The applicant evaluated reactor design and safety analysis information in the NuScale DCA and supporting analyses and documentation that served as the source for the identification process. The applicant indicated that identification of the vital equipment was based on the definition of vital equipment in 10 CFR 73.2, "Definitions." In TR-0416-48929, Section 4.8, the applicant states the following about identifying vital equipment:

> *An interdisciplinary design team evaluated SSC for vital equipment designation. The team included members from Physical Security, Plant Operations, Electrical Engineering, I&C Engineering, Civil/Structural Engineer, Nuclear Safety Engineering, and Probabilistic Risk Assessment Engineering. Using the 10 CFR 73.2 definition for vital equipment, the team evaluated systems and components for potential inclusion as vital equipment.*

The applicant applied the definition of vital equipment in 10 CFR 73.2, which states that "vital equipment means any equipment, systems, devices, or material, that failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect public health and safety following such a failure, destruction, or release are considered to be vital.

In its response to RAI 8998, Question 13.06.02-11 (ADAMS Accession No. ML17345A513), dated December 8, 2017, the applicant provided the following additional information on its evaluation of the NuScale standard power plant and the control of changes to its design:

- The team used insights from the PRA, the safety analysis, the SSC classification from the design reliability assurance program, and the vital equipment definition from 10 CFR 73.2 as the criteria for identifying vital equipment for the NuScale power plant. The evaluation assumed that all radiation that is released from the loss of vital equipment escapes to the environment.

- The evaluation considered whether the design included sufficient defense in depth to prevent any one SSC from causing a release of radiation significant enough to endanger public health and safety. The designation of an SSC as safety related and risk significant is based on the PRA, safety analysis, and the design reliability assurance program.

- The information on the initiating event analysis, accident sequence analysis, system analysis, and human reliability analysis described in DCA Part 2 Tier 2, Chapter 19, "Probabilistic Risk Assessment and Severe Accident Evaluation," was used to support the identification of vital equipment. Failure modes postulated in the PRA, along with internal fire and flood analyses addressed in DCA Part 2 Tier 2, Section 3.4, "Water Level (Flood) Design," and Appendix 9A, "Fire Hazard Analysis," were also considered.

- In identifying vital equipment, the evaluation also considered piping external to the modules and their safety-related and risk significance, loss of power or signals (cable controlling safety-related components) and systems failures to safe configurations, all components required to achieve safe shutdown, and the single-failure criterion and failure of multiple redundant components.

- NuScale uses an engineering change control program to maintain design configuration control and alignment with the licensing design basis. When a design engineer initiates a design change, an interdisciplinary panel of NuScale management reviews the proposed change to assess the potential impact on other areas of the design, including the current licensing basis.

The staff made the following findings:

- In TR-0416-48929, Section 4.8, the applicant established a reasonable process and applied reasonable criteria and assumptions for identifying a complete and accurate list of vital equipment for the NuScale standard power plant based on the definition of vital equipment in 10 CFR 73.2.

- The applicant applied, and relied on, information from the design and safety analyses for the NuScale design to identify an accurate and complete list of vital equipment.

Vital Equipment List

The applicant provided a list of vital equipment for the NuScale design in TR-0416-48929, Section 4.8.2, that meets the definition of 10 CFR 73.2 as vital. The details of the NuScale power plant SSCs (e.g., frontline systems and supporting systems) that make up the vital equipment for the NuScale design are identified as SGI; therefore, they are protected in accordance with 10 CFR 73.21 and withheld from the public in accordance with provisions of 10 CFR 2.390. In its review of the applicant's vital equipment list, the staff did not identify cases where the applicant excluded frontline systems/functions or primary supporting systems that meet the definition of vital equipment.

The staff made the following findings:

- The applicant has identified and provided lists of vital equipment for the NuScale design based on the definition of vital equipment in 10 CFR 73.2. TR-0416-48929 provides the detailed list of vital equipment.

- The applicant's list of vital equipment for the NuScale design is sufficiently complete and accurate to meet the definition of vital equipment in 10 CFR 73.2.

Vital Areas

The requirements in 10 CFR 73.55(e)(9)(i) state that "[v]ital equipment must be located only within vital areas, which must be located within a protected area so that access to vital equipment requires passage through at least two physical barriers, except as otherwise approved by the Commission and identified in the security plans." The applicant established vital areas within the scope of the NuScale standard plant based on the safety-related systems and components identified on the vital equipment list and other areas required by 10 CFR 73.55(e)(9) to designate the MCR, CAS, spent fuel pool, and secondary power supply as vital areas. TR-0416-48929, Section 4.10, "Design Element No. 10," addresses the specific areas that are designated vital, which are shown in TR-0416-48929, Section 7.

The applicant identified the vital areas that consist of the nuclear island and structures. Given the diverse locations of equipment that are considered vital, the applicant established certain building perimeters that enclose the vital equipment as boundaries of the vital areas. The applicant indicated that the designs and configurations of vital areas restrict access and limit access pathways, which facilitate the implementation of security for unauthorized access. The figures in TR-0416-48929, Section 7.1 through Section 7.9, show the specific boundaries of a structure that form the vital areas within the nuclear island and structures. The figures also show the exterior boundaries of the plant structures that form vital areas. The detailed boundaries of the vital areas are identified as SGI and are protected in accordance with requirements of 10 CFR 73.21. The figures in TR-0416-48929, Section 7, show the specific boundaries of the spent fuel pool that form the vital area.

TR-0416-48929 establishes design requirements for PSS that are standard for the protection of vital areas. TR-0416-48929, Section 3, describes the design of the NuScale power plant, which incorporates fewer, simpler, and passive SSCs that reduce reliance on operator actions and

electrical power and provide an additional source of coolant for the safety of reactor operations (e.g., based on the analysis of design-basis accidents). TR-0416-48929, Section 4, "Design Element Responses," describes the designs of PSS for the vital area portal detection system, interior assessment and monitoring, the vital area access control system, and the alarm system associated with the protection of the vital areas. Specifically, TR-0416-48929, Section 4.1; Section 4.2, "Design Element No. 2"; and Section 4.9, "Design Element No. 9," describe the design requirements for systems and components that provide access control, locking, and intrusion detection; assessment; communications; and emergency egress for the vital areas. The design descriptions include the system interfaces with security alarm stations necessary for the redundant intrusion detection alarm indications and assessment of alarms and physical barriers to address unauthorized access. TR-0416-48929, Section 4.6, "Design Element No. 6," addresses the design of security systems for securing, monitoring, detecting intrusion, and controlling access of vital area barrier system openings.

TR-0416-48929, Section 3, describes the design of system logic sequences for initiating alarm conditions and the supervision and monitoring of alarm signal integrity and system normal and trouble conditions, such as tampering, loss of or degraded signals, or a short in the system signal circuits for detecting the loss of system functions or abnormal system functions, as discussed under the alarm station design and in TR-0416-48929, Section 4.16, "Design Element No. 16."

The design descriptions specify the minimum duration and establish the configurations of secondary power supply designed for the continuity of security functions. The applicant also established design requirements for interfaces between the access control system and locking devices in the event of a loss of both primary and secondary power and identified the design requirements for protecting control and power wiring against physical tampering. Figure 25, "Security Power One Line Diagram," in TR-0416-48929, and Figure 26, "Simplified Security System Interconnection Diagram," in TR-0416-48929, Section 7.26, show the configurations for the design of the primary and secondary power supply for performing security functions, vital entry controls, and alarms with intrusion detection systems that annunciate at alarm stations to comply with regulatory requirements. The vital area physical boundaries are spatially separated from the PA boundary. TR-0416-48929, Section 7, provides the vital area boundaries.

The staff made the following findings:

- The applicant identified and designated vital areas to include vital equipment listed in TR-0416-48929, Section 4.8, and established that no vital equipment within the scope of the NuScale design is located outside of areas designated as vital. TR-0416-48929 documents the results of the applicant's evaluation and identification of vital equipment and vital areas for the NuScale design. DCA Part 2 Tier 2, Section 13.6, incorporates TR-0416-48929 by reference.

- The applicant has adequately described the design bases for physical barriers for the nuclear island and structures that have been designated as vital areas to address one of two barriers in accordance with 10 CFR 73.55(e)(9)(i), which requires that access to vital equipment must have passage through at least two physical barriers. The other barrier is the PA barrier, which is not within the scope of the NuScale design certification application and would be addressed by a COL applicant referencing the NuScale design, as discussed in TR-0416-48929.

- The applicant has adequately described the design of physical barriers to control access to the vital areas within the scope of the design certification application and satisfied the requirements of 10 CFR 73.55(e)(1). The design provided the control and delay of access necessary to facilitate the implementation of security responses.

- The applicant has identified the areas designated as vital for the NuScale standard design in TR-0416-48929. The NuScale design vital areas consist of nuclear island and structures. The applicant adequately addressed the requirements of 10 CFR 73.55(e)(9)(v) by designating vital areas that enclose identified vital equipment and the MCR, CAS, and spent fuel pool.

Security Computer Design Requirements

TR-0416-48929 provides systems functional diagrams showing the design interfaces of security computer systems with subsystems for performing redundant intrusion detection and assessment, access controls, and the interfaces between alarm stations. The design diagram addressing the capabilities of the systems for data communication and interfaces with subsystems and components is shown in TR-0416-48929 Figure 25, Simplified Security System Interconnection Diagram.

The security computer systems support the plant security functions by continuous access control, monitoring of doors, and the prompt reporting and permanent recording of all alarm points and system conditions (e.g., intrusions, tampers, and trouble conditions). The security computers are located within vital areas, and access is controlled. TR-0416-48929, Figure 26, shows the redundant security computers, which are spatially separated and independently powered by diverse security power subsystems; each one is independently capable of providing the required security functions. The security computer systems network is isolated and does not connect to any other plant system, computer, or data network. The CAS workstation and monitors are used to display the area of the originating alarm.

The security computer systems will be capable of data communications using the dedicated network. The computers, graphic displays, closed-circuit television system (CCTV) servers, and digital video recording systems are connected to the network. The network configuration allows communication between devices to provide information to the alarm station operators. TR-0416-48929, Figure 26, shows the functional diagram for the design of the security computer systems network. The figure shows how the network will be configured and how the backbone and infrastructure will accommodate the security devices. The remote field devices, such as intrusion detectors, CCTV, door card readers, and security alarming devices, are connected to the network and will be supplied by the COL applicant to complete the total integrated security systems. The security circuits are supervised and tamper indicating for indication of system conditions and operability.

The computer systems that process the inputs from remote field components to generate alarm indications from the intrusion detection system are on a dedicated network that is redundant and independent from other network systems. TR-0416-48929, Section 7, Figure 26, requires the designs for the systems to be independent and redundant of each other such that input from field devices and components is transmitted to allow both alarm stations to receive, process, and display the same information. The configuration provides continuity of security functions if either system has a malfunction.

The computer systems are also designed such that an alarm station operator cannot change the status of a detection point or deactivate a locking control device at a PA or vital area portal without the knowledge and concurrence of the alarm station operator in the other alarm station. All wiring that connects the computer systems with remote access control components (e.g., card readers, controllers) and with other security subsystems (e.g., perimeter intrusion detection) is configured as electronically supervised circuits. The primary and secondary cables between the alarm stations and controllers are separated to prevent simultaneous damage caused by a sabotage attempt or any unintended actions.

The security computer systems also interface with the CCTV. The functions of the CCTV system include operating cameras that provide visual monitoring of the area with an alarm in the event that the intrusion detection system actuates and that allow assessment of the area with an alarm.

Personnel access for the NuScale plant is controlled by a computer-based automatic access control system. The computer for the access control system will also interface with security subsystems, such as intrusion detection and CCTV images. The access control system permits entry only to those persons authorized to enter specific areas at the access point into the PA, buildings, and vital areas. Access point activities (including open or close door status, alarm indications, and attempts at unauthorized entry) are recorded. The system provides for automatic switchover to uninterrupted power supply and secondary power in the event that primary power is interrupted for continuity of access control functions.

In TR-0416-48929, Section 4.2, the applicant indicated that the COL applicant is responsible for providing vendor-specific design descriptions for the assessment system. The applicant indicated that the cameras and locations depicted in the figures in Section 7 are recommendations to a COL applicant to support the use of assessment technology for performing security functions, which would consider the plant lighting system for illumination to address the site-specific conditions in accordance with 10 CFR 73.55(b)(4).

The COL applicant that references the certified NuScale design must establish and describe how it will meet the requirements of 10 CFR 73.54. RG 5.71, “Cyber Security Programs for Nuclear Facilities,” provides acceptable methods and approaches for developing and establishing a cybersecurity program and submitting a cybersecurity plan to satisfy the requirement of 10 CFR 52.79(a)(36)(iii). The need for this information is addressed by COL Information Item 13.6-03 and TR-0416-48929, Table 5-1.

The staff made the following findings:

- The applicant adequately described the design of independent and redundant security computer systems and interfaces that support redundancy for the alarm station security functions of intrusion detection, assessment, and access control

- The COL applicant that references the NuScale certified design is responsible for meeting the requirements of 10 CFR 73.54 for a cybersecurity program that protects digital computers and communication systems and networks.

- The determination and finding on whether the applicant has met the requirements of 10 CFR 73.54 for a cybersecurity program are beyond the scope of the design

certification application. The NRC will evaluate compliance with the regulatory requirements for an adequate cybersecurity program as part of the review of a COL or an operating license application.

13.6.4.3 Design for Physical Barriers

Vital Area and Security Delay Barriers

Figure 1.2-1, “Conceptual Site Layout,” and Figure 1.2-2, “NuScale Functional Boundaries,” in DCA Part 2 Tier 1, Section 1.2.1, “Principle Site Characteristics,” show the separation from a PA boundary that a COL applicant will establish to comply with the requirements of 10 CFR 73.55(e)(8). The physical barriers for the PA perimeter and the vital area barriers and access controls delay an unauthorized person’s access to a vital area and allow security responders to interdict the unauthorized person before he or she can reach a vital area boundary and delay his or her access into a vital area. Figure 7, “Reactor Building Vital Areas 100'-0",” and Figure 10, “Control Building Vital Area 76'-6" and 100'-0",” in TR-0416-48929 show the vital area boundaries as distinct from a PA physical barrier.

The applicant described the design of the PSS provided to protect the access to vital areas. Specifically, TR-0416-48929 describes the design requirements for the protection of unoccupied vital areas, establishment of vital area physical barriers and separation from the PA, protection of penetrations through vital area physical barriers, minimization of entry points, hardening of vital area portal egress, control of access to vital areas, and detection and assessment of unauthorized access or intrusion for security response.

TR-0416-48929 describes the design and construction of vital area barriers, the vital area access control system, and alarm station design (bullet resistant) in Section 3. The configurations of the configurations of vital area boundaries are described in Sections 4.2, 4.3, 4.6, 4.7,4.14 and Section 7 (Figures 1–10). The descriptions of the minimum construction design requirements for walls, floors, and ceilings to establish physical barriers that enclose the designated vital areas, the MCR and the CAS to satisfy bullet-resisting requirements are described in Sections 4.1–4.4; Sections 4.7 and 4.9; and Sections 7.21, 7.23, and 7.24 (Figures 23 and 24). In addition, the descriptions for the design and construction requirements for the vital area barriers include the boundaries that enclose the spent fuel pool, as required by 10 CFR 73.55(e)(9). TR-0416-48929, Section 4.10, describes the identification of the walls, floor, and roof that form the boundaries enclosing the spent fuel pool, which is designated as vital in accordance with 10 CFR 75.55(e)(9)(v) and (9)(vi).

In TR-0416-48929, Section 3, Item 14, the applicant described physical barriers within the RXB or CRB to delay the DBT adversary. The applicant identified preliminary locations for such barriers in TR-0416-48929, Section 4.4, and drawings (Figure 27, “Simplified Drawing of HVAC Barrier,” and Figure 28, “Simplified Drawing of Mall Gate”) on a recommended typical design of a physical barrier. The applicant indicated that final delay credited for physical barriers, including access and exit barriers, will be the COL applicant’s responsibility. The COL applicant’s protective strategy must account for site-specific conditions, in accordance with 10 CFR 73.55(b)(4), for the design of a physical protection system that protects against the DBT for radiological sabotage.

TR-0416-48929, Section 4.7, describes the minimum design requirements of the walls, floor, and ceiling needed for meeting the function of bullet-resisting barriers. The design descriptions include the requirement for doors to meet Underwriters Laboratories (UL) 752, “Standard for

Bullet-Resisting Equipment," which is an acceptable standard for meeting NRC requirements as discussed in SRP Section 13.6.2. The design requirements include the protection of openings, such as for the HVAC, that penetrates the vital area barriers. TR-0416-48929, Figures 23 and 24, describe the barriers for protecting the CAS alarm station and typical protection for HVAC penetrations through the vital area barriers. The design for HVAC penetration openings requires the installation of barriers that allow airflow but do not allow the passage of a person. The physical barriers installed for HVAC penetrations are to restrict access and provide a security delay against forced entry.

TR-0416-48929, Sections 3.0, 4.2, 4.3., 4.4, 4.5, 4.6, 4.8, 4.9, 4.13, 4.14, 4.19, and 4.21, provide additional design descriptions for the protection of penetrations through the vital area physical barriers. Engineered systems or features that provide delay, denial, control, detection, and monitoring functions for unauthorized access must protect all openings that exceed a standard opening that is too small for the passage of an individual. TR-0416-48929, Section 7, shows the typical configuration of a vital area door with locking and alarming capabilities. TR-0416-48929, Figures 21, 23, and 24, show the locations for installations of bullet-resistant doors. The penetrations of HVAC ducts, cable trays, ventilation fans, and other such features are protected to ensure that the integrity of the vital area barrier is not decreased and that the penetrations do not allow for the passage of a person. TR-0416-48929, Section 7.26, Figure 26, shows the design configurations of vital area access controls, locks, and alarms for PSS that are included in the NuScale design.

The applicant indicated that barriers that protect penetrations through the vital area barriers will provide for a delay similar to that afforded by the adjacent portion of the vital area barriers or will otherwise provide the delay needed, and these barriers will comply with the regulatory requirements for a security barrier in 10 CFR 73.2. The security design features include hardened doors that delay forced entry and resist mechanical and explosive breaching to allow for security responses. TR-0416-48929, Figures 5–8, Figure 10, Figures 15–18, and Figures 20–21, show locations and doors that will be designed to delay unauthorized entries into designated vital areas and control access to vital equipment.

TR-0416-48929, Sections 4.6, 4.7, and 4.9, describe the design and construction requirements for delay to forced entry and locking mechanisms to secure vital area portals for ingress and egress. The design includes locking devices that allow for rapid egress during an emergency. UL-listed exit devices or panic and locking hardware accounts for normal and emergency operations and functions in the event of a loss of power. TR-0416-48929 also describes the design for hardened openings.

The system functional diagrams in TR-0416-48929, Figure 26, show the design for the access control system, access control unit, door control, intrusion detection components, and network management systems for vital areas. The design provides redundant systems for access control functions at alarm stations. Similarly, the design details of the intrusion detection and assessment systems show and establish the designed redundancy and separation of systems that provide intrusion detection and assessment functions.

The staff made the following findings:

- The applicant has adequately described the design bases for the physical barriers of the nuclear island and structures that are within the scope of the NuScale design to meet 10 CFR 73.55(e). A COL applicant that references the NuScale design will analyze site-specific conditions and describe the integration and design of additional physical barriers for meeting the requirements of 10 CFR 73.55(e), including sufficient delay to support the required security response time.

- The applicant adequately described the design and performance requirements of physical barriers for the nuclear island and structures that have been designated as vital areas and adequately addressed one of two physical barriers required for access to vital equipment in accordance with 10 CFR 73.55(e)(9)(i).

- The applicant adequately addressed the requirements of 10 CFR 73.55(e)(9)(ii) by providing a design that protects all vital area access points and vital area emergency exits with intrusion detection equipment and locking devices that satisfy the vital area entry control requirements and meet the requirement in 10 CFR 73.55(e)(9)(iii) that unoccupied vital areas must be locked and alarmed.

- The applicant adequately described the design and performance requirements of the PSS for access control. Specifically, the applicant's design addresses the requirements of 10 CFR 73.55(g) as they pertain to access to the nuclear island and structures of the NuScale power plant. The PSS design includes access control systems that meet the requirements of 10 CFR 73.55(g)(1)(i)(A) and (i)(B) at the vital area boundaries for the control of personnel, protection of openings with physical barriers with locking devices to delay access, inclusion of intrusion detection systems to detect unauthorized access, and provision of equipment to assess physical conditions of designated vital areas.

- The applicant adequately described the design and performance of PSS that provide capabilities for surveillance, observations, and monitoring in accordance with the requirements of 10 CFR 73.55(i)(5). The design also addressed the control of unattended openings by providing physical barriers and intrusion detection systems in accordance with 10 CFR 73.55(i)(5)(iii).

- The applicant has adequately considered the applicable requirements in 10 CFR 73.55 for the design of PSS within the scope of the NuScale design certification application to comply with the requirements of 10 CFR Part 52 for design certification. The staff concluded that the applicant has designated vital area boundaries, as indicated in TR-0416-48929, and established that vital equipment identified for the NuScale design will be located within vital areas in accordance with the requirements of 10 CFR 73.55(e)(9)(i).

- The applicant has adequately met the prescriptive requirements in the 10 CFR 73.2 definition for "physical barrier" by providing the design of PSS or by crediting building structural systems that satisfy the requirement for using brick, cinder block, concrete, steel, or comparable material for the construction of walls, ceilings, and floors. (The openings in such structures are secured by grates, doors, or covers of construction and fastening with sufficient strength such that any opening will not lessen the integrity of the structures.) The staff determined

that the 10 CFR 73.2 prescriptive requirements for physical barriers related to site specific designs for fence construction do not apply to the physical barrier systems described for the nuclear island and structures within the scope of the design certification application. The COL applicant will address and satisfy the requirements for site-specific physical barriers.

Bullet-Resistant Barriers

In TR-0416-48929, the applicant described the minimum construction standards for the walls, floors, and ceilings of the MCR and CAS and exterior and interior boundaries of buildings that have been designated as physical barriers that enclose vital areas. The applicant included design information for protecting openings and penetrations through vital area barriers, as previously discussed in this SER.

In its response to RAI 8998, Question 13.06-02-7b (ADAMS Accession No. ML17345A513), dated December 8, 2018, the applicant indicated that the thickness of reinforced concrete for the bullet-resisting design basis relies on guidance in U.S. Department of Defense (DoD) UFC 4-023-08, "Design to Resist Direct Fire Weapon Effects," issued July 2008, to determine the minimum thickness needed to meet the UL 752 standard and establish a conservative thickness of reinforced concrete. The structural design for walls, floors, and ceilings consists of varying thicknesses of reinforced concrete that exceed the minimum thickness required for structures, walls, and locations of doors needed to meet bullet-resistance requirements. The walls, floors, and ceilings of the CAS are of a thickness beyond that chosen as a baseline minimum required for resisting bullets, and the as-built structure would provide additional design margin in the construction of the physical barriers.

The buildings that house the CAS and designated as a vital area will be constructed and installed with access controls and protection of openings and penetrations to meet vital area and bullet-resistance requirements. The areas that contain the alarm station will also be designated as vital areas and will meet the appropriate vital area requirements. The applicant indicated that the design of the last access control location is outside the scope of the NuScale design and will be specified by the COL applicant, and the COL information will include the construction requirements for bullet-resisting physical barriers.

The applicant indicated that the MCR and CAS walls, floors, ceilings, doors, and windows are designed and will be constructed to meet a minimum bullet resistance to a UL level, as shown in TR-0416-48929, Figures 10, 21, 23, and 24. TR-0416-48929, Section 4.7, provides the design requirements for the construction of doors to provide a minimum UL 752 standard for bullet resistance. The applicant indicated that the walls, floors, and ceilings of the MCR have a minimum thickness of reinforced concrete that is credited to meet the physical protection requirement for a bullet-resistant barrier. The thickness of concrete exceeds the bullet-resistance requirements of the UL 752 standard. Any doors on the MCR boundary will be bullet resisting to the minimum of the UL 752 standard. The windows on doors that lead into the MCR will be bullet resistant.

The staff finds that the applicant has adequately described the design for the MCR and CAS to meet the requirements of 10 CFR 73.55(e)(5). The design provides protection for the MCR and CAS with a bullet-resistant enclosure by crediting structural elements of the NuScale standard power plant and providing hardened doors and engineered barriers for protecting openings and penetrations of the bullet-resistant enclosure. The design of the last access control to the PA is outside the scope of the design certification application.

Vital Area Doors

TR-0416-48929, Section 7, Figures 5–22, establish door schedules for the design and locations of doors with card reader access, lock, and alarm. The figures in TR-0416-48929, Section 7, show the typical vital area access control doors and the design configuration for the installation of intrusion detection, access control, locking, and other design features for securing vital areas. To provide delay and access control, exterior doors have a delay capability equivalent to the delay capability credited for the structure walls. The remaining exterior doors are hardened to provide resistance to penetrations with delay control as stated in TR-0416-48929.

The design descriptions in TR-0416-48929, Section 4.9, address requirements to provide exit devices on vital area egress doors that require emergency egress capability. Section 4.9 describes these devices and their operation. Utility penetrations, such as HVAC ducts and other piping, will be equipped with barriers hardened with construction material that delays unauthorized access.

The staff finds that the applicant's description of the design bases for physical barriers, as detailed in TR-0416-48929, adequately addresses the requirements of 10 CFR 73.55(e)(4) by providing the design of physical barrier systems that secure openings or penetrations into the structural boundaries of the nuclear island and structures.

Vehicle Barrier System

The construction and installation of the VBS are to be addressed by the COL applicant. However, in TR-0416-48929, Section 4.11, "Design Element No. 11," the applicant established and showed the bounding MSSD for protecting the nuclear island and structures, including the CAS, from the maximum DBT vehicle-borne explosive. Table 4-1, "Minimum Standoff Distances," in TR-0416-48929 shows the required MSSDs for the construction and installation of a continuous VBS, along with results for required minimum standard of distance for the CAS and the protection of physical security SSCs and personnel that must be met for a bounding MSSD.

TR-0416-48929, Section 4.11, indicates that the VBS must be located at least the bounding MSSD from the nearest external surface of any vital areas. The distance required is based on methods or approaches referenced in NUREG/CR-6190, "Protection against Malevolent Use of Vehicles at Nuclear Power Plants," dated March 27, 2003. The applicant applied DoD methods and guidance for predicting blast effects and structural responses to assess and evaluate the various distances that would be safe for SSCs for the safety of nuclear plant operations and personnel. They included DoD Uniform Facility Code (UFC) 3-040-01, "Design and Analysis of Hardened Structures to Conventional Weapons Effects"; UFC 3-340-02, "Structures to Resist the Effect of Accidental Explosion"; and U.S. Army Corps of Engineers Protective Design Center TR-06-08, "Single Degree Freedom Structural Response Limits for Antiterrorism Design, Department of Defense Single Degree of Freedom Blast Design Spreadsheet (SBEDS), BlastX—Fast Running Model for Airblast Prediction Involving Internal and External Detonations, In Structure Shock (ISS) 3D, and LS-Dyna Finite Element Analysis Software."

The staff conducted a licensing audit for the design of PSS described for the NuScale design on December 5–6, 2017. During the audit, the staff examined the assessment and engineering calculations supporting the results and conclusions in TR-0416-48929, Section 4.11. The staff concluded that the overall determinations of required MSSDs for the structures within the scope

of the NuScale design were based on accepted methods, software, or guidance and that the results are reasonable. The staff noted that some of the MSSDs in TR-0416-48929, Revision 0, differed from the values in the supporting calculations; these discrepancies were corrected in Revision 1 of TR-0416-48929. Enclosure 1 to the NRC memorandum dated February 16, 2018 (ADAMS Accession No. ML18031A454), documents the results of the staff's audit.

In TR-0416-48929, Table 4-1, the applicant provided the minimum standoff distances analyzed for the RXB to protect against the DBT vehicle borne explosive. The applicant's analysis did not include the determination of minimum stand-off distances for the secondary alarm station, personnel in open or in nonhardened enclosures, and blast- and bullet-resistance enclosures, which are not included in the scope of the NuScale design certification application.

In TR-0416-48929, Section 6, "References," the applicant identified engineering calculations, analyses, assessments, or other references that provide the design and technical basis for the summary descriptions of designs, design bases, results, and conclusions presented in TR-0416-48929.

The staff finds that the applicant has adequately assessed and documented the required MSSDs for the NuScale nuclear island and structures based on a maximum quantity of explosives associated with the adversarial characteristics of the DBT. The applicant adequately established the design basis for a location of the VBS that would be sufficient to protect safety-related SSCs or loss of spent fuel pool cooling against the DBT vehicle borne explosive threats.

13.6.4.4 Design Features Facilitating Security Response

The applicant did not include the design of PSS that facilitate security, such as hardened defensive fighting positions, in the scope of the NuScale design. Other than the PSS described above, the design of the fighting positions (e.g., locations, blast and bullet resistance, firing ports, material construction, fully or partially enclosed fighting positions to protect security personnel from attack, blast protection, environmental controls and protection, lighting, communications) and other features (e.g., delay, protection against hand-thrown explosives) for security responses to interdict or neutralize the DBT must be provided by the COL applicant. The COL applicant will address these issues to meet the requirements of 10 CFR Part 73 for combined license.

13.6.5 Combined License Information Items

The staff reviewed the applicant's descriptions of COL information items that a COL applicant is directed to address if referencing the certified NuScale design. The applicant provided the following COL information items in DCA Part 2, Tier 2, Table 1.8-2, and in TR-0416-48929:

Table 13.6-1 NuScale COL Information Items related to Section 13.6

Item No.	Description	DCA Part 2 Tier 2 Section

COL Item 13.6-1	A COL Applicant that references the NuScale Power Plant design certification will provide the following: Security Plans (Physical Security, Security Training and Qualification, and Safeguards Contingency Plans); proposed site security provisions to be implemented during construction and as modules are completed and become operational of a new plant; portions of the physical security system not located within the nuclear island and structures.	13.6
COL Item 13.6-2	A COL Applicant that references the NuScale Power Plant design certification will be responsible for the requirements described in Table 5-1 of TR-0416-48929, Rev 0 NuScale Design of Physical Security Systems.	13.6
COL Item 13.6-3	A COL Applicant that references the NuScale Power Plant design certification will provide a secondary alarm station that is equal and redundant to the central alarm station.	13.6
COL Item 13.6-4	A COL Applicant that references the NuScale Power Plant design certification will provide Inspections, Tests, Analyses, and Acceptance Criteria for site specific physical security SSCs.	13.6
COL Item 13.6-5	A COL Applicant that references the NuScale Power Plant design certification will provide a description of the Access Authorization Program.	13.6
COL Item 13.6-6	A COL Applicant that references the NuScale Power Plant design certification will provide a Cyber Security Plan.	13.6
COL Item 9.5-2	A COL applicant that references the NuScale Power Plant design certification will determine the location for the security power equipment within a vital area in accordance with 10 CFR 73.55(e)(9)(vii)(B).	9.5
COL Item 13.4-1	A COL applicant that references the NuScale Power Plant design certification will provide site-specific information, including implementing schedule, for operations program: • Security (refer to Section 13.6)	13.4
COL Item 13.5-3	A COL applicant that references the NuScale Power Plant design certification will describe the site-specific maintenance and other operating procedures, including how these procedures are classified, and the general format and content of the different classifications. The categories of procedures listed below should be included: • Plant security procedures	13.5
COL Item 13.7-1	A COL applicant that references the NuScale Power Plant design certification will provide a description of the applicant's 10 CFR 26 compliant fitness-for-duty (FFD) program for operations.	13.7
COL Item 13.7-2	A COL applicant that references the NuScale Power Plant design certification will provide a description of the applicant's 10 CFR 26 compliant fitness-for-duty (FFD) program for construction.	13.7

TR-0416-48929, Section 5, “Summary and Conclusions,” states that the COL applicant will be responsible for addressing site-specific conditions (e.g., programs, personnel, plans, and procedures) and design element details that are not addressed in the NuScale design, based on the guidance of SRP Section 13.6.2 (i.e., Criterion 3(A) and 3(B)).

TR-0416-48929, Table 5-1, identifies the following site-specific details for the design and configuration of the PSS that the COL applicant that references the certified NuScale power plant design will address as COL information:

- Provide the location and design details for the secondary alarm station.
- Provide design details for physical barriers located outside the nuclear island and structures.
- Provide design details for isolation zones, associated intrusion detection monitoring equipment, and areas of the PA perimeter without isolation zones.
- Provide vehicle barrier design details.
- Provide design details for the exterior personnel, vehicles, and material access control portals.
- Provide design details for the secondary alarm station and the main security building.
- Provide design details for, and placement of, the communication system secondary power supply.
- Provide design details for, and placement of, the secondary security power supply.
- Ensure that the site-specific characteristics are bounded by the NuScale-calculated minimum standoff distances and ensure the survivability of the security alarm station.
- Ensure that the site-specific physical security design is bounded by the NuScale blast analysis.
- Ensure that the CAS and secondary alarm station are designed and equipped in accordance with the DBT of radiological sabotage such that no single act can simultaneously remove the ability of both alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.
- Design the secondary alarm station such that the CAS and the secondary alarm station are functionally redundant.
- Ensure that the alarm system design does not allow a change in the status of a detection point, locking mechanism, or access control device without the

knowledge and concurrence of the alarm station operator in the other alarm station.

- Provide design details for specific security illumination for the isolation zone and accessible external PAs.

- Provide design details for the communication equipment in the secondary alarm station.

- Describe the independent security power sources that consist of fully charged uninterrupted power supply batteries, in-line generators, or other power sources.

TR-0416-48929, Table 5-1, also identifies the following commitments related to the security operational program that a COL applicant must complete to establish elements of a physical security program:

- Establish, maintain, and implement a standalone insider mitigation program.

- Establish, maintain, and implement a site-specific cybersecurity plan.

- Establish and implement an access authorization system/program with a numbered photograph identification badge system for controlling access to PAs and vital areas.

- Develop and implement a comprehensive site-specific physical security program description for PSS.

- Test intrusion detection and assessment equipment to ensure that the requirements of 10 CFR 73.55(i)(3)(i) through 10 CFR 73.55(i)(3)(v) are met before declaring that the systems are operable.

- Test intrusion detection systems to ensure the recordkeeping capability meets the requirements of 10 CFR 73.55(i)(4)(ii)(h) and 10 CFR 73.70(f) before declaring that the intrusion recording system is operable.

- Select the appropriate vendor's alarm station design.

The staff finds the COL information items listed in Table 13.6-1 to be complete. In addition to information already captured in DCA Part 2, Tier 2, the COL application must provide information showing compliance with applicable requirements (i.e., for a security plan, access authorization program, and cybersecurity plan) including addressing the COL information items described above.

13.6.6 Conclusion

The staff concludes that the applicant has considered and provided design information for PSS within the scope of the design certification application to facilitate the implementation of a physical protection program to protect against potential acts of radiological sabotage. Within the scope of the design, the design information provided satisfies the applicable parts of 10 CFR

73.55. Also, the staff concludes that the applicant has adequately identified the responsibilities of the COL applicant with respect to physical security.

13.7 Fitness for Duty

Part 26 of 10 CFR, “Fitness for Duty Programs,” prescribes requirements and standards for the establishment, implementation, and maintenance of fitness-for-duty (FFD) programs (73 FR 17176, March 31, 2008). Section 26.3 of 10 CFR states, in part, that holders of a COL under 10 CFR Part 52 shall implement the FFD program during construction and operation. Whether the COL holder is constructing the plant, has received special nuclear material onsite, or is operating the plant will determine the FFD requirements that it must implement. In addition, an applicant for a COL who has been issued a limited work authorization (LWA) under 10 CFR 50.10(e) must implement an FFD program if the LWA authorizes the applicant to install the foundations for safety- and security-related SSCs. Pursuant to 10 CFR 52.79(a)(44), COL applications must contain: “[a] description of the fitness-for-duty program required by 10 CFR Part 26 and its implementation.”

DCA Part 2, Tier 2, Table 1.8-2, provides COL Items 13.7-1 and 13.7-2, included in Table 13.6-1 above, for a COL applicant that references the certified NuScale Power Plant design:

DCA Part 2 Tier 2, Section 13.7.1, “Combined License Information,” restates the COL item and descriptions from DCA Part 2 Tier 2, Table 1.8-2. The staff agrees that the FFD program is the COL applicant’s responsibility. The staff finds that COL Items 13.7-1 and 13.7-2 adequately describe actions necessary for the COL applicant to address the regulatory requirements for fitness-for-duty program, and no additional COL items need to be included in DCA Part 2 Tier 2, Table 1.8-2, for fitness-for-duty consideration.