

**January 2020 NEI Additional Input for the Rulemaking for Physical Security for Advanced Reactors
(RIN Number: 3150-AK19 / NRC Docket ID: NRC-2017-0227)**

The comments below should be reviewed in conjunction with those provided in NEI letter, “NEI Comments on Draft Regulatory Basis, ‘Rulemaking for Physical Security for Advanced Reactors’ [Docket ID: NRC-2017-0227],” dated August 15, 2019. Any comments that would prolong the rulemaking schedule or require additional direction from the Commission should be held for future disposition in another effort.

ID#	Regulation	Comments
1	General comment	The assessment of potential regulation changes should examine all prescriptive requirements in 10 CFR 73.55 to determine their necessity within a performance-based framework. In general, a facility license should be granted if the applicant can demonstrate that the site physical protection program, to include individuals performing security functions, in conjunction with the facility design and safety features, provides reasonable assurance that adversary actions could not lead to offsite doses above specified values (e.g., the reference values defined in 10 CFR 50.34 and 52.79). This would provide flexibility for an applicant to propose a combination of barriers, access controls, search programs, detection and assessment capabilities, etc. to meet a “performance measure.” Performance-based approaches are particularly important for designs with very low potential offsite consequences (e.g., micro reactors).
2	10 CFR § 73.2 Definitions	Include terms and definitions as needed to support clear understanding of new rule requirements. Consider revising the definition of “physical barrier” or create a new term and definition for “barrier” to allow for obstructions based on other methods and technology that could accomplish the intended function (e.g., deterrence, delay, denial, support other elements of the physical protection program).
3	§ 73.55 (a) Introduction (5) The Tennessee Valley Authority Watts Bar Nuclear Plant, Unit 2, holding a current construction permit under the provisions of part 50 of this chapter, shall meet the revised requirements in paragraphs (a) through (r) of this section as applicable to operating nuclear power reactor facilities.	The reference to Watts Bar Unit 2 can be removed since construction is completed and an operating license issued.

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4	<p>§ 73.55 (a) Introduction</p> <p>(6) Applicants for an operating license under the provisions of part 50 of this chapter, or holders of a combined license under the provisions of part 52 of this chapter that do not reference a standard design certification or reference a standard design certification issued after May 26, 2009 shall meet the requirement of § 73.55(i)(4)(iii).</p>	<p>A change may be necessary to recognize new alternative requirements for secondary alarm stations.</p>
5	<p>§ 73.55 (b) <i>General performance objective and requirements.</i></p> <p>(1) The licensee shall establish and maintain a physical protection program, to include a security organization, which will have as its objective 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 the public health and safety.</p> <p>(2) To satisfy the general performance objective of paragraph (b)(1) of this section, the physical protection program must protect against the design basis threat of radiological sabotage as stated in § 73.1.</p> <p>(3) The physical protection program must be designed to prevent significant core damage and spent fuel sabotage. Specifically, the program must:</p> <p>(i) Ensure that the capabilities to detect, assess, interdict, and neutralize threats up to and including the design basis threat of radiological sabotage as stated in § 73.1, are maintained at all times.</p> <p>(ii) Provide defense-in-depth through the integration of systems, technologies, programs, equipment, supporting processes, and implementing procedures as needed to ensure the effectiveness of the physical protection program.</p>	<p>This section will need revision to recognize the availability of “performance measures” for determining the applicability of revised security requirements and the associated performance-based alternatives to prescribed requirements.</p> <p>Consider replacing “high assurance” with “reasonable assurance” to align with Commission direction in Staff Requirements Memorandums; this will eliminate confusion and provide consistency of terminology used within the regulation.</p>

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	<p>(4) The licensee shall analyze and identify site-specific conditions, including target sets, that may affect the specific measures needed to implement the requirements of this section and shall account for these conditions in the design of the physical protection program.</p> <p>(5) Upon the request of an authorized representative of the Commission, the licensee shall demonstrate the ability to meet Commission requirements through the implementation of the physical protection program, including the ability of armed and unarmed personnel to perform assigned duties and responsibilities required by the security plans and licensee procedures.</p> <p>(6) The licensee shall establish, maintain, and implement a performance evaluation program in accordance with appendix B to this part, to demonstrate and assess the effectiveness of armed responders and armed security officers to implement the licensee's protective strategy.</p> <p>(9) The licensee shall establish, maintain, and implement an insider mitigation program and shall describe the program in the Physical Security Plan.</p> <p>(i) The insider mitigation program must monitor the initial and continuing trustworthiness and reliability of individuals granted or retaining unescorted access authorization to a protected or vital area, and implement defense-in-depth methodologies to minimize the potential for an insider to adversely affect, either directly or indirectly, the licensee's capability to prevent significant core damage and spent fuel sabotage.</p>	
6	<p>§ 73.55 (d) <i>Security organization.</i> (1) The licensee shall establish and maintain a security organization that is designed, staffed, trained, qualified, and equipped to implement the physical protection program in accordance with the requirements of this section.</p>	<p>The organization at an advanced reactor site may be significantly different than the organizations at currently operating LLWR sites. In particular, it is likely that individuals will be trained and qualified to perform a number of functions and duties concurrently (with supporting/enabling technologies), including security functions and duties. This should be permitted provided</p>

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	<p>(2) The security organization must include:</p> <p>(ii) At least one member, onsite and available at all times, who has the authority to direct the activities of the security organization and who is assigned no other duties that would interfere with this individual's ability to perform these duties in accordance with the security plans and the licensee protective strategy.</p>	<p>there is reasonable assurance that the security plan functions necessary to prevent offsite doses above specified values (e.g., the reference values defined in 10 CFR 50.34 and 52.79) can be performed.</p>
7	<p>§ 73.55 (e) <i>Physical barriers.</i></p> <p>(3) Physical barriers must:</p> <p>(i) Be designed and constructed to:</p> <p>(A) Protect against the design basis threat of radiological sabotage;</p> <p>(9) Vital areas.</p> <p>(v) At a minimum, the following shall be considered vital areas:</p> <p>(A) The reactor control room;</p> <p>(B) The spent fuel pool;</p> <p>(C) The central alarm station; and</p> <p>(D) The secondary alarm station in accordance with § 73.55(i)(4)(iii).</p> <p>(10) Vehicle control measures. Consistent with the physical protection program design requirements of § 73.55(b), and in accordance with the site-specific analysis, the licensee shall establish and maintain vehicle control measures, as necessary, to protect against the design basis threat of radiological sabotage vehicle bomb assault.</p> <p>(i) Land vehicles. Licensees shall:</p> <p>(A) Design, construct, install, and maintain a vehicle barrier system, to include passive and active barriers, at a stand-off distance adequate to protect personnel, equipment, and systems necessary to prevent significant core damage and spent fuel</p>	<p>1) See comment #2 above.</p> <p>2) The physical barriers required for an advanced reactor facility should be those necessary to meet the "performance measure" that permitted the facility to qualify for performance-based alternatives to prescribed requirements.</p> <p>3) Advanced reactor facilities may or may not include "vital equipment," as defined in § 73.2, in the listed areas. The areas requiring designation as a "vital area" should be those with the equipment that permitted the facility to qualify for performance-based alternatives to prescribed requirements (i.e., equipment supporting the applicable "performance measure").</p>

January 2020 NEI Additional Input for the Rulemaking for Physical Security for Advanced Reactors
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	sabotage against the effects of the design basis threat of radiological sabotage and vehicle bomb assault.	
8	<p>§ 73.55 (g) <i>Access controls.</i></p> <p>(3) Vehicles in the protected area.</p> <p>(iv) Vehicles transporting hazardous materials inside the protected area must be escorted by an armed member of the security organization.</p>	<p>If vehicles transporting hazardous materials could not be employed to cause unacceptable offsite consequences (e.g., doses greater than the reference values defined in 10 CFR 50.34 and 52.79), then an armed security escort should not be required.</p>
9	<p>§ 73.55 (h) <i>Search programs.</i></p> <p>(1) The objective of the search program is to detect, deter, and prevent the introduction of firearms, explosives, incendiary devices, or other items which could be used to commit radiological sabotage.</p> <p>(2) Owner controlled area searches.</p> <p>(iv) Vehicle searches must be accomplished through the use of equipment capable of detecting firearms, explosives, incendiary devices, or other items which could be used to commit radiological sabotage, or through visual and physical searches, or both, to ensure that all items are identified before granting access.</p> <p>(3) Protected area searches. Licensees shall search all personnel, vehicles and materials requesting access to protected areas.</p> <p>(iii) When an attempt to introduce firearms, explosives, incendiary devices, or other items which could be used to commit radiological sabotage has occurred or is suspected, the licensee shall implement actions to ensure that the suspect individuals, vehicles, and materials are denied access and shall perform a visual and physical search to determine the absence or existence of a threat.</p>	<p>The search programs and capabilities required for an advanced reactor facility should be those necessary to support the “performance measure” that permitted the facility to qualify for performance-based alternatives to prescribed requirements.</p>
10	<p>§ 73.55 (i) <i>Detection and assessment systems.</i></p> <p>(2) Intrusion detection equipment must annunciate and video assessment equipment shall display concurrently, in at least two</p>	<p>These requirements should recognize the establishment of a Secondary Alarm Station (SAS) at a remote location. Further, the requirements should be flexible with respect to acceptable remote locations, detection and</p>

January 2020 NEI Additional Input for the Rulemaking for Physical Security for Advanced Reactors
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ID#	Regulation	Comments
	<p>continuously staffed onsite alarm stations, at least one of which must be protected in accordance with the requirements of the central alarm station within this section.</p> <p>(4) Alarm stations.</p> <p>(i) Both alarm stations required by paragraph (i)(2) of this section must be designed and equipped to ensure that a single act, in accordance with the design basis threat of radiological sabotage defined in § 73.1(a)(1), cannot disable both alarm stations. The licensee shall ensure the survivability of at least one alarm station to maintain the ability to perform the following functions: ...</p> <p>(ii) Licensees shall:</p> <p>(B) Continuously staff each alarm station with at least one trained and qualified alarm station operator. The alarm station operator must not be assigned other duties or responsibilities which would interfere with the ability to execute the functions described in § 73.55(i)(4)(i) of this section.</p> <p>(C) Not permit any activities to be performed within either alarm station that would interfere with an alarm station operator's ability to execute assigned duties and responsibilities.</p> <p>(F) Ensure that an alarm station operator cannot change the status of a detection point or deactivate a locking or access control device at a protected or vital area portal, without the knowledge and concurrence of the alarm station operator in the other alarm station.</p> <p>(G) Ensure that operators in both alarm stations are knowledgeable of final disposition of all alarms.</p> <p>(iii) Applicants for an operating license under the provisions of part 50 of this chapter, or holders of a combined license under the provisions of part 52 of this chapter, shall construct, locate, protect, and equip both the central and secondary alarm stations to the standards for the central alarm station contained in this</p>	<p>assessment alarm and monitoring capabilities, and staffing. For example, a micro reactor facility could have a SAS arrangement with the local law enforcement agency (such as remote alarms in a police station) or an SMR vendor might supply a single SAS to serve all sites that use their technology.</p>

**January 2020 NEI Additional Input for the Rulemaking for Physical Security for Advanced Reactors
(RIN Number: 3150-AK19 / NRC Docket ID: NRC-2017-0227)**

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	<p>section. Both alarm stations shall be equal and redundant, such that all functions needed to satisfy the requirements of this section can be performed in both alarm stations.</p> <p>(5) Surveillance, observation, and monitoring.</p> <p>(i) The physical protection program must include surveillance, observation, and monitoring as needed to satisfy the design requirements of § 73.55(b), identify indications of tampering, or otherwise implement the site protective strategy.</p> <p>(ii) The licensee shall provide continuous surveillance, observation, and monitoring of the owner controlled area as described in the security plans to detect and deter intruders and ensure the integrity of physical barriers or other components and functions of the onsite physical protection program. Continuous surveillance, observation, and monitoring responsibilities may be performed by security personnel during continuous patrols, through use of video technology, or by a combination of both.</p> <p>(iii) Unattended openings that intersect a security boundary such as underground pathways must be protected by a physical barrier and monitored by intrusion detection equipment or observed by security personnel at a frequency sufficient to detect exploitation.</p> <p>(iv) Armed security patrols shall periodically check external areas of the protected area to include physical barriers and vital area portals.</p> <p>(v) Armed security patrols shall periodically inspect vital areas to include the physical barriers used at all vital area portals.</p>	
11	<p>§ 73.55 (j) <i>Communication requirements.</i></p> <p>2) Individuals assigned to each alarm station shall be capable of calling for assistance in accordance with the security plans and the licensee's procedures.</p>	See comment #10 above.

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	<p>(3) All on-duty security force personnel shall be capable of maintaining continuous communication with an individual in each alarm station, and vehicle escorts shall maintain continuous communication with security personnel. All personnel escorts shall maintain timely communication with the security personnel.</p> <p>(4) The following continuous communication capabilities must terminate in both alarm stations required by this section: ...</p>	
12	<p>§ 73.55 (k) <i>Response requirements.</i></p> <p>(1) The licensee shall establish and maintain, at all times, properly trained, qualified and equipped personnel required to interdict and neutralize threats up to and including the design basis threat of radiological sabotage as defined in § 73.1, to prevent significant core damage and spent fuel sabotage.</p> <p>(3) The licensee shall train each armed member of the security organization to prevent or impede attempted acts of radiological sabotage by using force sufficient to counter the force directed at that person, including the use of deadly force when the armed member of the security organization has a reasonable belief that the use of deadly force is necessary in self-defense or in the defense of others, or any other circumstances as authorized by applicable State or Federal law.</p> <p>(4) The licensee shall provide armed response personnel consisting of armed responders which may be augmented with armed security officers to carry out armed response duties within predetermined time lines specified by the site protective strategy.</p> <p>(5) Armed responders.</p> <p>(i) The licensee shall determine the minimum number of armed responders necessary to satisfy the design requirements of § 73.55(b) and implement the protective strategy. The licensee shall document this number in the security plans.</p>	<p>A facility design meeting a “performance measure” would permit the applicant to establish a detect, assess and communicate security response; an onsite armed response force would not be necessary for threat interdiction and neutralization. Should a facility require an armed response force because a “performance measure” cannot be met, then the “Response requirements” should be those necessary to provide reasonable assurance that adversary actions could not lead to offsite doses above specified values (e.g., the reference values defined in 10 CFR 50.34 and 52.79). The facility-specific requirements could be determined through an analysis (e.g., use the guidance in NUREG/CR-7145, “Nuclear Power Plant Security Assessment Guide”). A minimum number should not be specified in regulations.</p>

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	<p>(ii) The number of armed responders shall not be less than ten (10).</p> <p>(iii) Armed responders shall be available at all times inside the protected area and may not be assigned other duties or responsibilities that could interfere with their assigned response duties.</p> <p>(6) Armed security officers.</p> <p>(i) Armed security officers, designated to strengthen onsite response capabilities, shall be onsite and available at all times to carry out their assigned response duties.</p> <p>(ii) The minimum number of armed security officers designated to strengthen onsite response capabilities must be documented in the security plans.</p> <p>(7) The licensee shall have procedures to reconstitute the documented number of available armed response personnel required to implement the protective strategy.</p> <p>8) Protective strategy. The licensee shall establish, maintain, and implement a written protective strategy in accordance with the requirements of this section and part 73, appendix C, Section II. Upon receipt of an alarm or other indication of a threat, the licensee shall:</p> <p>ii) Initiate response actions to interdict and neutralize the threat in accordance with the requirements of part 73, appendix C, section II, the safeguards contingency plan, and the licensee's response strategy.</p>	
13	<p>Appendices B and C to Part 73</p>	<p>Depending upon how the staff structures the new regulations, changes may be needed to these appendices to align the contents with new performance-based alternatives to prescribed requirements. For example, a facility that is not required to maintain an onsite response force for threat</p>

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		interdiction and neutralization would not need a performance evaluation program or a protective strategy.
14	Various other 10 CFR sections and paragraphs	Depending upon how the staff structures the new regulations, conforming changes may be needed to other sections and paragraphs in 10 CFR. See NEI White Paper, "Proposed Physical Security Requirements for Advanced Reactor Technologies," Attachment 1, "Proposed Changes to 10 CFR for New Physical Security Requirements for Advanced Reactor Technologies," for examples.
15	Additional considerations for micro reactors	The potential consequences for micro-reactors are expected to be similar to research and test reactors, for which there is no DBT. Therefore, establishment of the requirements that are applicable to micro-reactors should consider the requirements in 10 CFR 73.60, "Additional requirements for physical protection at nonpower reactors," and 10 CFR 73.67, "Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance," applicable to nonpower reactors. Consideration should also be given to alternatives to requirements to protect against theft and diversion and cyber security. More specific recommendations on the physical security for micro-reactors are included in the NEI White Paper, "Micro-Reactor Regulatory Issues," Appendix E, "Physical Security."