



102-07227-MLL/DCE  
April 11, 2016

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U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station**  
**Units 1, 2, and 3**  
**Docket Nos. STN 50-528, 50-529, and 50-530**  
**Renewed Operating License Nos. NPF-41, NPF-51, NPF-74**  
**Response to Request for Additional Information Regarding License**  
**Amendment Request to Adopt TSTF-505**

By letter number 102-07060, dated July 31, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15218A300), Arizona Public Service Company (APS) submitted a license amendment request (LAR) to revise the Technical Specifications (TS) for Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3. The proposed amendment would modify TS requirements to permit the use of Risk-Informed Completion Times (RICTs) in accordance with Technical Specifications Task Force (TSTF) traveler TSTF-505-A, Revision 1, *Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b*.

The NRC Electrical Engineering, Instrumentation and Control Branch (EICB) staff determined that additional information is required regarding the LAR and provided a formal request for additional information (RAI) by an NRC letter dated March 7, 2016 (ADAMS Accession No. ML16064A497). The enclosure to this letter provides the APS response to the NRC RAI.

No commitments are being made by this letter. Should you need further information regarding this submittal, please contact Michael D. Dilorenzo, Licensing Section Leader, at (623) 393-3495.

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I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 11, 2016  
(Date)

Sincerely,

MLL/DCE

Enclosure: Response to Request for Additional Information

cc:	M. L. Dapas	NRC Region IV Regional Administrator
	S. P. Lingam	NRC NRR Project Manager for PVNGS
	M. M. Watford	NRC NRR Project Manager
	C. A. Peabody	NRC Senior Resident Inspector for PVNGS
	A. V. Godwin	Arizona Radiation Regulatory Agency (ARRA)
	T. Morales	Arizona Radiation Regulatory Agency (ARRA)

**Enclosure**

**Response to Request for Additional Information**

### **Summary Description**

By letter number 102-07060, dated July 31, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15218A300), Arizona Public Service Company (APS) submitted a license amendment request (LAR) to revise the Technical Specifications (TS) for Palo Verde Nuclear Generating Station Units (PVNGS), Units 1, 2, and 3. The proposed amendment would modify TS requirements to permit the use of Risk-Informed Completion Times (RICTs) in accordance with Technical Specifications Task Force (TSTF) traveler TSTF-505-A, Revision 1, *Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b*.

The NRC Electrical Engineering, Instrumentation and Control Branch (EICB) staff determined that additional information is required regarding the LAR and provided a formal request for additional information (RAI) by an NRC letter dated March 7, 2016 (ADAMS Accession No. ML16064A497). Each NRC request is described below, followed by the APS response.

### **Response to RAI Questions**

#### ***EICB-RAI-1***

*The NRC staff seeks clarification on how probabilistic risk assessment (PRA) Functionality will be determined in the risk-informed completion time (RICT) program as implemented. The LAR does not describe conditions where Actuation Logic channels are INOPERABLE but PRA Functional.*

- (a) Please provide several example conditions that would allow one or more Actuation Logic channels (see TS 3.3.6, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip," Action E insert for TS page 3.3.6-2) to be considered both INOPERABLE and PRA Functional.*
- (b) For each example in part (a), please include an evaluation against the criteria in Nuclear Energy Institute (NEI) 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS)," November 2006 (ADAMS Accession No. ML12286A322), Section 2.3.1, "Configuration Risk Management Process & Application of Technical Specifications," Item Nos. 10 and 11.*
- (c) The NRC staff understands that by meeting the criteria in Items Nos. 10 and 11 in NEI 06-09, Section 2.3.1, all design basis events would be protected against. Please describe any associated design basis events that are NOT protected against in each example condition in part (a).*

## **APS Response**

The criterion of NEI 06-09-A Section 2.3.1, Item 10 permits RICT to be applied to emergent inoperability of all trains, provided one or more trains is considered PRA functional, as defined by Item 11 of the same section.

Technical Specification 3.3.6 Actuation Logic channels that are INOPERABLE will be considered PRA functional only when the cause of the inoperability is solely due to an administrative consideration. For a Technical Specification 3.3.6 Actuation Logic channel to be considered PRA functional, it must be capable of performing the specified functions set forth in the current licensing basis (CLB).

- a. The sole case of an inoperable ESFAS train being considered PRA functional is a system, structure, or component (SSC) inoperable only for an administrative consideration. An example of an administrative consideration causing inoperability that will be considered to not impact PRA functionality is corrective maintenance and associated post-maintenance testing that have been successfully completed on a channel, indicating a reasonable expectation that the channel can perform the specified functions in the CLB, but the Technical Specification Surveillance Requirement has not yet been satisfied to declare the channel OPERABLE. This practice is consistent with the current program in use for assessing and managing configuration risk per 10 CFR 50.65(a)(4) (Maintenance Rule). Note that performance of a surveillance test that results in failure to meet its Surveillance Requirements would result in the affected Actuation Logic channel being considered inoperable and not PRA functional and, therefore, the channel could not be credited in a RICT calculation.
- b. The criterion of NEI 06-09-A, Section 2.3.1, item 11.2 is applicable to the example. This criterion permits consideration of the unaffected functions of the component to be PRA functional when the condition causing the inoperability is capable of being assessed by the PRA model. The corrective maintenance has restored the channel to its design configuration and associated post-maintenance testing has been completed on the channel which indicates a reasonable expectation that the channel can perform the specified functions in the CLB and, therefore, the functions modeled in the PRA are no longer affected.

The other PRA functionality criteria under item 11 (11.1 and 11.3) are not applicable to TS 3.3.6 because, as stated above, inoperable ESFAS components will not be considered PRA functional, except for administrative considerations. Specifically:

- Item 11.1 is not applicable because degraded performance parameters will not be considered PRA functional when they are inoperable, as discussed above in part (a).

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- Item 11.3 is not applicable because the affected functions for inoperable ESFAS components are modeled by bounding inputs in the PRA, even though specific components are not modeled. The surrogates will not be considered PRA functional when the associated components are inoperable, as discussed above in part (a).
- c. All design basis events are protected when a Technical Specification 3.3.6 Actuation Logic channel is INOPERABLE solely for the cause of the above administrative consideration since the channel would be capable of performing the specified functions in the CLB. There are no associated design basis events that would not be protected against in the example in part (a) of this response.

**EICB-RAI-2**

*Enclosure 1, "List of Revised Required Actions to Corresponding PRA Functions," to the model application for licensee adoption of TSTF-505 dated January 31, 2012 (ADAMS Accession No. ML12032A065) states:*

*This enclosure [Enclosure 1] should provide a description of PRA functionality for each associated specified safety function that corresponds to each proposed Required Action that is applicable when all trains of equipment are inoperable as discussed in Section 2.3.1.10 of NEI 06-09. For example, the number and identity of instrumentation and control channels (or functions) required to be PRA functional is highly dependent on the specific plant and associated equipment design.*

*Enclosure 1 guidance is included as part of the model application because the NRC staff seeks clarity on how PRA Functional will be used during full power operation following "loss of a specified safety function or inoperability of all required trains or divisions of a system."*

*In the LAR, Attachment 5, "List of Revised Required Actions to Corresponding Probabilistic Risk Assessment Functions," the "PRA Success Criteria" is indicated as being the same as the "Design Success Criteria" (i.e., the same minimum number of channels actuate for some instrumentation and controls (I&C) functions). (Regarding: TS 3.3.4, "Reactor Protective System (RPS) Logic and Trip Initiation," and TS 3.3.6.)*

- (a) *Please confirm that the PRA Success Criteria ensures all associated design basis events are protected against in the condition where two Actuation Logic channels are INOPERABLE and PRA Functional or justify how adequate protection is maintained, if not.*
- (b) *Attachment 5 of the LAR identifies some I&C structures, systems, and components that are partially modeled (or not modeled) in the PRA. Item No. 11 in NEI 06-09, Section 2.3.1 includes criteria for determining PRA functionality of components, and these*

## Response to Request for Additional Information

*criteria were developed based on the assumption that the function would be modeled in the PRA.*

- (i) Please describe how PRA Functionality of these partial models (or un-modeled items) will be determined (i.e., how the criteria of Item No. 11 will be applied).*
- (ii) Please describe how PRA Functionality of bounding evaluations will be determined (i.e., how the criteria of Item No. 11 will be applied).*

**APS Response**

- (a) As described above in the response to EICB-RAI-1, when one or more Actuation Logic channels are INOPERABLE and PRA functional, they will be capable of performing the specified functions in the CLB and the PRA. Actuation Logic channels will not be considered PRA functional unless the cause of the inoperability is solely due to an administrative consideration. Therefore, since the PRA success criteria are met only when the design success criteria are met, all design basis events are protected against when two Actuation Logic channels are INOPERABLE and PRA functional.
- (b)(i) For INOPERABLE I&C SSCs not modeled or partially modeled in the PRA, they will be determined PRA functional only in the case where inoperability is solely due to an administrative consideration as described in the response to EICB-RAI-1 above.
- (b)(ii) The PRA model uses bounding inputs for the reliability and availability of SSCs that are either partially or not modeled. For the ESFAS modeling, the matrix logic is not broken down into individual components and thus the PRA model will use a surrogate event for the not modeled components' reliability from Combustion Engineering Owners Group Topical Report CEN-327-A, *RPS/ESFAS Extended Test Interval Evaluation*, (References 1 and 2). The topical report has been reviewed and endorsed by the NRC for prior risk-informed regulatory applications. For the RPS modeling, a bounding value for the input parameter logic reliability up to the reactor trip circuit breaker will be based on more detailed modeling from the topical report.

Attachment 11, *Probabilistic Risk Assessment Model Update Process*, to the Enclosure of the LAR, describes incorporation of PRA updates such as these to reflect the as-built/as-operated plant.

**EICB-RAI-3**

*NEI 06-09, Revision 0-A states that a RICT cannot be used in a condition where there is a total loss of TS specified safety function; however, it does not describe how to determine when a total loss of safety function has occurred.*

*(a) For two Actuation Logic channels inoperable, please describe the process of how it will be determined if there is a total loss of TS specified safety function.*

**APS Response**

For two Actuation Logic channels inoperable for TS 3.3.6, the total loss of the specified safety functions will be assessed in accordance with the station's operational risk assessment process described in the LAR in Attachment 14, *Program Implementation*. The specified safety functions of both inoperable channels will be considered to be lost, unless at least one channel is inoperable solely due to an administrative consideration as described in the example in the response to EICB-RAI-1 above.

**References**

1. Combustion Engineering Owners Group Topical Report CEN-327-A, *RPS/ESFAS Extended Test Interval Evaluation*, May 1986
2. NRC Letter dated November 6, 1989, NRC Evaluation of CEOG Topical Report CEN-327, *RPS/ESFAS Extended Test Interval Evaluation*