10 CFR 50.90

aps

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102-07060-MLL/DCE
July 31, 2015

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

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS)**
Units 1, 2, and 3
Docket Nos. STN 50-528, 59-529, and 50-530
License Amendment Request to Revise Technical Specifications to Adopt TSTF-505-A, Revision 1, Risk-Informed Completion Times

In accordance with the provisions of Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), Arizona Public Service Company (APS) is submitting a request for a license amendment to revise the Technical Specifications (TSs) for Palo Verde Nuclear Generating Station 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 availability of this TS improvement was announced in the Federal Register on March 15, 2012 (77 FR 15399).

The Enclosure to this letter provides a description and assessment of the proposed change, the requested confirmation of applicability, and plant-specific verifications. Attachment 1 provides the existing TS pages marked up to show the proposed changes. Attachment 2 provides revised (clean) TS pages. Attachment 3 provides existing TS Bases pages marked up to show the proposed changes.

This submittal contains new regulatory commitments (as defined by NEI 99-04, *Guidelines for Managing NRC Commitment Changes,* Revision 0) to be implemented, which are identified in Attachment 4 of the Enclosure. Attachments 5 through 16 of the Enclosure provide probabilistic risk assessment information to support NRC review of this license amendment request. APS requests approval of the proposed license amendment within one year of the date of this letter, with the amendment being implemented within 180 days of issuance.

In accordance with the PVNGS Quality Assurance Program, the Plant Review Board and the Offsite Safety Review Committee have reviewed and approved the proposed

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amendment. By copy of this letter, this license amendment request is being forwarded to the Arizona Radiation Regulatory Agency pursuant to 10 CFR 50.91(b)(1).

Should you have any questions concerning the content of this letter, please contact Thomas Weber, Department Leader, Nuclear Regulatory Affairs, at (623) 393-5764.

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

Executed on 7/31/2015
(Date)

Sincerely,

George W. Ad— FOR MARIA LACAL

MLL/DCE/akf

Enclosure: Description and Assessment of Proposed Amendment for Risk-Informed Completion Times

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

Enclosure

Description and Assessment of Proposed Amendment for Risk-Informed Completion Times

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1.0 DESCRIPTION

In accordance with the provisions of Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), Arizona Public Service Company (APS) is submitting a request for a license amendment to revise the Technical Specifications (TSs) 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 availability of the NRC model safety evaluation for TSTF-505-A was announced in the Federal Register on March 15, 2012 (77 FR 15399).

The proposed amendment involves TS Completion Times (CTs) for Required Actions (RAs) to provide the option to calculate a risk-informed CT (RICT). A new program, the *Risk-Informed Completion Time Program*, is added to TS Section 5, *Administrative Controls*.

The methodology for using the RICT Program is described in Nuclear Energy Institute (NEI) 06-09, Revision 0 - A, *Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (NEI 06-09-A), which was found acceptable by the NRC on May 17, 2007, for use by licensees in license amendment proposals. Adherence to NEI 06-09-A is required by the RICT Program and APS is not proposing any deviations from the NEI guidance.

The proposed amendment is consistent with TSTF-505-A. However, only those RAs described in Attachment 5 to this Enclosure are proposed to be changed. Attachment 5 does not include the modified RAs in TSTF-505-A that were not applicable to PVNGS. The proposed amendment also incorporates two additional limiting conditions of operations (LCOs) that were not included in TSTF-505-A. These are discussed in Section 2.3 of this Enclosure.

This Enclosure provides a description and assessment of the proposed changes, the requested confirmation of applicability, and plant-specific verifications. Attachment 1 to this Enclosure provides the existing TS pages marked up to show the proposed changes. Attachment 2 provides revised (clean) TS pages. Attachment 3 provides existing TS Bases pages marked up to show the proposed changes. Attachments 4 through16 provide descriptions of new regulatory commitments, probabilistic risk assessment (PRA) information, and program information to support NRC review of this license amendment request (LAR). They are discussed further in the assessment below.

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

APS reviewed the NRC model safety evaluation in TSTF-505-A, as well as the information provided to support TSTF-505-A and the safety evaluation for NEI 06-09-A. APS has concluded that the technical basis presented in TSTF-505-A and the associated model safety evaluation prepared by the NRC staff are applicable to PVNGS Units 1, 2, and 3, and support incorporation of this amendment in the TS.

2.2 Verifications and Regulatory Commitments

The following is provided in accordance with Section 4.0 *Limitations and Conditions* of the safety evaluation for NEI 06-09-A:

Attachment 4 to this Enclosure lists the new APS regulatory commitments regarding plant-specific changes necessary to support implementation of TSTF-505-A.

Attachment 5 to this Enclosure identifies each of the TS RAs to which the RICT Program will apply, with a comparison of the TS functions to the functions modeled in the PRA of the structures, systems and components (SSCs) subject to those actions.

Attachment 6 to this Enclosure provides a discussion of the results of peer reviews and self-assessments conducted for the plant-specific PRA models which support the RICT Program, as required by Regulatory Guide (RG) 1.200, *An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,* Revision 2, dated March 2009, Section 4.2.

Attachment 7 to this Enclosure is a placeholder to retain the TSTF-505-A format since each APS PRA model used for the RICT Program is addressed using a standard endorsed by the NRC.

Attachment 8 to this Enclosure provides appropriate justification for excluding sources of risk not addressed by the PRA models.

Attachment 9 to this Enclosure provides the plant-specific baseline core damage frequency (CDF) and large early release frequency (LERF) to confirm that the potential risk increases allowed under the RICT Program are acceptable.

Attachment 10 to this Enclosure is a placeholder to retain the TSTF-505-A format since each APS PRA model used for the RICT Program is addressed using a standard endorsed by the NRC.

Attachment 11 to this Enclosure provides a discussion of the programs and procedures that assure the PRA models that support the RICT Program are maintained consistent with the as-built, as-operated plant.

Attachment 12 to this Enclosure provides a description of how the baseline PRA model, which calculates average annual risk, is evaluated and modified for use in the *Configuration Risk Management Program* (CRMP) to assess real-time configuration risk, and describes the scope of and quality controls applied to the CRMP.

Attachment 13 to this Enclosure provides a discussion of how the key assumptions and sources of uncertainty in the PRA models were identified for this LAR, and how their impact on the RICT Program was assessed and evaluated.

Attachment 14 to this Enclosure provides a description of the implementing programs and procedures regarding the plant staff responsibilities for the RICT Program, including risk management action (RMA) implementation.

Attachment 15 to this Enclosure provides a description of the monitoring program as described in NEI 06-09-A, Section 2.3.2.

Finally, Attachment 16 to this Enclosure provides a description of the process to identify RMAs and includes specific examples of RMAs.

2.3 Editorial Changes and Variations

APS is proposing certain editorial changes and variations from the TSs described in TSTF-505-A, Revision 1, and applicable parts of the NRC model safety evaluation dated March 15, 2012. Differences between the PVNGS proposed LAR and TSTF-505-A and related justifications are provided in Table 1, *TSTF-505-A Reconciliation*. In some instances, the PVNGS TSs use different numbering (including RAs and programs) and titles than NUREG 1432, *Standard Technical Specifications, Combustion Engineering Plants*, on which TSTF-505-A was based. These differences are administrative and do not affect the applicability of TSTF-505-A to the PVNGS TS. Due to plant-specific design differences, the PVNGS TSs do not contain all of the LCOs and conditions that are contained in TSTF-505-A. This LAR includes the LCOs from TSTF 505-A which are applicable to PVNGS.

TSTF-505-A states:

> "It is necessary to adopt TSTF-439, *Eliminate Second Completion Times Limiting Time From Discovery of Failure To Meet an LCO*, in order to adopt TSTF 505 for those Required Actions that are affected by both Travelers."

APS previously submitted letter number 102-07002, *License Amendment Request (LAR) for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-439-A, Revision 2, Eliminate Second Completion Times Limiting Time from Discovery of Failure to Meet an LCO*, dated February 27, 2015, to adopt TSTF-439-A, Revision 2 (Agencywide Document Access and Management System [ADAMS] Accession Number ML15065A031).

The LAR proposed removal of the second completion times from the following TS sections, as described in TSTF-439-A:

- TS 1.3, *Completion Times*
- TS 3.7.5, *Auxiliary Feedwater (AFW) System*
- TS 3.8.1, *AC Sources - Operating*
- TS 3.8.9, *Distribution Systems - Operating*

APS anticipates NRC approval of the TSTF-439-A LAR before NRC completion of the review of this TSTF-505-A LAR. The expected TSTF-439-A changes have been clearly marked and annotated on the marked-up TS and TS Bases pages in Attachments 1 and 3 of this Enclosure. The revised (clean) TS pages included in Attachment 2 of this Enclosure reflect the removal of the second completion times from the affected TSs.

There are two plant-specific LCOs for which APS is proposing to apply the RICT Program that are not within the scope of TSTF 505-A. These LCOs are variations as identified in Table 1 with additional justification provided:

- TS 3.4.12, *Pressurizer Vents.* There is no pressurizer vent TS in NUREG 1432 or in TSTF 505-A. The PVNGS TS address the pressurizer vent lines and valves that can be used to depressurize and degas the reactor coolant system. The pressurizer vent valves are remotely operated solenoid valves administratively controlled in the key-locked closed position to prevent inadvertent opening. There are two separate vent paths out of the pressurizer; one path has two solenoid isolation valves and the other has a single solenoid isolation valve and an orifice. Each of these two paths can be directed through an additional solenoid operated valve to either the reactor drain tank or to containment atmosphere directly, for a total of four vent paths. The pressurizer vent paths are modeled in the PRA and credited in the PVNGS safety analysis for the steam generator tube rupture event as described in Updated Final Safety Analysis Report (UFSAR) Section 15.6.3. The pressurizer vent TS at PVNGS has similarities to the pressurizer power-operated relief valves (PORVs) TS 3.4.11 addressed by TSTF-505-A. Although the PVNGS design does not include PORVs, APS proposes to apply the RICT Program to PVNGS TS LCO 3.4.12 for the pressurizer vents using TSTF-505-A RA 3.4.11.B.3 as a guide.

- TS 3.7.3, *Main Feedwater Isolation Valves (MFIVs).* The MFIV TS was not included in TSTF-505-A because the TS LCO conditions do not include restoration actions for an inoperable MFIV. APS proposes adding restoration actions to RA 3.7.3.A.1 (one or more MFIVs inoperable) and RA 3.7.3.B.1 (two valves in the same flow path inoperable) and including both in the RICT Program. A description of the MFIVs is included in UFSAR 10.4.7. The MFIVs are modeled in the PRA and credited in the safety analysis to close during a steam line break and a feedwater line break.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
1	1.3 Completion Times	1.3 Completion Times	The changes described in the TSTF are incorporated.
2	3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation (Digital)	3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation	The changes described in the TSTF are incorporated.
3	3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip (Digital)	3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip	The changes described in the TSTF are incorporated with the following differences: • EDITORIAL: TSTF 3.3.6.E states “Two Actuation Logic channels inoperable.” The PVNGS Condition statement states “One or more functions with two Actuation Logic channels inoperable.” This is consistent with the NRC-approved PVNGS wording in Conditions A, B, and C. • EDITORIAL: APS proposes to revise Required Action (RA) E.1 to read “Restore channel(s) to OPERABLE status” to clarify that at least one Actuation Logic channel must be restored to OPERABLE status.
4	3.4.9 Pressurizer	3.4.9 Pressurizer	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: TSTF RA C.1 states “Restore [required group] of pressurizer heaters to OPERABLE status.” PVNGS RA C.1 states “Restore at least one required group of pressurizer heaters to OPERABLE status.” PVNGS added the phrase “at least one” to be precise in the action necessary to exit the Condition.
5	3.4.10 Pressurizer Safety Valves	3.4.10 Pressurizer Safety Valves - Modes 1, 2, and 3	The changes described in the TSTF are incorporated.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
6	Not in TSTF	3.4.12 Pressurizer Vents	VARIATION: PVNGS has pressurizer vent valves to depressurize the reactor coolant system or remove accumulated gases in the pressurizer. The pressurizer vent TS at PVNGS has similarities to the pressurizer power-operated relief valves (PORVs) TS 3.4.11 addressed by TSTF-505-A. Although the PVNGS design does not include PORVs, APS proposes to apply the RICT Program to PVNGS TS LCO 3.4.12 for the pressurizer vents using TSTF-505-A RA 3.4.11.B.3 as a guide. APS proposes to apply the RICT Program to PVNGS restoration items RA 3.4.12.A.1 and 3.4.12.B.1 for the pressurizer vents. The vent paths are modeled in the site-specific PRA and credited in the PVNGS safety analysis. APS also proposes to include a NOTE that states the Risk Informed Completion Time is not applicable when the last vent path is intentionally made inoperable.
7	3.5.1 Safety Injection Tanks (SITs)	3.5.1 Safety Injection Tanks (SITs) - Operating	The changes described in the TSTF are incorporated with the following differences: • EDITORIAL: TSTF 3.5.1.C.1 states "Restore SITs to OPERABLE status." PVNGS 3.5.1.C.1 states "Restore all but one SIT to OPERABLE status." PVNGS added the phrase to be precise in the action necessary to exit the Condition. • EDITORIAL: TSTF 3.5.1.D states "Required Action and associated completion time [of Condition A or B] not met." PVNGS 3.5.1.D states "Required Action and associated completion time of Condition A, B, or C not met." The TSTF added Condition C so PVNGS TS Condition D is worded such that Conditions A, B, and C are addressed in the restoration condition. • EDITORIAL: The TSTF Bases state that Condition E regarding entry into LCO 3.0.3 is only applicable to plants that have not adopted a RICT Program. Therefore, APS proposes to delete the existing corresponding PVNGS Condition D. • EDITORIAL: The logical connector "OR" in PVNGS TS Condition A was adjusted to be properly aligned.
8	3.5.2 ECCS - Operating	3.5.3 ECCS - Operating	The changes described in the TSTF are incorporated with the following difference: • VARIATION: PVNGS proposes to delete the following words from TS Condition B "AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available." The deletion of these words from Condition B is being done in order to adopt both the TSTF 505 text and to be consistent with NUREG 1432. TSTF 505 Condition 3.5.2.C and proposed PVNGS Condition 3.5.3.C will address the condition for "less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train" so it is not required to have the wording in PVNGS TS Condition 3.5.3 Condition B to require at least 100% of the flow equivalent to a single OPERABLE ECCS train.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
9	3.5.4 Refueling Water Tank (RWT)	3.5.5 Refueling Water Tank (RWT)	The changes described in the TSTF are incorporated.
10	3.6.2 Containment Air Locks (Atmospheric and Dual)	3.6.2 Containment Air Locks	The changes described in the TSTF are incorporated.
11	3.6.3 Containment Isolation Valves (Atmospheric and Dual)	3.6.3 Containment Isolation Valves	The changes described in the TSTF are incorporated.
12	3.6.6A Containment Spray and Cooling Systems (Atmospheric and Dual)	3.6.6 Containment Spray System	The changes described in the TSTF are incorporated with the following differences: • EDITORIAL: PVNGS TS do not have TSTF Conditions C, D, or E because there is no containment cooling system that operates in conjunction with the containment spray system at PVNGS. PVNGS proposes adopting TSTF Condition F as PVNGS Condition C modified to properly reflect the PVNGS design. • EDITORIAL: PVNGS proposes deleting existing TS Condition C regarding entry into LCO 3.0.3 and adopting TSTF/NUREG-1432 Condition G as new PVNGS Condition D. • EDITORIAL: TSTF RA F.1 states containment spray trains are to be restored to OPERABLE status. PVNGS RA C.1 is revised to read "Restore at least one containment spray train to OPERABLE status." APS used the phrase "at least one" to be precise in the action necessary to exit the Condition.
13	3.7.2 Main Steam Isolation Valves (MSIVs)	3.7.2 Main Steam Isolation Valves (MSIVs)	The changes described in the TSTF are incorporated with the following differences, primarily in numbering sequence resulting from changes approved in TS Amendment 163: • EDITORIAL: PVNGS proposes adopting TSTF Condition A as PVNGS Condition F. • EDITORIAL: PVNGS proposes adopting TSTF Condition C as new PVNGS Condition G. • EDITORIAL: TSTF RA C.1 states "Restore MSIVs to OPERABLE status." PVNGS TS 3.7.2 RA G.1 is revised to read "Restore all but one MSIV to OPERABLE status." APS used the phrase "all but one" to be precise in the action necessary to exit the condition.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
14	Not in TSTF	3.7.3 Main Feedwater Isolation Valves (MFIVs)	VARIATION: TSTF 505 has a comment stating that Conditions A and B do not specify a restoration action and Condition C is a default Condition, thus the LCO conditions were excluded. APS proposes to add restoration actions to plant-specific PVNGS TS 3.7.3 RA A.1 for one or more MFIVs inoperable and RA B.1 for two valves in the same flow path inoperable, with a RICT applied to each. Each RA will have an alternative (using the logical connector OR) action of isolating AND verifying the MFIV(s) closed or isolated. APS believes this is acceptable because the TSTF states that there may also be plant-specific TS to which changes of the type presented in the TSTF may be applied.
15	3.7.4 Atmospheric Dump Valves (ADVs)	3.7.4 Atmospheric Dump Valves (ADVs)	The changes described in the TSTF are incorporated with the following difference: • VARIATION: PVNGS proposes adding a NOTE in Condition B that states "Risk-Informed Completion Time not applicable when all ADVs intentionally made inoperable." This reflects the intent of the TSTF to ensure the RICT is not used for situations that represent a loss of safety function due to planned maintenance and reflects the existing NOTE in PVNGS TS Bases 3.7.4.B.1. The PVNGS design retains the ADV safety function with one ADV OPERABLE.
16	3.7.5 Auxiliary Feedwater (AFW) System	3.7.5 Auxiliary Feedwater (AFW) System	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: PVNGS proposes to delete the second part of revised PVNGS TS Condition D (existing PVNGS TS Condition C) after the OR clause that reads "Two AFW trains inoperable in MODES 1, 2, or 3." TSTF 505 adds the same condition as new PVNGS TS Condition C. This change makes the PVNGS TS consistent with NUREG 1432 and facilitates the incorporation of TSTF 505.
17	3.7.6 Condensate Storage Tank (CST)	3.7.6 Condensate Storage Tank (CST)	The changes described in the TSTF are incorporated with the following differences: • VARIATION: PVNGS proposes to change the PVNGS LCO from "The CST level shall be ≥ 29.5 ft" to read "The CST shall be OPERABLE." This change is consistent with TSTF-505 and NUREG 1432. The change revises the LCO wording to directly address the requirement for the CST to be OPERABLE rather than a limited requirement for CST level. CST level is governed by the same limit described in TS surveillance requirement 3.7.6.1 which states "Verify CST level is ≥ 29.5 ft." • VARIATION: PVNGS proposes to change Condition A from "CST level not within limit" to read "CST inoperable." This change is needed so that the condition matches the LCO requirement. • VARIATION: PVNGS proposes to change RA A.2 from "Restore CST level to within limit" to read "Restore CST to OPERABLE status." This change is needed for the RA to match the condition.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
18	3.7.7 Component Cooling Water (CCW) System	3.7.7 Essential Cooling Water (EW) System	The changes described in the TSTF are incorporated with the following differences: • EDITORIAL: For this TS, PVNGS uses the terminology "EW" rather than "CCW" as in the TSTF. • VARIATION: PVNGS proposes adding a NOTE to TSTF Condition B that reads "Not applicable when second EW train intentionally made inoperable." This reflects the intent of the TSTF to ensure the RICT is not used for situations that represent a loss of safety function due to planned maintenance.
19	3.7.8 Service Water System (SWS)	3.7.8 Essential Spray Pond System (ESPS)	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: For this TS, PVNGS uses the terminology "SP" rather than "SWS" as in the TSTF.
20	3.7.9 Ultimate Heat Sink (UHS)	3.7.9 Ultimate Heat Sink (UHS)	The changes described in the TSTF are incorporated with the following difference: • VARIATION: The design for PVNGS uses spray ponds as the UHS with spray nozzles for the method to dissipate heat as opposed to natural bodies of water with cooling towers or other designs. PVNGS existing TS 3.7.9 has only one condition (UHS inoperable) for which the RA is to shut down without a required action to restore the UHS. APS proposes adding a Condition requiring restoration of the UHS to an OPERABLE status within one hour or in accordance with the RICT Program in order to be consistent with TSTF 505-A. The wording of the TSTF Condition C was revised to delete "for reasons other than Conditions A or B" since TSTF Condition A and B are not applicable to PVNGS. The revised PVNGS Condition A reads "UHS INOPERABLE." The NOTE above Condition A reads "Risk informed Completion Time not applicable when UHS intentionally made inoperable." The RA and Completion time for Condition A are consistent with TSTF 505-A.
21	3.7.10 Essential Chilled Water (ECW)	3.7.10 Essential Chilled Water (EC) System	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: For this TS, PVNGS uses the terminology "EC" rather than "ECW" as in the TSTF.
22	3.7.12 Control Room Emergency Air Temperature Control System (CREATCS)	3.7.12 Control Room Emergency Air Temperature Control System (CREATCS)	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: The TSTF Bases state that TSTF Condition F regarding entry into LCO 3.0.3 is only applicable to plants that have not adopted a RICT Program. Therefore, APS proposes to delete existing PVNGS Condition F, which is the same as TSTF Condition F, and add the condition for two CREATCS trains inoperable into PVNGS TS as Condition B.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
23	3.8.1 AC Sources - Operating	3.8.1 AC Sources - Operating	The changes described in the TSTF are incorporated with the following differences: • EDITORIAL: APS proposes to revise RA G.1 to read "Restore required AC source(s) to OPERABLE status" to clarify that at least one required AC source must be restored to OPERABLE status. • EDITORIAL: The TSTF Bases state that Condition I regarding entry into LCO 3.0.3 is only applicable to plants that have not adopted a RICT Program. Therefore, APS proposes to delete existing PVNGS Condition I, which is the same as TSTF Condition I, and add the condition for three or more required AC sources inoperable into PVNGS TS as Condition G.
24	3.8.4 DC Sources - Operating	3.8.4 DC Sources - Operating	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: PVNGS TS do not include TSTF Condition B, as approved in PVNGS License Amendment number 193 that adopted TSTF-500.
25	3.8.7 Inverters - Operating	3.8.7 Inverters - Operating	The changes described in the TSTF are incorporated with the following differences: • VARIATION: TSTF Condition B includes a NOTE that states "Not applicable when two or more [required] inverters intentionally made inoperable." PVNGS proposes rewording the NOTE to read "Not applicable when two or more required inverters intentionally made inoperable resulting in loss of safety function." This reflects the PVNGS design which differs from the TSTF. PVNGS has two inverters per train, thus two inverters inoperable in the same train do not represent a loss of safety function because the other train remains operable. • EDITORIAL: TSTF RA B.1 states "Restore inverters to OPERABLE status." PVNGS RA B.1 is proposed to state "Restore all but one inverter to OPERABLE status." PVNGS added the phrase "all but one" to be precise in the action necessary to exit the Condition.

Table 1 –TSTF-505-A Reconciliation

ITEM #	TSTF LCO	PVNGS LCO	DESCRIPTION
26	3.8.9 Distribution Systems - Operating	3.8.9 Distribution Systems - Operating	The changes described in the TSTF are incorporated with the following differences: • VARIATION: The TSTF Conditions A, B and C state "one or more" while the PVNGS Conditions state only "one" with respect to the number of electrical power distribution system being inoperable for the respective conditions. These differences are reflected in the RAs as well. This is acceptable due to the PVNGS specific licensing bases that approved this wording in TS Amendment number 117. • VARIATION: APS proposes to not adopt the clause in new TSTF Condition D "...that results in a loss of safety function" because the new action applies when more than one electrical power distribution subsystem is inoperable without linking the condition to the loss of safety function. This is consistent with the wording of Conditions A, B and C. • EDITORIAL: APS proposes to revise RA D.1 to read "Restore electrical power distribution subsystem(s) to OPERABLE status" to clarify that at least one electrical power distribution subsystem must be restored to OPERABLE status. • EDITORIAL: The TSTF Bases state that Condition F regarding entry into LCO 3.0.3 is only applicable to plants that have not adopted a RICT Program. Therefore, APS proposes to delete existing PVNGS Condition E, which is the same as TSTF Condition F and add the condition for two or more electrical power distribution subsystems inoperable into PVNGS TS as Condition D. • EDITORIAL: The NOTE for PVNGS new Condition D adds the phrase "resulting in loss of safety function." This is needed since PVNGS Conditions A, B and C are only applicable to one electrical power distribution subsystem, respectively. There could be instances where two electrical power distribution subsystems are made inoperable without having a loss of safety function.
27	5.5.18 Risk-Informed Completion Time Program	5.5.20 Risk-Informed Completion Time Program	The changes described in the TSTF are incorporated with the following difference: • EDITORIAL: NEI 06-09 (Revision 0)-A is applicable rather than NEI 06-09, Revision 0.

3.0 REGULATORY SAFETY ANALYSIS

Arizona Public Service Company (APS) has evaluated the proposed change to the Technical Specifications (TSs) using the criteria in 10 CFR 50.92 and has determined that the proposed change does not involve a significant hazards consideration.

APS requests adoption of an NRC accepted change to the Standard TSs and plant specific TS, to modify the TS requirements related to Completion Times (CTs) for Required Actions (RAs) to provide the option to calculate risk-informed CTs based on risk levels associated with equipment determined to be inoperable that are within the scope of the Risk-Informed Completion Time (RICT) Program. The allowance is described in a new program in Chapter 5, *Administrative Controls*, entitled the *Risk-Informed Completion Time Program.* The proposed RICT program conforms to the NRC model safety evaluation, *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (Agencywide Documents Access and Management System (ADAMS) Accession No., ML071200238), dated May 17, 2007.

The proposed license amendment includes regulatory commitments to achieve the baseline PRA risk metrics specified in the NRC model evaluation by design changes or compensatory measures. The design changes proposed by regulatory commitments will be implemented under the requirements of 10 CFR 50.59 and will not require prior NRC approval.

As required by 10 CFR 50.91(a), *Notice for Public Comment*, an analysis of the issue of no significant hazards consideration is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change permits the use of RICTs provided the associated risk is assessed and managed in accordance with the NRC-accepted RICT Program. The proposed use of RICTs does not involve a significant increase in the probability of an accident previously evaluated because the change only affects TS Conditions, Required Actions and CTs associated with risk informed technical specifications and does not involve changes to the plant, its modes of operation, or TS mode applicability. The proposed license amendment references regulatory commitments to achieve the baseline PRA risk metrics specified in the NRC model evaluation. The changes proposed by regulatory commitments will be implemented under the requirements of 10 CFR 50.59 without the need for prior NRC approval. The proposed change does not increase the consequences of an accident because the accident mitigation functions of the affected systems, structures, or components (SSCs) are not changed.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change permits the use of RICTs provided the associated risk is assessed and managed in accordance with the NRC-accepted RICT Program. The proposed use of RICTs does not create the possibility of a new or different kind of accident from any accident previously evaluated because the change only affects TS Conditions, Required Actions and CTs associated with risk informed technical specifications. The proposed change does not involve a physical alteration of the plant and does not involve installation of new or different kind of equipment. The proposed license amendment references regulatory commitments to achieve the baseline PRA risk metrics specified in the NRC model evaluation. The changes proposed by regulatory commitments will be implemented under the requirements of 10 CFR 50.59 without the need for prior NRC approval. The proposed change does not alter the accident mitigation functions of the affected SSCs and does not introduce new or different SSC failure modes than already evaluated.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change permits the use of RICTs provided the risk levels associated with inoperable equipment within the scope of the RICT program are assessed and managed in accordance with the NRC approved RICT Program. The proposed change implements a risk-informed *Configuration Risk Management Program* (CRMP) to assure that adequate margins of safety are maintained. Application of these new specifications and the CRMP considers cumulative effects of multiple systems or components being out of service and does so more effectively than the current TS. In this regard, the implementation of the CRMP is considered an improvement in safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, APS concludes that the proposed change presents no significant hazards considerations under the standards set forth in 10 CFR 50.92(c), *Issuance of amendment*, and, accordingly, a finding of "no significant hazards consideration" is justified.

4.0 ENVIRONMENTAL CONSIDERATION

APS has reviewed the environmental evaluation included in the model safety evaluation published on March 15, 2012, as part of the Notice of Availability (77 FR 15399). APS has concluded that the NRC staff findings presented in that evaluation are applicable to PVNGS Units 1, 2, and 3.

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, *Standards for Protection*

Against Radiation, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22, *Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review.* Therefore, pursuant to 10 CFR 51.22, no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

ATTACHMENT 1

Proposed Technical Specification Changes

TS Mark-up Pages

1.3-13	3.7.4-1
3.3.4-1	3.7.5-1
3.3.6-1	3.7.5-2
3.3.6-2	3.7.6-1
3.3.6-3	3.7.7-1
3.4.9-1	3.7.8-1
3.4.9-2	3.7.9-1
3.4.10-1	3.7.10-1
3.4.12-1	3.7.12-1
3.5.1-1	3.7.12-2
3.5.3-1	3.8.1-2
3.5.5-1	3.8.1-3
3.6.2-3	3.8.1-4
3.6.3-1	3.8.1-5
3.6.3-2	3.8.4-1
3.6.3-3	3.8.7-1
3.6.3-4	3.8.7-2
3.6.6-1	3.8.9-1
3.7.2-2	3.8.9-2
3.7.3-1	5.5-19

1.3 Completion Times

EXAMPLES	EXAMPLE 1.3-7 (continued) The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.
Insert	
IMMEDIATE COMPLETION TIME	When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

INSERT for page 1.3-13

EXAMPLE 1.3-8

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program
B. ---- NOTE ----- Not applicable when second subsystem intentionally made inoperable. -------------------- Two subsystems inoperable.	B.1 Restore subsystems to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

When a subsystem is declared inoperable, Condition A is entered. The 7 day Completion Time may be applied as discussed in Example 1.3-2. However, the licensee may elect to apply the Risk Informed Completion Time Program which permits calculation of a Risk Informed Completion Time (RICT) that may be used to complete the Required Action beyond the 7 day Completion Time. The RICT cannot exceed 30 days. After the 7 day Completion Time has expired, the

Insert for page 1.3-13 (continued)

subsystem must be restored to OPERABLE status within the RICT or Condition C must also be entered.

If a second subsystem is declared inoperable, Condition B may also be entered. The Condition is modified by a Note stating it is not applicable if the second subsystem is intentionally made inoperable. The Required Actions of Condition B are not intended for voluntary removal of redundant subsystems from service. The Required Action is only applicable if one subsystem is inoperable for any reason and the second subsystem is found to be inoperable, or if both subsystems are found to be inoperable at the same time. If Condition B is applicable, at least one subsystem must be restored to OPERABLE status within 1 hour or Condition C must also be entered. The licensee may be able to apply a RICT to extend the Completion Time beyond 1 hour if the requirements of the Risk Informed Completion Time Program are met. If two subsystems are inoperable and Condition B is not applicable (i.e., the second subsystem was intentionally made inoperable), LCO 3.0.3 is entered as there is no applicable Condition.

The Risk Informed Completion Time Program requires recalculation of the RICT to reflect changing plant conditions. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

If the 7 day Completion Time clock of Condition A or the 1 hour Completion Time clock of Condition B have expired and subsequent changes in plant condition result in exiting the applicability of the Risk Informed Completion Time Program without restoring the inoperable subsystem to OPERABLE status, Condition C is also entered and the Completion Time clocks for Required Actions C.1 and C.2 start.

If the RICT expires or is recalculated to be less than the elapsed time since the Condition was entered and the inoperable subsystem has not been restored to OPERABLE status, Condition C is also entered and the Completion Time clocks for Required Actions C.1 and C.2 start. If the inoperable subsystems are restored to OPERABLE status after Condition C is entered, Conditions A, B, and C are exited, and therefore, the Required Actions of Condition C may be terminated.

3.3 INSTRUMENTATION

3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation

LCO 3.3.4 Six channels of RPS Matrix Logic, four channels of RPS Initiation Logic, four channels of reactor trip circuit breakers (RTCBs), and four channels of Manual Trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, with any RTCBs closed and any control element assemblies capable of being withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Matrix Logic channel inoperable. OR Three Matrix Logic channels inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1 Restore channel to OPERABLE status.	48 hours RICT Insert

(continued)

Reviewers Note:
The "RICT Insert" is used repeatedly throughout this package. The insert will not be provided as a separate page every time it is used. This will be the only time the insert page will follow the marked-up TS page.

RICT Insert

<u>OR</u>

In accordance with the Risk Informed Completion Time Program

3.3 INSTRUMENTATION

3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip

LCO 3.3.6 Six channels of ESFAS Matrix Logic, four channels of ESFAS Initiation Logic, two channels of Actuation Logic, and four channels of Manual Trip shall be OPERABLE for each Function in Table 3.3.6-1.

APPLICABILITY: According to Table 3.3.6-1.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one Matrix Logic channel inoperable. OR Three Matrix Logic channels are inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1 Restore channel to OPERABLE status.	48 hours ← RICT Insert
B. One or more Functions with one Manual Trip or Initiation Logic channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours ← RICT Insert

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more Functions with two Initiation Logic channels or Manual Trip channels affecting the same trip leg inoperable.	C.1	Open at least one contact in the affected trip leg of both ESFAS Actuation Logics.	Immediately
	AND		
	C.2	Restore channels to OPERABLE status.	48 hours RICT Insert
D. One or more Functions with one Actuation Logic channel inoperable. Insert	D.1	--------NOTE--------- One channel of Actuation Logic may be bypassed for up to 1 hour for Surveillances, provided the other channel is OPERABLE. --------------------- Restore ~~inoperable~~ channel to OPERABLE status.	48 hours RICT Insert
F E. Required Action and associated Completion Time of Conditions for Containment Spray Actuation Signal, Main Steam Isolation Signal or Auxiliary Feedwater Actuation Signal not met.	F E.1	Be in MODE 3.	6 hours
	AND		
	F E.2	Be in MODE 4.	12 hours

(continued)

Insert for page 3.3.6-2

E. ------- NOTE ------- Not applicable when second Actuation Logic channel intentionally made inoperable. ------------------ One or more functions with two Actuation Logic channels inoperable.	E.1 Restore channel(s) to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

G

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. G Required Action and associated Completion Time of Conditions for Safety Injection Actuation Signal, Containment Isolation Actuation Signal, or Recirculation Actuation Signal not met.	F.1	Be in MODE 3.	6 hours
	AND		
	F.2 G	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	-------------------NOTE-------------------- Testing of Actuation Logic shall include the verification of the proper operation of each initiation relay. --	
	Perform a CHANNEL FUNCTIONAL TEST on each ESFAS logic channel and Manual Trip channel.	In accordance with the Surveillance Frequency Control Program
SR 3.3.6.2	-------------------NOTE-------------------- Relays exempt from testing during operation shall be tested in accordance with the Surveillance Frequency Control Program. --	
	Perform a subgroup relay test of each Actuation Logic channel, which includes the de-energization of each subgroup relay and verification of the OPERABILITY of each subgroup relay.	In accordance with the Surveillance Frequency Control Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≥ 27% and ≤ 56%; and

b. Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 125 kW.

APPLICABILITY: MODES 1, 2, and 3.

-----------------------------NOTE-----------------------------
The pressurizer water level limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute; or
b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor trip breakers open. AND A.2 Be in MODE 4.	6 hours 12 hours
B. One required group of pressurizer heaters inoperable.	B.1 Restore required group of pressurizer heaters to OPERABLE status.	72 hours RICT Insert

(continued)

Insert

Insert for page 3.4.9-1

C. ------ NOTE ------- Not applicable when second group of required pressurizer heaters intentionally made inoperable. ----------------- Two required groups of pressurizer heaters inoperable.	C.1 Restore at least one required group of pressurizer heaters to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D ~~C~~. Required Action and associated Completion Time of Condition B or C not met.	D ~~C~~.1	Be in MODE 3.	6 hours
	AND		
	D ~~C~~.2	Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is ≥ 27% and ≤ 56%	In accordance with the Surveillance Frequency Control Program
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters ≥ 125 kW.	In accordance with the Surveillance Frequency Control Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves - Modes 1, 2 and 3

LCO 3.4.10 Four pressurizer safety valves shall be OPERABLE with lift settings ≥ 2450.25 psia and ≤ 2549.25 psia.

APPLICABILITY: MODES 1, 2, and 3,

----------------------------NOTE----------------------------
The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 72 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes RICT Insert
B. Required Action and associated Completion Time not met. OR Two or more pressurizer safety valves inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4	6 hours 12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Pressurizer Vents

LCO 3.4.12 Four pressurizer vent paths shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.
MODE 4 with RCS pressure ≥ 385 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two or three required pressurizer vent paths inoperable.	A.1 Restore required pressurizer vent paths to OPERABLE status.	72 hours
B. All pressurizer vent paths inoperable.	B.1 Restore one pressurizer vent path to OPERABLE status.	6 hours
C. Required Action and associated Completion Time of Condition A, or B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4 with RCS pressure < 385 psia.	6 hours 24 hours

RICT Insert

------NOTE------
Risk Informed Completion Time not applicable when last vent path intentionally made inoperable.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Safety Injection Tanks (SITs) - Operating

LCO 3.5.1 Four SITs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3 and 4 with pressurizer pressure ≥ 1837 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SIT inoperable due to boron concentration not within limits. ~~OR~~ OR One SIT inoperable due to inability to verify level or pressure.	A.1 Restore SIT to OPERABLE status.	72 hours RICT Insert
B. One SIT inoperable for reasons other than Condition A.	B.1 Restore SIT to OPERABLE status.	24 hours
Insert		
~~C~~ D. Required Action and associated Completion Time of Condition A ~~or B~~ , B, or C not met.	~~C~~ D.1 Be in MODE 3. AND ~~C~~ D.2 Reduce pressurizer pressure to < 1837 psia.	6 hours 12 hours
~~D. Two or more SITs inoperable.~~	~~D.1 Enter LCO 3.0.3.~~	~~Immediately~~

Insert for page 3.5.1-1

C. ---- NOTE ---- Not applicable when two or more SITs intentionally made inoperable. ------------- Two or more SITs inoperable.	C.1 Restore all but one SIT to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Operating

LCO 3.5.3 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ 1837 psia or with RCS T_c ≥ 485°F.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One LPSI subsystem inoperable.	A.1	Restore subsystem to OPERABLE status.	7 days RICT insert
B. One or more trains inoperable for reasons other than Condition A. ~~AND~~ ~~At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.~~	B.1	Restore train(s) to OPERABLE status.	72 hours RICT insert
Insert ~~C~~ D. Required Action and associated Completion Time not met.	~~C~~ D.1	Be in MODE 3.	6 hours
	AND		
	~~C~~ D.2	Reduce pressurizer pressure to < 1837 psia.	12 hours
	AND		
	~~C~~ D.3	Reduce RCS T_c to < 485°F.	12 hours

Insert for page 3.5.3-1

C. ---- NOTE ---- Not applicable when second ECCS train intentionally made inoperable. ------------ Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	C.1	Restore ECCS flow equivalent to 100% of a single OPERABLE train.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Refueling Water Tank (RWT)

LCO 3.5.5 The RWT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWT boron concentration not within limits. <u>OR</u> RWT borated water temperature not within limits.	A.1 Restore RWT to OPERABLE status.	8 hours RICT Insert
B. RWT inoperable for reasons other than Condition A.	B.1 Restore RWT to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 5.	6 hours 36 hours

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.1	Verify an OPERABLE door is closed in the affected air lock.	1 hour
	AND		
	B.2	Lock an OPERABLE door closed in the affected air lock.	24 hours
	AND		
	B.3	--------NOTE--------- Air lock doors in high radiation areas may be verified locked closed by administrative means. ---------------------	
		Verify an OPERABLE door is locked closed in the affected air lock.	Once per 31 days
C. One or more containment air locks inoperable for reasons other than Condition A or B.	C.1	Initiate action to evaluate overall containment leakage rate per LCO 3.6.1.	Immediately
	AND		
	C.2	Verify a door is closed in the affected air lock.	1 hour
	AND		
	C.3	Restore air lock to OPERABLE status.	24 hours ← RICT Insert

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.3 Containment Isolation Valves

LCO 3.6.3 Each required containment isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

------------------------------------NOTES------------------------------------

1. Penetration flow paths except for 42 inch purge valve penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for system(s) made inoperable by containment isolation valves.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when leakage results in exceeding the overall containment leakage rate acceptance criteria.
5. A 42 inch refueling purge valve is not a required containment isolation valve when its flow path is isolated with a blind flange tested in accordance with SR 3.6.1.1.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Only applicable to penetration flow paths with two required containment isolation valves. ---------------------- One or more penetration flow paths with one required containment isolation valve inoperable except for purge valve leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours ← RICT Insert

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 --------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	following isolation Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
B. ---------NOTE--------- Only applicable to penetration flow paths with two required containment isolation valves. ---------------------- One or more penetration flow paths with two required containment isolation valves inoperable except for purge valve leakage not within limit.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	1 hour RICT Insert

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------NOTE--------- Only applicable to penetration flow paths with only one required containment isolation valve and a closed system. ---------------------- One or more penetration flow paths with one required containment isolation valve inoperable.	C.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND C.2 --------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	4 hours RICT Insert following isolation Once per 31 days
D. One or more penetration flow paths with one or more required containment purge valves not within purge valve leakage limits.	D.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve with resilient seals, or blind flange. AND	24 hours RICT Insert

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. (continued)	D.2	--------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------------------	
		Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside containment AND following isolation Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	AND		
	D.3	Perform SR 3.6.3.6 for the resilient seal purge valves closed to comply with Required Action D.1.	Once per 92 days
E. Required Action and associated Completion Time not met.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 5.	36 hours

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray System

LCO 3.6.6 Two containment spray trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.
MODE 4 when RCS pressure is ≥ 385 psia

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours RICT Insert
B. Required Action and associated Completion Time of Condition A not met. Insert	B.1 Be in MODE 3. AND B.2 Be in MODE 4 with RCS pressure < 385 psia.	6 hours 84 hours
~~C. Two containment spray trains inoperable.~~	~~C.1 Enter LCO 3.0.3.~~	~~Immediately~~

Insert for page 3.6.6-1

C. ----- NOTE ------ Not applicable when second containment spray train intentionally made inoperable. --------------------- Two containment spray trains inoperable.	C.1 Restore at least one containment spray train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Three or more MSIV actuator trains inoperable. <u>OR</u> Required Action and associated Completion Time of Condition A, B, or C not met.	E.1 Declare each affected MSIV inoperable. Insert	Immediately
F. One MSIV inoperable in MODE 1.	F.1 Restore MSIV to OPERABLE status.	4 hours RICT Insert
H G. Required Action and Associated Completion Time of Condition F or G not met.	G.1 Be in MODE 2. H	6 hours
I H. ----------NOTE---------- Separate Condition entry is allowed for each MSIV. ---------------------------- One or more MSIVs inoperable in MODE 2, 3, or 4.	H.1 Close MSIV. I <u>AND</u> H.2 Verify MSIV is closed. I	4 hours Once per 7 days
J I. Required Action and associated Completion Time of Condition H not met. I	I.1 Be in MODE 3. J <u>AND</u> I.2 Be in MODE 5. J	6 hours 36 hours

Insert for page 3.7.2-2

G. - - - - NOTE - - - - Not applicable when two or more MSIVs intentionally made inoperable. - - - - - - - - - - - - Two or more MSIVs inoperable in MODE 1.	G.1 Restore all but one MSIV to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs)

LCO 3.7.3 Four economizer MFIVs and four downcomer MFIVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4 except when MFIV is closed and deactivated or isolated by a closed and deactivated power operated valve.

Insert

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each penetration flow path.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more MFIVs inoperable.	~~A.1~~ ~~Close or isolate inoperable MFIV.~~ ~~AND~~ ~~A.2~~ ~~Verify inoperable MFIV is closed or isolated.~~	~~72 hours~~ ~~Once per 7 days~~
~~B.~~ ~~Two valves in the same flow path inoperable.~~	~~B.1~~ ~~Isolate affected flow path.~~ ~~AND~~ ~~B.2~~ ~~Verify inoperable MFIV is closed or isolated.~~	~~8 hours~~ ~~Once per 7 days~~

(continued)

Insert for page 3.7.3-1

	A.1 Restore MFIV(s) to OPERABLE status. OR A.2.1 Close or isolate inoperable MFIV(s). AND A.2.2 Verify inoperable MFIV(s) is closed or isolated.	72 hours OR In accordance with the Risk Informed Completion Time Program 72 hours Once per 7 days following isolation
B. Two valves in the same flow path inoperable.	B.1 Restore one valve to OPERABLE status. OR B.2.1 Isolate affected flow path. AND B.2.2 Verify inoperable MFIV(s) is closed or isolated.	8 hours OR In accordance with the Risk Informed Completion Time Program 8 hours Once per 7 days following isolation

3.7 PLANT SYSTEMS

3.7.4 Atmospheric Dump Valves (ADVs)

LCO 3.7.4 Four ADV lines shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is being relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. --------NOTE-------- Separate Condition entry is allowed for each SG. -------------------- One required ADV line inoperable.	A.1 Restore ADV line to OPERABLE status.	7 days RICT Insert
B. Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs.	B.1 Restore one ADV line to OPERABLE status on each SG.	24 hours RICT Insert
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4 without reliance on steam generator for heat removal.	6 hours 24 hours

------ NOTE -------
Risk Informed Completion Time not applicable when all ADVs intentionally made inoperable.

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 Three AFW trains shall be OPERABLE.

-------------------------NOTE-------------------------
Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

-------------------------NOTE-------------------------
LCO 3.0.4.b is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable. OR ---------NOTE--------- Only applicable if MODE 2 has not been entered following refueling. ---------------------- One turbine driven AFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status. Deleted by adoption of TSTF-439	7 days RICT Insert ~~AND~~ ~~10 days from discovery of failure to meet the LCO~~
B. One AFW train inoperable for reasons other than Condition A in MODE 1, 2, or 3.	B.1 Restore AFW train to OPERABLE status. Deleted by adoption of TSTF-439	72 hours ~~AND~~ ~~10 days from discovery of failure to meet the LCO~~

(continued)

Insert

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C~~ D. Required Action and associated Completion Time of Condition A, B, or C ~~or B~~ not met. ~~OR~~ ~~Two AFW trains inoperable in MODE 1, 2, or 3~~	~~C~~ D.1 Be in MODE 3. AND ~~C~~ D.2 Be in MODE 4.	6 hours 12 hours
~~D~~ E. Three AFW trains inoperable in MODE 1, 2, or 3.	~~D~~ E.1 --------NOTE--------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. -------------------- Initiate action to restore one AFW train to OPERABLE status.	 Immediately
~~E~~ F. Required AFW train inoperable in MODE 4.	~~E~~ F.1 --------NOTE--------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. -------------------- Initiate action to restore one AFW train to OPERABLE status.	 Immediately

Insert for page 3.7.5-2

C. ---- NOTE ---- Not applicable when second AFW train intentionally made inoperable. ------------ Two AFW trains inoperable in MODE 1, 2, or 3.	C.1 Restore at least one AFW train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.6 Condensate Storage Tank (CST)

OPERABLE.

LCO 3.7.6 The CST ~~level~~ shall be ≥ ~~29.5 ft.~~

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CST ~~level not within limit.~~ inoperable.	A.1 Verify OPERABILITY of backup water supply.	4 hours AND Once per 12 hours thereafter
	AND A.2 Restore CST ~~level~~ to ~~within limit~~ OPERABLE status.	7 days RICT Insert
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	AND B.2 Be in MODE 4 without reliance on steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.6.1 Verify CST level is ≥ 29.5 ft.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.7 Essential Cooling Water (EW) System

LCO 3.7.7 Two EW trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One EW train inoperable.	A.1 --------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4" for shutdown cooling made inoperable by EW. --------------------- Restore EW train to OPERABLE status.	72 hours RICT Insert
Insert		
~~B~~C. Required Action and associated Completion Time ~~of Condition A~~ not met.	~~B~~C.1 Be in MODE 3. AND ~~B~~C.2 Be in MODE 5.	6 hours 36 hours

Insert for page 3.7.7-1

B. - - - - NOTE - - - - Not applicable when second EW train intentionally made inoperable. - - - - - - - - - - - - - Two EW trains inoperable.	B.1 Restore at least one EW train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.8 Essential Spray Pond System (ESPS)

LCO 3.7.8 Two ESPS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

Insert

C

RICT Insert

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESPS train inoperable.	A.1 --------Notes-------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1. "AC Sources – Operating," for emergency diesel generator made inoperable by ESPS. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6. "RCS Loops – MODE 4," for shutdown cooling made inoperable by ESPS. --------------------- Restore ESPS train to OPERABLE status.	72 hours
~~B~~. Required Action and associated Completion Time ~~of Condition A~~ not met.	~~B~~.1 Be in MODE 3.	6 hours
	AND	
	~~B~~.2 Be in MODE 5.	36 hours

Insert for page 3.7.8-1

B. - - - - NOTE - - - - Not applicable when second ESPS train intentionally made inoperable. - - - - - - - - - - - - - - Two ESPS trains inoperable.	B.1 Restore at least one ESPS train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

Insert

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. UHS inoperable.~~ B	~~A~~.1 Be in MODE 3. AND	6 hours
B	~~A~~.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.9.1	Verify the usable water depth of each essential spray pond is ≥ 12 feet.	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.2	Verify water temperature of each essential spray pond is ≤ 89°F.	In accordance with the Surveillance Frequency Control Program

Insert for page 3.7.9-1

A. ----- NOTE ---- Risk Informed Completion Time not applicable when UHS intentionally made inoperable. -------------- UHS inoperable.	A.1 Restore UHS to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.		

3.7 PLANT SYSTEMS

3.7.10 Essential Chilled Water (EC) System

LCO 3.7.10 Two EC trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One EC train inoperable.	A.1 Restore EC train to OPERABLE status.	72 hours RICT Insert
Insert C ~~B~~. Required Action and associated Completion Time not met.	~~B~~.1 Be in MODE 3. AND ~~B~~.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.10.1 Verify each EC System manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.10.2 Verify the proper actuation of each EC System component on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

Insert for page 3.7.10-1

B. ---- NOTE ---- Not applicable when second EC train intentionally made inoperable. ------------- Two EC trains inoperable.	B.1 Restore at least one EC train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.12 Control Room Emergency Air Temperature Control System (CREATCS)

LCO 3.7.12 Two CREATCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies,

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREATCS train inoperable.	A.1 Restore CREATCS train to OPERABLE status.	30 days
Insert		
C ~~B~~. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	C ~~B~~.1 Be in MODE 3. AND C ~~B~~.2 Be in MODE 5.	6 hours 36 hours
D or B ~~C~~. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6.	D ~~C~~.1 Place OPERABLE CREATCS train in operation.	Immediately
E ~~D~~. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies.	E ~~D~~.1 Place OPERABLE CREATCS train in operation OR E ~~D~~.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately

(continued)

Insert for page 3.7.12-1

B. ---- NOTE ---- Not applicable when second CREATCS train intentionally made inoperable. ------------- Two CREATCS trains inoperable in MODE 1, 2, 3, or 4.	B.1 Restore at least one CREATCS train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION $\boxed{F}$	REQUIRED ACTION	COMPLETION TIME
~~E~~. Two CREATCS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	~~E~~.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	~~E~~.2 Suspend movement of irradiated fuel assemblies.	Immediately
~~F. Two CREATCS trains inoperable in MODE 1, 2, 3, or 4.~~	~~F.1 Enter LCO 3.0.3.~~	~~Immediately~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.12.1	Verify each CREATCS train has the capability to remove the assumed heat load.	In accordance with the Surveillance Frequency Control Program

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status. Deleted by adoption of TSTF-439	72 hours RICT Insert ~~AND~~ ~~13 days from discovery of failure to meet LCO~~
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the OPERABLE required offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	
	B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND	
	B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR	
	B.3.2 Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	AND	
		(continued)

RICT insert

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Restore DG to OPERABLE status. Deleted by adoption of TSTF-439	10 days ~~AND~~ ~~13 days from discovery of failure to meet LCO~~
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)
	AND	
	C.2 Restore one required offsite circuit to OPERABLE status.	24 hours

RICT insert

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One required offsite circuit inoperable. AND One DG inoperable.	------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition D is entered with no AC power source to a train. ----------------------------	
	D.1 Restore required offsite circuits to OPERABLE status.	12 hours
	OR	
	D.2 Restore DG to OPERABLE status.	12 hours
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours
F. One automatic load sequencer inoperable.	F.1 Restore automatic load sequencer to OPERABLE status.	24 hours
	AND	
	F.2 Declare required feature(s) supported by the inoperable sequencer inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition F concurrent with inoperability of redundant required feature(s)

RICT Insert

(continued)

Insert

Insert for page 3.8.1-4

G. ---- NOTE ---- Not applicable when three or more required AC sources intentionally made inoperable. ------------- Three or more required AC sources inoperable.	G.1 Restore required AC source(s) to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION H	REQUIRED ACTION	COMPLETION TIME
~~G~~ H. One or more required offsite circuit(s) do not meet required capability.	~~G~~ H.1 Restore required capability of the offsite circuit(s). <u>OR</u> -------------NOTE------------ Enter LCO 3.8.1 Condition A or C for required offsite circuit(s) inoperable. ----------------------------- ~~G~~ H.2 Transfer the ESF bus(es) from the offsite circuit(s) to the EDG(s).	1 hour 1 hour
~~H~~ I. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, ~~or G~~ G, or H not met.	~~H~~ I.1 Be in MODE 3. <u>AND</u> ~~H~~ I.2 Be in MODE 5.	6 hours 36 hours
~~I. Three or more required AC sources inoperable.~~	~~I.1 Enter LCO 3.0.3.~~	~~Immediately~~

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources – Operating

LCO 3.8.4 The Train A and Train B DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One battery charger on one subsystem inoperable. Insert	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage. <u>AND</u> A.2 Verify battery float current ≤ 2 amps. <u>AND</u> A.3 Restore battery charger to OPERABLE status.	2 hours RICT Insert Once per 12 hours 72 hours RICT Insert
B. One DC electrical power subsystem inoperable for reasons other than Condition A.	B.1 Restore DC electrical power subsystem to OPERABLE status D	2 hours RICT Insert
C. Required Action and associated Completion Time not met. D	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 5.	6 hours 36 hours

D

Insert for page 3.8.4-1

C. ---- NOTE ---- Not applicable when second DC electrical power subsystem intentionally made inoperable. ------------- Two DC electrical power subsystems inoperable.	C.1 Restore at least one DC electrical power subsystem to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters – Operating

LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

---------------------------NOTE---------------------------
One inverter may be disconnected from its associated DC bus for ≤ 24 hours to perform an equalizing charge on its associated battery, provided:

a. The associated AC vital instrument bus is energized from its Class 1E constant voltage source regulator; and

b. All other AC vital instrument buses are energized from their associated OPERABLE inverters.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	A.1 ---------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital instrument bus de-energized. ---------------------- Restore inverter to OPERABLE status.	 7 days

RICT insert

(continued)

Insert

Insert for page 3.8.7-1

B. ---- NOTE ---- Not applicable when two or more required inverters intentionally made inoperable resulting in loss of safety function. ------------ Two or more required inverters inoperable.	B.1 Restore all but one inverter to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION C	REQUIRED ACTION		COMPLETION TIME
~~B~~. Required Action and associated Completion Time not met.	~~B~~.1	Be in MODE 3.	6 hours
	AND		
	~~B~~.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to required AC vital instrument buses.	In accordance with the Surveillance Frequency Control Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems – Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC vital instrument bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC electrical power distribution subsystem inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours ~~AND~~ ~~16 hours from discovery of failure to meet LCO~~
B. One AC vital instrument bus electrical power distribution subsystem inoperable.	B.1 Restore AC vital instrument bus electrical power distribution subsystem to OPERABLE status.	2 hours ~~AND~~ ~~16 hours from discovery of failure to meet LCO~~

RICT Insert

Deleted by adoption of TSTF-439

Deleted by adoption of TSTF-439

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One DC electrical power distribution subsystems inoperable. Insert E	C.1 Restore DC electrical power distribution subsystem to OPERABLE status. Deleted by adoption of TSTF-439	2 hours RICT Insert ~~AND~~ ~~16 hours from discovery of failure to meet LCO~~
~~D~~. Required Action and associated Completion Time not met.	~~D~~.1 Be in MODE 3. AND ~~D~~.2 Be in MODE 5.	6 hours 36 hours
~~E. Two or more inoperable distribution subsystems that result in a loss of safety function.~~	~~E.1 Enter LCO 3.0.3.~~	~~Immediately~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, DC, and AC vital instrument bus electrical power distribution subsystems.	In accordance with the Surveillance Frequency Control Program

Insert for page 3.8.9-2

D. ---- NOTE ----- Not applicable when two or more electrical power distribution subsystems intentionally made inoperable resulting in loss of safety function. ------------- Two or more electrical power distribution subsystems inoperable.	D.1 Restore electrical power distribution subsystem(s) to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

5.5 Programs and Manuals (continued)

5.5.19 Battery Monitoring and Maintenance Program (continued)

4. In Regulatory Guide 1.129, Regulatory Position 3, Subsection 5.4.1, "State of Charge Indicator," the following statements in paragraph (d) may be omitted: "When it has been recorded that the charging current has stabilized at the charging voltage for three consecutive hourly measurements, the battery is near full charge. These measurements shall be made after the initially high charging current decreases sharply and the battery voltage rises to approach the charger output voltage."

5. In lieu of RG 1.129, Regulatory Position 7, Subsection 7.6, "Restoration," the following may be used: "Following the test, record the float voltage of each cell of the string."

b. The program shall include the following provisions:

1. Actions to restore battery cells with float voltage < 2.13 V;

2. Actions to determine whether the float voltage of the remaining battery cells is ≥ 2.13 V when the float voltage of a battery cell has been found to be < 2.13 V;

3. Actions to equalize and test battery cells that had been discovered with electrolyte level below the top of the plates;

4. Limits on average electrolyte temperature, battery connection resistance, and battery terminal voltage; and

5. A requirement to obtain specific gravity readings of all cells at each discharge test, consistent with manufacturer recommendations.

Insert

Insert for page 5.5-19

5.5.20 Risk Informed Completion Time Program

This program provides controls to calculate a Risk Informed Completion Time (RICT) and must be implemented in accordance with NEI 06-09 Revision 0 - A, "Risk-Managed Technical Specifications (RMTS) Guidelines." The program shall include the following:

a. The RICT may not exceed 30 days;

b. A RICT may only be utilized in MODE 1, 2;

c. When a RICT is being used, any plant configuration change within the scope of the Risk Informed Completion Time Program must be considered for the effect on the RICT.

   1. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration.

   2. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

   3. Revising the RICT is not required if the plant configuration change would lower plant risk and would result in a longer RICT.

d. Use of a RICT is not permitted for voluntary entry into a configuration which represents a loss of a specified safety function or inoperability of all required trains of a system required to be OPERABLE.

e. Use of a RICT is permitted for emergent conditions which represent a loss of a specified safety function or inoperability of all required trains of a system required to be OPERABLE if one or more of the trains are considered "PRA functional" as defined in Section 2.3.1 of NEI 06-09 Revision 0 - A.

ATTACHMENT 2

Revised Technical Specification Pages (Clean copy)

1.3-13	3.6.6-1	3.8.1-4
1.3-14	3.6.6-2	3.8.1-5
1.3-15	3.6.6-3	3.8.1-6
3.3.4-1	3.7.2-2	3.8.1-7
3.3.6-1	3.7.2-3	3.8.1-8
3.3.6-2	3.7.2-4	3.8.1-9
3.3.6-3	3.7.3-1	3.8.1-10
3.3.6-4	3.7.3-2	3.8.1-11
3.3.6-5	3.7.4-1	3.8.1-12
3.4.9-1	3.7.5-1	3.8.1-13
3.4.9-2	3.7.5-2	3.8.1-14
3.4.10-1	3.7.6-1	3.8.1-15
3.4.12-1	3.7.6-2	3.8.1-16
3.5.1-1	3.7.7-1	3.8.1-17
3.5.1-2	3.7.7-2	3.8.1-18
3.5.3-1	3.7.8-1	3.8.4-1
3.5.3-2	3.7.8-2	3.8.4-2
3.5.3-3	3.7.9-1	3.8.4-3
3.5.3-4	3.7.9-2	3.8.4-4
3.5.5-1	3.7.10-1	3.8.7-1
3.6.2-3	3.7.10-2	3.8.7-2
3.6.3-1	3.7.12-1	3.8.9-1
3.6.3-2	3.7.12-2	3.8.9-2
3.6.3-3	3.8.1-2	5.5.20
3.6.3-4	3.8.1-3	

Note:

The following TS clean pages in this attachment reflect the deletion of second completions adopted by the pending licensing amendment request to adopt TSTF-439-A (ML15065A031)

- TS 1.3, *Completion Times*
- TS 3.7.5, *Auxiliary Feedwater (AFW) System*
- TS 3.8.1, *AC Sources - Operating*
- TS 3.8.9, *Distribution Systems - Operating*

1.3 Completion Times

EXAMPLES

EXAMPLE 1.3-7 (continued)

The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

EXAMPLE 1.3-8

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program
B.-----NOTE----- Not applicable when second subsystem intentionally made inoperable. --------------- Two subsystems inoperable.	B.1 Restore subsystems to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

When a subsystem is declared inoperable, Condition A is entered. The 7 day Completion Time may be applied as discussed in Example 1.3-2. However, the licensee may elect to apply the

1.3 Completion Times

ACTION (continued)

Risk Informed Completion Time Program which permits calculation of a Risk Informed Completion Time (RICT) that may be used to complete the Required Action beyond the 7 day Completion Time. The RICT cannot exceed 30 days. After the 7 day Completion Time has expired, the subsystem must be restored to OPERABLE status within the RICT or Condition C must also be entered.

If a second subsystem is declared inoperable, Condition B may also be entered. The Condition is modified by a NOTE stating it is not applicable if the second subsystem is intentionally made inoperable. The Required Actions of Condition B are not intended for voluntary removal of redundant subsystems from service. The Required Action is only applicable if one subsystem is inoperable for any reason and the second subsystem is found to be inoperable, or if both subsystems are found to be inoperable at the same time. If Condition B is applicable, at least one subsystem must be restored to OPERABLE status within 1 hour or Condition C must also be entered. The licensee may be able to apply a RICT to extend the Completion Time beyond 1 hour if the requirements of the Risk Informed Completion Time Program are met. If two subsystems are inoperable and Condition B is not applicable (i.e., the second subsystem was intentionally made inoperable), LCO 3.0.3 is entered as there is no applicable Condition.

The Risk Informed Completion Time Program requires recalculation of the RICT to reflect changing plant conditions. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

If the 7 day Completion Time clock of Condition A or the 1 hour Completion Time clock Condition B have expired and subsequent changes in the plant condition result in exiting the applicability of the Risk Informed Completion Time Program without restoring the inoperable subsystem to OPERABLE status, Condition C is also entered and the Completion Time clocks for Required Actions C.1 and C.2 start.

If the RICT expires or is recalculated to be less than the elapsed time since the Condition was entered and the inoperable subsystem has not been restored to OPERABLE status, Condition C is also entered and the Completion Time clocks for Required Actions C.1 and C.2 start. If the inoperable subsystems are restored to OPERABLE status after Condition C is entered, Conditions A, B, and C are exited, and therefore, the Required Actions of Condition C may be terminated.

1.3 Completion Times

IMMEDIATE COMPLETION TIME	When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

3.3 INSTRUMENTATION

3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation

LCO 3.3.4 Six channels of RPS Matrix Logic, four channels of RPS Initiation Logic, four channels of reactor trip circuit breakers (RTCBs), and four channels of Manual Trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, with any RTCBs closed and any control element assemblies capable of being withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Matrix Logic channel inoperable. OR Three Matrix Logic channels inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1 Restore channel to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program

(continued)

3.3 INSTRUMENTATION

3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip

LCO 3.3.6 Six channels of ESFAS Matrix Logic, four channels of ESFAS Initiation Logic, two channels of Actuation Logic, and four channels of Manual Trip shall be OPERABLE for each Function in Table 3.3.6-1.

APPLICABILITY: According to Table 3.3.6-1.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one Matrix Logic channel inoperable. <u>OR</u> Three Matrix Logic channels are inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1 Restore channel to OPERABLE status.	48 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. One or more Functions with one Manual Trip or Initiation Logic channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with two Initiation Logic channels or Manual Trip channels affecting the same trip leg inoperable.	C.1 Open at least one contact in the affected trip leg of both ESFAS Actuation Logics. AND	Immediately
	C.2 Restore channels to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program
D. One or more Functions with one Actuation Logic channel inoperable.	D.1 --------NOTE--------- One channel of Actuation Logic may be bypassed for up to 1 hour for Surveillances, provided the other channel is OPERABLE. --------------------- Restore channel to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program
E. --------NOTE------- Not applicable when second Actuation Logic channel intentionally made inoperable. ------------------- One or more functions with two Actuation Logic channels inoperable.	E.1 Restore channel(s) to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

F. Required Action and associated Completion Time of Conditions for Containment Spray Actuation Signal, Main Steam Isolation Signal or Auxiliary Feedwater Actuation Signal not met.	F.1 Be in MODE 3. <u>AND</u> F.2 Be in MODE 4.	6 hours 12 hours
G. Required Action and associated Completion Time of Conditions for Safety Injection Actuation Signal, Containment Isolation Actuation Signal, or Recirculation Actuation Signal not met.	G.1 Be in MODE 3. <u>AND</u> G.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	-------------------NOTE------------------- Testing of Actuation Logic shall include the verification of the proper operation of each initiation relay. -- Perform a CHANNEL FUNCTIONAL TEST on each ESFAS logic channel and Manual Trip channel.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.2	-------------------NOTE------------------- Relays exempt from testing during operation shall be tested in accordance with the Surveillance Frequency Control Program. --	
	Perform a subgroup relay test of each Actuation Logic channel, which includes the de-energization of each subgroup relay and verification of the OPERABILITY of each subgroup relay.	In accordance with the Surveillance Frequency Control Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≥ 27% and ≤ 56%; and

b. Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 125 kW.

APPLICABILITY: MODES 1, 2, and 3.

------------------------------NOTE------------------------------
The pressurizer water level limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute; or
b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Pressurizer water level not within limit.	A.1	Be in MODE 3 with reactor trip breakers open.	6 hours
	AND		
	A.2	Be in MODE 4.	12 hours
B. One required group of pressurizer heaters inoperable.	B.1	Restore required group of pressurizer heaters to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. --------NOTE-------- Not applicable when second group of required pressurizer heaters intentionally made inoperable. -------------------- Two required groups of pressurizer heaters inoperable.	C.1 Restore at least one required group of pressurizer heaters to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
D. Required Action and associated Completion Time of Condition B or C not met.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is ≥ 27% and ≤ 56%	In accordance with the Surveillance Frequency Control Program
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters ≥ 125 kW.	In accordance with the Surveillance Frequency Control Program

Table 3.3.6-1 (page 1 of 1)
Engineered Safety Features Actuation System Logic and Manual Trip Applicability

FUNCTION	APPLICABLE MODES
1. Safety Injection Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
2. Containment Isolation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
3. Recirculation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
4. Containment Spray Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
5. Main Steam Isolation Signal[a]	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3

(a) The MSIS Function is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves - Modes 1, 2 and 3

LCO 3.4.10 Four pressurizer safety valves shall be OPERABLE with lift settings ≥ 2450.25 psia and ≤ 2549.25 psia.

APPLICABILITY: MODES 1, 2, and 3.

-----------------------------NOTE-----------------------------
The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 72 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met. <u>OR</u> Two or more pressurizer safety valves inoperable.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4	6 hours 12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Pressurizer Vents

LCO 3.4.12 Four pressurizer vent paths shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.
MODE 4 with RCS pressure ≥ 385 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two or three required pressurizer vent paths inoperable.	A.1 Restore required pressurizer vent paths to OPERABLE status.	72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. ---------NOTE------- Risk Informed Completion Time not applicable when last vent path intentionally made inoperable. -------------------- All pressurizer vent paths inoperable.	B.1 Restore one pressurizer vent path to OPERABLE status.	6 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time of Condition A, or B not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4 with RCS pressure < 385 psia.	6 hours 24 hours

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Safety Injection Tanks (SITs) - Operating

LCO 3.5.1 Four SITs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3 and 4 with pressurizer pressure ≥ 1837 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SIT inoperable due to boron concentration not within limits. OR One SIT inoperable due to inability to verify level or pressure.	A.1 Restore SIT to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
B. One SIT inoperable for reasons other than Condition A.	B.1 Restore SIT to OPERABLE status.	24 hours OR In accordance with the Risk Informed Completion Time Program
C. --------NOTE-------- Not applicable when two or more SITs intentionally made inoperable. -------------------- Two or more SITs inoperable.	C.1 Restore all but one SIT to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program

ACTIONS

D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Reduce pressurizer pressure to < 1837 psia.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each SIT isolation valve is fully open.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.2	Verify borated water volume in each SIT is ≥ 28% narrow range and ≤ 72% narrow range.	In accordance with the Surveillance Frequency Control Program
R 3.5.1.3	Verify nitrogen cover pressure in each SIT is ≥ 600 psig and ≤ 625 psig.	In accordance with the Surveillance Frequency Control Program

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Operating

LCO 3.5.3 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ 1837 psia or with RCS T_c ≥ 485°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LPSI subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program
B. One or more trains inoperable for reasons other than Condition A.	B.1 Restore train(s) to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
C. -------NOTE-------- Not applicable when second ECCS train intentionally made inoperable. ------------------- Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	C.1 Restore ECCS flow equivalent to 100% of a single OPERABLE train.	1 hour OR In accordance with the Risk Informed Completion Time Program

ACTIONS

D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	6 hours
	AND	
	D.2 Reduce pressurizer pressure to < 1837 psia.	12 hours
	AND	
	D.3 Reduce RCS T_c to < 485°F.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.3.2	Verify ECCS piping is full of water.	In accordance with the Surveillance Frequency Control Program
SR 3.5.3.3	Verify each ECCS pump develops the required differential pressure at the flow test point.	In accordance with the Inservice Testing Program
SR 3.5.3.4	Verify each ECCS automatic valve that is not locked, sealed, or otherwise secured in position, in the flow path actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.3.5	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.3.6	Verify each LPSI pump stops on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.3.7	Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. LPSI System Valve Number: SIB-UV 615, SIB-UV 625, SIA-UV 635, SIA-UV 645, SIA-HV 306, SIB-HV 307 Hot Leg Injection Valve Numbers: SIC-HV 321, SID-HV 331	In accordance with the Surveillance Frequency Control Program
SR 3.5.3.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet strainers show no evidence of structural distress or abnormal corrosion.	In accordance with the Surveillance Frequency Control Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Refueling Water Tank (RWT)

LCO 3.5.5 The RWT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWT boron concentration not within limits. OR RWT borated water temperature not within limits.	A.1 Restore RWT to OPERABLE status.	8 hours OR In accordance with the Risk Informed Completion Time Program
B. RWT inoperable for reasons other than Condition A.	B.1 Restore RWT to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.1 Verify an OPERABLE door is closed in the affected air lock.	1 hour
	AND	
	B.2 Lock an OPERABLE door closed in the affected air lock.	24 hours
	AND	
	B.3 --------NOTE--------- Air lock doors in high radiation areas may be verified locked closed by administrative means. ---------------------	
	Verify an OPERABLE door is locked closed in the affected air lock.	Once per 31 days
C. One or more containment air locks inoperable for reasons other than Condition A or B.	C.1 Initiate action to evaluate overall containment leakage rate per LCO 3.6.1.	Immediately
	AND	
	C.2 Verify a door is closed in the affected air lock.	1 hour
	AND	
	C.3 Restore air lock to OPERABLE status.	24 hours OR In accordance with the Risk Informed Completion Time Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.3 Containment Isolation Valves

LCO 3.6.3 Each required containment isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

------------------------------------NOTES------------------------------------

1. Penetration flow paths except for 42 inch purge valve penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for system(s) made inoperable by containment isolation valves.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when leakage results in exceeding the overall containment leakage rate acceptance criteria.
5. A 42 inch refueling purge valve is not a required containment isolation valve when its flow path is isolated with a blind flange tested in accordance with SR 3.6.1.1.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ---------NOTE--------- Only applicable to penetration flow paths with two required containment isolation valves. ---------------------- One or more penetration flow paths with one required containment isolation valve inoperable except for purge valve leakage not within limit.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	4 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
	<u>AND</u>		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 --------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	 Once per 31 days following isolation for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
B. ---------NOTE--------- Only applicable to penetration flow paths with two required containment isolation valves. ---------------------- One or more penetration flow paths with two required containment isolation valves inoperable except for purge valve leakage not within limit.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	1 hour OR In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. ---------NOTE--------- Only applicable to penetration flow paths with only one required containment isolation valve and a closed system. --------------------- One or more penetration flow paths with one required containment isolation valve inoperable.	C.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	4 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
	<u>AND</u>		
	C.2	--------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	Once per 31 days following isolation
D. One or more penetration flow paths with one or more required containment purge valves not within purge valve leakage limits.	D.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve with resilient seals, or blind flange.	24 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
	<u>AND</u>		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. (continued)	D.2	--------NOTE--------- Isolation devices in high radiation areas may be verified by use of administrative means. --------------------- Verify the affected penetration flow path is isolated.	Once per 31 days following isolation for isolation devices outside containment <u>AND</u> Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	<u>AND</u>		
	D.3	Perform SR 3.6.3.6 for the resilient seal purge valves closed to comply with Required Action D.1.	Once per 92 days following isolation
E. Required Action and associated Completion Time not met.	E.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	E.2	Be in MODE 5.	36 hours

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray System

LCO 3.6.6 Two containment spray trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.
MODE 4 when RCS pressure is ≥ 385 psia

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 4 with RCS pressure < 385 psia.	84 hours
C. -------NOTE-------- Not applicable when second containment spray train intentionally made inoperable. ------------------- Two containment spray trains inoperable.	C.1 Restore at least one containment spray train to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	Verify each containment spray manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.6.6.2	Verify the containment spray piping is full of water to the 113 ft level in the containment spray header.	In accordance with the Surveillance Frequency Control Program
SR 3.6.6.3	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.6.4	Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.5	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.6.6	Verify each spray nozzle is unobstructed.	In accordance with the Surveillance Frequency Control Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Three or more MSIV actuator trains inoperable. <u>OR</u> Required Action and associated Completion Time of Condition A, B, or C not met.	E.1 Declare each affected MSIV inoperable.	Immediately
F. One MSIV inoperable in MODE 1.	F.1 Restore MSIV to OPERABLE status.	4 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
G. --------NOTE-------- Not applicable when two or more MSIVs intentionally made inoperable. -------------------- Two or more MSIVs inoperable in MODE 1.	G.1 Restore all but one MSIV to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
H. Required Action and Associated Completion Time of Condition F or G not met.	H.1 Be in MODE 2.	6 hours

ACTIONS (continued)

I. ---------NOTE--------- Separate Condition entry is allowed for each MSIV. --------------------- One or more MSIVs inoperable in MODE 2, 3, or 4.	I.1 Close MSIV. AND I.2 Verify MSIV is closed.	4 hours Once per 7 days
J. Required Action and associated Completion Time of Condition I not met.	J.1 Be in MODE 3. AND J.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	-------------------NOTE-------------------- Not required to be performed prior to entry into MODE 3. --- Verify closure time of each MSIV is within limits with each actuator train on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs)

LCO 3.7.3 Four economizer MFIVs and four downcomer MFIVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4 except when MFIV is closed and deactivated or isolated by a closed and deactivated power operated valve.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each penetration flow path.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more MFIVs inoperable.	A.1 Restore MFIV(s) to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
	OR	
	A.2.1 Close or isolate inoperable MFIV(s). AND	72 hours
	A.2.2 Verify inoperable MFIV(s) is closed or isolated.	Once per 7 days following isolation

ACTIONS (continued)

B. Two valves in the same flow path inoperable.	B.1 Restore one valve to OPERABLE status.	8 hours OR In accordance with the Risk Informed Completion Time Program
	OR	
	B.2.1 Isolated affected flow path.	8 hours
	AND	
	B.2.2. Verify inoperable MFIV(s) is closed or isolated.	Once per 7 days following isolation
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the closure time of each MFIV is within limits on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

3.7 PLANT SYSTEMS

3.7.4 Atmospheric Dump Valves (ADVs)

LCO 3.7.4 Four ADV lines shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is being relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. --------NOTE-------- Separate Condition entry is allowed for each SG. -------------------- One required ADV line inoperable.	A.1 Restore ADV line to OPERABLE status.	7 days <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. --------NOTE-------- Risk Informed Completion Time not applicable when all ADVs intentionally made inoperable. ------------------- Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs.	B.1 Restore one ADV line to OPERABLE status on each SG.	24 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4 without reliance on steam generator for heat removal.	6 hours 24 hours

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 Three AFW trains shall be OPERABLE.

---------------------------NOTE---------------------------
Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

-----------------------------------NOTE-----------------------------------
LCO 3.0.4.b is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable. <u>OR</u> ---------NOTE--------- Only applicable if MODE 2 has not been entered following refueling. --------------------- One turbine driven AFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status.	7 days <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. One AFW train inoperable for reasons other than Condition A in MODE 1, 2, or 3.	B.1 Restore AFW train to OPERABLE status.	72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. --------NOTE--------- Not applicable when second AFW train intentionally made inoperable. --------------------- Two AFW trains inoperable in MODE 1, 2, or 3.	C.1	Restore at least one AFW train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	D.2	Be in MODE 4.	12 hours
E. Three AFW trains inoperable in MODE 1, 2, or 3.	E.1	--------NOTE--------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. --------------------- Initiate action to restore one AFW train to OPERABLE status.	Immediately
F. Required AFW train inoperable in MODE 4.	F.1	--------NOTE--------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. --------------------- Initiate action to restore one AFW train to OPERABLE status.	Immediately

3.7 PLANT SYSTEMS

3.7.6 Condensate Storage Tank (CST)

LCO 3.7.6 The CST shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CST inoperable.	A.1 Verify OPERABILITY of backup water supply.	4 hours <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>	
	A.2 Restore CST to OPERABLE status	7 days <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.2 Be in MODE 4 without reliance on steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify CST level is ≥ 29.5 ft.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.7 Essential Cooling Water (EW) System

LCO 3.7.7 Two EW trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One EW train inoperable.	A.1 --------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4" for shutdown cooling made inoperable by EW. --------------------- Restore EW train to OPERABLE status.	72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. --------NOTE--------- Not applicable when second EW train intentionally made inoperable. -------------------- Two EW trains inoperable	B.1 Restore at least one EW train to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.7.1	-------------------NOTE-------------------- Isolation of EW flow to individual components does not render the EW System inoperable. --- Verify each EW manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.7.2	Verify each EW automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.7.3	Verify each EW pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.8 Essential Spray Pond System (ESPS)

LCO 3.7.8 Two ESPS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESPS train inoperable.	A.1 --------Notes-------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1. "AC Sources – Operating," for emergency diesel generator made inoperable by ESPS. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6. "RCS Loops – MODE 4," for shutdown cooling made inoperable by ESPS. --------------------- Restore ESPS train to OPERABLE status.	 72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. --------NOTE-------- Not applicable when second ESPS train intentionally made inoperable. -------------------- Two ESPS trains inoperable.	B.1 Restore at least one ESPS train to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.8.1	------------------Notes------------------ Isolation of ESPS flow to individual components does not render ESPS inoperable. --- Verify each ESPS manual and power operated valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.2	Verify each ESPS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. --------NOTE-------- Risk Informed Completion Time not applicable when UHS intentionally made inoperable. -------------------- UHS inoperable.	A.1 Restore UHS to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.9.1	Verify the usable water depth of each essential spray pond is ≥ 12 feet.	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.2	Verify water temperature of each essential spray pond is ≤ 89°F.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.10 Essential Chilled Water (EC) System

LCO 3.7.10 Two EC trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One EC train inoperable.	A.1 Restore EC train to OPERABLE status.	72 Hours OR In accordance with the Risk Informed Completion Time Program
B. --------NOTE-------- Not applicable when second EC train intentionally made inoperable. -------------------- Two EC trains inoperable.	B.1 Restore at least one EC train to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Verify each EC System manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.10.2	Verify the proper actuation of each EC System component on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.12 Control Room Emergency Air Temperature Control System (CREATCS)

LCO 3.7.12 Two CREATCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies,

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREATCS train inoperable.	A.1 Restore CREATCS train to OPERABLE status.	30 days
B. --------NOTE-------- Not applicable when second CREATCS train intentionally made inoperable. -------------------- Two CREATCS trains inoperable in MODE 1, 2, 3, or 4.	B.1 Restore at least one CREATCS train to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours
D. Required Action and associated Comple tion Time of Condition A not met in MODE 5 or 6.	D.1 Place OPERABLE CREATCS train in operation.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies.	E.1 Place OPERABLE CREATCS train in operation OR E.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately
F. Two CREATCS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	F.1 Suspend CORE ALTERATIONS. AND F.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.12.1 Verify each CREATCS train has the capability to remove the assumed heat load.	In accordance with the Surveillance Frequency Control Program

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the OPERABLE required offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	
	B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND	
	B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR	
	B.3.2 Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Restore DG to OPERABLE status.	10 days OR In accordance with the Risk Informed Completion Time Program
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)
	AND	
	C.2 Restore one required offsite circuit to OPERABLE status.	24 hours OR In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One required offsite circuit inoperable. AND One DG inoperable.	------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition D is entered with no AC power source to a train. ----------------------------	
	D.1 Restore required offsite circuits to OPERABLE status.	12 hours OR In accordance with the Risk Informed Completion Time Program
	OR	
	D.2 Restore DG to OPERABLE status.	12 hours OR In accordance with the Risk Informed Completion Time Program
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours OR In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One automatic load sequencer inoperable.	F.1 Restore automatic load sequencer to OPERABLE status.	24 hours OR In accordance with the Risk Informed Completion Time Program
	AND	
	F.2 Declare required feature(s) supported by the inoperable sequencer inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition F concurrent with inoperability of redundant required feature(s)
G. --------NOTE-------- Not applicable when three or more required AC sources intentionally made inoperable. -------------------- Three or more required AC sources inoperable.	G.1 Restore required AC source(s) to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One or more required offsite circuit(s) do not meet required capability.	H.1 Restore required capability of the offsite circuit(s). OR -------------NOTE------------ Enter LCO 3.8.1 Condition A or C for required offsite circuit(s) inoperable. ---------------------------- H.2 Transfer the ESF bus(es) from the offsite circuit(s) to the EDG(s).	1 hour 1 hour
I. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, G, or H not met.	I.1 Be in MODE 3. AND I.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.2	-------------------NOTES----------------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. 4. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. --- Verify each DG starts from standby condition and achieves steady state voltage ≥ 4000 V and ≤ 4377.2 V, and frequency ≥ 59.7 Hz and ≤ 60.7 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	-------------------NOTES------------------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. --- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4950 kW and ≤ 5500 kW.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.4	Verify each day tank contains ≥ 550 gal of fuel oil (minimum level of 2.75 feet).	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	-------------------NOTE-------------------- 1. All DG starts may be preceded by an engine prelube period followed by a warmup period prior to loading. 2. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. --- Verify each DG starts from standby condition and achieves a. In ≤ 10 seconds, voltage ≥ 3740 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 4000 V and ≤ 4377.2 V, and frequency ≥ 59.7 Hz and ≤ 60.7 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.8	-------------------NOTE------------------- This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. --- Verify manual transfer of AC power sources from the normal offsite circuit to each alternate offsite circuit.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	-------------------NOTE------------------ This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. --	
	Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 64.5 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 3740 V and ≤ 4580 V; and c. Within 3 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.10	-------------------NOTE------------------ If performed with the DG synchronized with offsite power, it shall be performed at a power factor of ≤ 0.89. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. --	
	Verify each DG does not trip, and voltage is maintained ≤ 6200 V during and following a load rejection of ≥ 4950 kW and ≤ 5500 kW.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	-------------------NOTE-------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 3. Momentary voltage and frequency transients induced by load changes do not invalidate this test. 4. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. ---	
	Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through automatic load sequencer, 3. maintains steady state voltage ≥ 4000 V and ≤ 4377.2 V, 4. maintains steady state frequency ≥ 59.7 Hz and ≤ 60.7 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	-------------------NOTES------------------ 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 3. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. --	
	Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal (without a loss of offsite power) each DG auto-starts and: a. In ≤ 10 seconds, achieves voltage ≥ 3740 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 4000 and ≤ 4377.2 V and frequency ≥ 59.7 Hz and ≤ 60.7 Hz; c. Operates for ≥ 5 minutes on standby (running unloaded); d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized (auto-connected through the automatic load sequencer) from the offsite power system.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	Verify each DG automatic trip is bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: a. Engine overspeed; b. Generator differential current; c. Engine low lube oil pressure; and d. Manual emergency stop trip.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	-------------------NOTES------------------- 1. Momentary transients outside the load range do not invalidate this test. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor of ≤ 0.89. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. 3. All DG starts may be preceded by an engine prelube period followed by a warmup period prior to loading. 4. DG loading may include gradual loading as recommended by the manufacturer. ---	
	Verify each DG operates for ≥ 24 hours: a. For ≥ 22 hours loaded ≥ 4950 kW and ≤ 5500 kW; and b. For the remaining hours (≥ 2) of the test loaded ≥ 5775 kW and ≤ 6050 kW.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	-------------------NOTES------------------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG, loaded ≥ 4950 kW and ≤ 5500 kW, has operated ≥ 2 hours or until temperatures have stabilized. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. 3. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. --	
	Verify each DG starts and achieves a. In ≤ 10 seconds, voltage ≥ 3740 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 4000 V and ≤ 4377.2 V, and frequency ≥ 59.7 Hz and ≤ 60.7 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.16	-------------------NOTE------------------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. --	
	Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.17	-------------------NOTE------------------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. -- Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by: a. Returning DG to ready-to-load operation; and b. Automatically energizing the emergency load from offsite power.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.18	-------------------NOTE------------------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. -- Verify interval between each sequenced load block is within ± 1 second of design interval for each automatic load sequencer.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	-------------------NOTES------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 3. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. --- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencer, 3. achieves steady state voltage ≥ 4000 V and ≤ 4377.2 V, 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 60.7 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.20	-----NOTES----- 1. All DG starts may be preceded by an engine prelube period. 2. The steady state voltage and frequency limits are analyzed values and have not been adjusted for instrument error. ---------- Verify, when started simultaneously, each DG achieves a. In ≤ 10 seconds, voltage ≥ 3740 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 4000 V and ≤ 4377.2 V, and frequency ≥ 59.7 Hz and ≤ 60.7 Hz.	In accordance with the Surveillance Frequency Control Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources – Operating

LCO 3.8.4 The Train A and Train B DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One battery charger on one subsystem inoperable.	A.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
	<u>AND</u>		
	A.2	Verify battery float current ≤ 2 amps.	Once per 12 hours
	<u>AND</u>		
	A.3	Restore battery charger to OPERABLE status.	72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

B. One DC electrical power subsystem inoperable for reasons other than Condition A.	B.1 Restore DC electrical power subsystem to OPERABLE status	2 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. --------NOTE-------- Not applicable when second DC electrical power subsystem intentionally made inoperable. -------------------- Two DC electrical power subsystems inoperable.	C.1 Restore at least one DC electrical power subsystem to OPERABLE status.	1 hour <u>OR</u> In accordance with the Risk Informed Completion Time Program
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.2	Deleted	
SR 3.8.4.3	Deleted	
SR 3.8.4.4	Deleted	
SR 3.8.4.5	Deleted	
SR 3.8.4.6	Verify each battery charger supplies ≥ 400 amps for Batteries A and B and ≥ 300 amps for Batteries C and D at greater than or equal to the minimum established float voltage for ≥ 8 hours. <u>OR</u> Verify each battery charger can recharge the battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.7	--------------------NOTES-------------------- 1. The modified performance discharge test in SR 3.8.6.9 may be performed in lieu of SR 3.8.4.7. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. -- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.8	Deleted	

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters – Operating

LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

---------------------------NOTE---------------------------
One inverter may be disconnected from its associated DC bus for ≤ 24 hours to perform an equalizing charge on its associated battery, provided:

a. The associated AC vital instrument bus is energized from its Class 1E constant voltage source regulator; and

b. All other AC vital instrument buses are energized from their associated OPERABLE inverters.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	A.1 ---------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital instrument bus de-energized. ---------------------	
	Restore inverter to OPERABLE status.	7 days <u>OR</u> In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. --------NOTE-------- Not applicable when two or more required inverters intentionally made inoperable resulting in loss of safety function. -------------------- Two or more required inverters inoperable.	B.1	Restore all but one inverter to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	6 hours
	AND		
	C.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to required AC vital instrument buses.	In accordance with the Surveillance Frequency Control Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems – Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC vital instrument bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC electrical power distribution subsystem inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours OR In accordance with the Risk Informed Completion Time Program
B. One AC vital instrument bus electrical power distribution subsystem inoperable.	B.1 Restore AC vital instrument bus electrical power distribution subsystem to OPERABLE status.	2 hours OR In accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One DC electrical power distribution subsystems inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours OR In accordance with the Risk Informed Completion Time Program
D. --------NOTE-------- Not applicable when two or more electrical power distribution subsystems intentionally made inoperable resulting in loss of safety function. -------------------- Two or more electrical power distribution subsystems inoperable.	D.1 Restore electrical power distribution subsystem(s) to OPERABLE status.	1 hour OR In accordance with the Risk Informed Completion Time Program
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital instrument bus electrical power distribution subsystems.	In accordance with the Surveillance Frequency Control Program

5.5 Programs and Manuals (continued)

5.5.20 Risk Informed Completion Time Program

This program provides controls to calculate a Risk Informed Completion Time (RICT) and must be implemented in accordance with NEI 06-09 (Revision 0) - A, "Risk-Managed Technical Specifications (RMTS) Guidelines." The program shall include the following:

a. The RICT may not exceed 30 days;

b. A RICT may only be utilized in MODE 1, 2;

c. When a RICT is being used, any plant configuration change within the scope of the Risk Informed Completion Time Program must be considered for the effect on the RICT.

   1. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration.

   2. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

   3. Revisng the RICT is not required if the plant configuration change would lower plant risk and would result in a longer RICT.

d. Use of a RICT is not permitted for voluntary entry into a configuration which represents a loss of a specified safety function or inoperability of all required trains of a system required to be OPERABLE.

e. Use of a RICT is permitted for emergent conditions which represent a loss of a specified safety function or inoperability of all required trains of a system required to be OPERABLE if one or more of the trains are considered "PRA functional" as defined in Section 2.3.1 of NEI 06-09 (Revision 0) - A.

ATTACHMENT 3

Technical Specification Bases Changes

TS Bases Pages

B 3.3.4-10	B 3.6.6-5	B 3.8.1-13
B 3.3.6-16	B 3.6.6-6	B 3.8.1-14
B 3.3.6-17	B 3.7.2-7	B 3.8.1-15
B 3.3.6-18	B 3.7.2-8	B 3.8.1-16
B 3.3.6-19	B 3.7.3-3	B 3.8.1-17
B 3.4.9-5	B 3.7.3-4	B 3.8.1-18
B 3.4.10-3	B 3.7.4-5	B 3.8.1-19
B 3.4.12-3	B 3.7.5-5	B 3.8.1-20
B 3.4.12-4	B 3.7.5-6	B 3.8.1-21
B 3.5.1-7	B 3.7.5-7	B 3.8.1-22
B 3.5.1-8	B 3.7.5-8	B 3.8.4-5
B 3.5.3-6	B 3.7.6-3	B 3.8.4-6
B 3.5.3-7	B 3.7.7-3	B 3.8.4-7
B 3.5.5-7	B 3.7.7-4	B 3.8.4-8
B 3.5.5-8	B 3.7.8-3	B 3.8.7-3
B 3.6.2-7	B 3.7.9-2	B 3.8.7-4
B 3.6.3-10	B 3.7.10-3	B 3.8.9-4
B 3.6.3-11	B 3.7.12-2	B 3.8.9-5
B 3.6.3-12	B 3.7.12-3	B 3.8.9-6
B 3.6.3-13	B 3.7.12-4	B 3.8.9-7
B 3.6.3-14	B 3.8.1-9	B 3.8.9-8
B 3.6.3-15	B 3.8.1-12	B 3.8.9-9

BASES

ACTIONS

A.1

or in accordance with the Risk Informed Completion Time Program.

Condition A applies if one Matrix Logic channel is inoperable or three Matrix Logic channels inoperable due to a common power source failure de-energizing three matrix power supplies in any applicable MODE. Loss of a single vital instrument bus will de-energize one of the two matrix power supplies in up to three matrices. This is considered a single matrix failure, providing the matrix relays associated with the failed power supplies de-energize as required. The channel must be restored to OPERABLE status within 48 hours. The Completion Time of 48 hours provides the operator time to take appropriate actions and still ensures that any risk involved in operating with a failed channel is acceptable. Operating experience has demonstrated that the probability of a random failure of a second Matrix Logic channel is low during any given 48 hour interval. If the channel cannot be restored to OPERABLE status within 48 hours, Condition E is entered.

B.1, B.2.1, and B.2.2

Condition B applies to one Initiation Logic channel, RTCB channel, or Manual Trip channel in MODES 1 and 2, since they have the same actions. MODES 3, 4, and 5, with the RTCBs shut, are addressed in Condition C. These Required Actions require opening of the affected RTCB, or the redundant RTCB in the affected Trip Leg. This removes the need for the affected Trip Leg by performing its associated safety function. With an RTCB open, the affected Functions are in one-out-of-two logic, which meets redundancy requirements, but testing on the OPERABLE channels cannot be performed without causing a reactor trip unless the RTCBs in the inoperable channels are closed to permit testing. Therefore, a Note has been added specifying that the RTCBs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST.

(continued)

BASES

ACTIONS

A.1 (continued)

The channel must be restored to OPERABLE status within 48 hours. This provides the operator with time to take appropriate actions and still ensures that any risk involved in operating with a failed channel is acceptable. Operating experience has demonstrated that the probability of a random failure of a second Matrix Logic channel is low during any given 48 hour period. If the channel cannot be restored to OPERABLE status with 48 hours, Condition E is entered.

or in accordance with the Risk Informed Completion Time Program

B.1

Condition B applies to one Manual Trip or Initiation Logic channel inoperable.

The channel must be restored to OPERABLE status within 48 hours. Operating experience has demonstrated that the probability of a random failure in a second channel is low during any given 48 hour period.

Failure of a single Initiation Logic channel may open one contact affecting both Actuation Logic channels. For the purposes of this Specification, the Actuation Logic is not inoperable. This prevents the need to enter LCO 3.0.3 in the event of an Initiation Logic channel failure. The Actions differ from those involving one RPS manual channel inoperable, because in the case of the RPS, opening RTCBs can be easily performed and verified. Opening an initiation relay contact is more difficult to verify, and subsequent shorting of the contact is always possible.

C.1 and C.2

Condition C applies to the failure of both Initiation Logic channels affecting the same trip leg.

In this case, the Actuation Logic channels are not inoperable, since they are in one-out-of-two logic and capable of performing as required. This obviates the need to enter LCO 3.0.3 in the event of a matrix or vital bus power failure.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

channels (ed. change)

Both Initiation Logic channels in the same trip leg will de-energize if a matrix power supply or vital instrument bus is lost. This will open the Actuation Logic contacts, satisfying the Required Action to open at least one set of contacts in the affected trip leg. Indefinite operation in this condition is prohibited because of the difficulty of ensuring the contacts remain open under all conditions. Thus, the ~~channel~~ must be restored to OPERABLE status within 48 hours. This provides the operator with time to take appropriate actions and still ensures that any risk involved in operating with a failed channel is acceptable. Operating experience has demonstrated that the probability of a random failure of a second channel is low during any given 48 hour period. If the channel cannot be restored to OPERABLE status with 48 hours, Condition E is entered.

or in accordance with the Risk Informed Completion Time Program

Of greater concern is the failure of the initiation circuit in a nontrip condition (e.g., due to two initiation relay failures). With one failed, there is still the redundant contact in the trip leg of each Actuation Logic. With both failed in a nontrip condition, the ESFAS Function is lost in the affected train. To prevent this, immediate opening of at least one contact in the affected trip leg is required. If the required contact has not opened, as indicated by annunciation or trip leg current lamps, Manual Trip of the affected trip leg contacts may be attempted. Caution must be exercised, since operating the wrong ESFAS handswitch may result in an ESFAS actuation.

D.1

Condition D applies to Actuation Logic.

With one Actuation Logic channel inoperable, automatic actuation of one train of ESF may be inhibited. The remaining train provides adequate protection in the event of Design Basis Accidents, but the single failure criterion may be violated. For this reason operation in this condition is restricted.

(continued)

BASES

ACTIONS

D.1 (continued)

The channel must be restored to OPERABLE status within 48 hours. Operating experience has demonstrated that the probability of a random failure in the Actuation Logic of the second train is low during a given 48 hour period.

or in accordance with the Risk Informed Completion Time Program

Failure of a single Initiation Logic channel, matrix channel power supply, or vital instrument bus may open one or both contacts in the same trip leg in both Actuation Logic channels. For the purposes of this Specification, the Actuation Logic is not inoperable. This obviates the need to enter LCO 3.0.3 in the event of a vital bus, matrix, or initiation channel failure.

Each Actuation Logic channel has two sets of redundant power supplies. The power supplies in each set are powered from different vital instrument buses. Failure of a single power supply or a set of power supplies due to the loss of a vital instrument bus, does not affect the operation of the Actuation Logic because the redundant power supplies can supply the full system load. For the purposes of this specification, the Actuation Logic is not inoperable.

Required Action D.1 is modified by a Note to indicate that one channel of Actuation Logic may be bypassed for up to 1 hour for Surveillance, provided the other channel is OPERABLE.

This allows performance of a PPS CHANNEL FUNCTIONAL TEST on an OPERABLE ESFAS train without generating an ESFAS actuation in the inoperable train.

Insert

~~E~~ F.1 and ~~E~~ F.2

If the Required Actions and associated Completion Times of Conditions for CSAS, MSIS or AFAS cannot be met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

Insert for page B 3.3.6-18

E.1

With two Actuation Logic channels inoperable, the Required Action is to restore at least one channel to OPERABLE status within 1 hour. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one channel. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second Actuation Logic channel is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one Actuation Logic channel is inoperable for any reason and a second Actuation Logic channel is found to be inoperable, or if two Actuation Logic channels are found to be inoperable at the same time.

BASES G G

ACTIONS (continued)

F.1 and F.2

If the Required Actions and associated Completion Times for SIAS, CIAS, or RAS are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. If the Required Actions and associated Completion Times for SIAS, CIAS, or RAS Matrix Logic are not met this Action may be exited when the plant is brought to MODE 4 since the LCO does not apply in MODE 4. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1

A CHANNEL FUNCTIONAL TEST is performed to ensure the entire channel will perform its intended function when needed.

The CHANNEL FUNCTIONAL TEST is part of an overlapping test sequence similar to that employed in the RPS. This sequence, consisting of SR 3.3.5.2, SR 3.3.6.1, and SR 3.3.6.2, tests the entire ESFAS from the bistable input through the actuation of the individual subgroup relays. These overlapping tests are described in Reference 1. SR 3.3.5.2 and SR 3.3.6.1 are normally performed together and in conjunction with ESFAS testing. SR 3.3.6.2 verifies that the subgroup relays are capable of actuating their respective ESF components when de-energized.

These tests verify that the ESFAS is capable of performing its intended function, from bistable input through the actuated components. SR 3.3.5.2 is addressed in LCO 3.3.5. SR 3.3.6.1 includes Matrix Logic tests and trip path (Initiation Logic) tests, and Manual Actuation Tests.

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS (continued)

B.1

If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours. The Completion Time of 72 hours is reasonable considering that a demand caused by loss of offsite power would be unlikely in this period. Pressure control may be maintained during this time using normal station powered heaters.

Insert (s) are

D D

~~C~~.1 and ~~C~~.2

If ~~one~~ required group of pressurizer heaters ~~is~~ inoperable and cannot be restored within the allowed Completion Time ~~of Required Action B.1~~, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 4 from full power in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This Surveillance ensures that during steady state operation, pressurizer water level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

(continued)

Insert for page B 3.4.9-5

C.1

With two required groups of pressurizer heaters inoperable, the Required Action is to restore at least one required group of pressurizer heaters to OPERABLE status within 1 hour to regain this safety function, prior to initiating actions to place the plant in a MODE or other specified condition in which the LCO does not apply. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second required group of pressurizer heaters is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one required group of pressurizer heaters is inoperable for any reason and the second required group of pressurizer heaters is found to be inoperable, or if two required groups of pressurizer heaters are found to be inoperable at the same time.

BASES

APPLICABILITY (continued)

The requirements for overpressure protection in other MODES are covered by LCO 3.4.11, "Pressurizer Safety Valves-MODE 4," and LCO 3.4.13, "LTOP System."

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The 72 hour exception is based on 18 hour outage time for each of the four valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe.

ACTIONS

or in accordance with the Risk Informed Completion Time Program

With one pressurizer safety valve inoperable, restoration must take place within 15 minutes. The Completion Time of 15 minutes reflects the importance of maintaining the RCS overpressure protection system. An inoperable safety valve coincident with an RCS overpressure event could challenge the integrity of the RCPB.

B.1 and B.2

If the Required Action cannot be met within the required Completion Time or if two or more pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The 6 hours allowed is reasonable, based on operating experience, to reach MODE 3 from full power without challenging plant systems. Similarly, the 12 hours allowed is reasonable, based on operating experience, to reach MODE 4 without challenging plant systems.

(continued)

BASES

LCO (continued)

A vent path is flow capability from the pressurizer to the RDT or from the pressurizer to containment atmosphere. Loss of any single valve in the pressurizer vent system will cause two flow paths to become inoperable. A pressurizer vent path is required to depressurize the RCS in a SGTR design basis event which assumes LOP and APSS unavailable.

APPLICABILITY

In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia the four pressurizer vent paths are required to be OPERABLE. The safety analysis for the SGTR with LOP and a Single Failure (loss of APSS) credits a pressurizer vent path to reduce RCS pressure.

In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia the SGs are the primary means of heat removal in the RCS, until shutdown cooling can be initiated. In MODES 1, 2, 3, and MODE 4 with RCS pressure ≥ 385 psia, assuming the APSS is not available, the pressurizer vent paths are the credited means to depressurize the RCS to Shutdown Cooling System entry conditions. Further depressurization into MODE 5 requires use of the pressurizer vent paths. In MODE 5 with the reactor vessel head in place, temperature requirements of MODE 5 (< 210°F) ensure the RCS remains depressurized. In MODE 6 the RCS is depressurized.

ACTIONS

A.1

If two or three pressurizer vent paths are inoperable, they must be restored to OPERABLE status. Loss of any single valve in the pressurizer vent system will cause two flow paths to become inoperable. Any vent path that provides flow capability from the pressurizer to the RDT or to the containment atmosphere, independent of which train is powering the valves in the flow path, can be considered an operable vent path. The Completion Time of 72 hours is reasonable because there is at least one pressurizer vent path that remains OPERABLE.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

BASES

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

ACTIONS (continued)

B.1

If all pressurizer vent paths are inoperable, then restore at least one pressurizer vent path to OPERABLE status. The Completion Time of 6 hours is reasonable to allow time to correct the situation, yet emphasize the importance of restoring at least one pressurizer vent path. If at least one pressurizer vent path is not restored to OPERABLE within the Completion Time, then Action C is entered.

Insert

C.1

If the required Actions, A and B, cannot be met within the associated Completion Times, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours, and to MODE 4 with RCS pressure < 385 psia within 24 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1

SR 3.4.12.1 requires complete cycling of each pressurizer vent path valve. The vent valves must be cycled from the control room to demonstrate their operability. Pressurizer vent path valve cycling demonstrates its function. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. This surveillance test must be performed in Mode 5 or Mode 6. In any Mode, partial surveillance tests can be performed for post-maintenance testing under site procedural controls that ensure the valve being tested is isolated from RCS pressure.

SR 3.4.12.2

SR 3.4.12.2 requires verification of flow through each pressurizer vent path. Verification of pressurizer vent path flow demonstrates its function. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. This surveillance test must be performed in Mode 5 or Mode 6.

(continued)

Insert for page B 3.4.12-4

(Second paragraph for Action B.1)

The Condition is modified by a Note stating the Risk Informed Completion Time is not applicable when the last vent path is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if three pressurizer vent paths are inoperable for any reason and the last vent path is found to be inoperable, or if all pressurizer vent paths are found to be inoperable at the same time.

BASES

or in accordance with the Risk Informed Completion Time Program

ACTIONS

A.1

If the boron concentration of one SIT is not within limits, the SIT must be returned to OPERABLE status within 72 hours. If the boron concentration is not within limits, ability to maintain subcriticality or minimum boron precipitation time may be reduced, but the reduced concentration effects on core subcriticality during reflood are minor. Boiling of the ECCS water in the core during reflood concentrates the boron in the saturated liquid that remains in the core. In addition, the volume of the SIT is still available for injection. Since the boron requirements are based on the average boron concentration of the total volume of three SITs, the consequences are less severe than they would be if a SIT were not available for injection. Thus, 72 hours is allowed to return the boron concentration to within limits.

If one SIT is inoperable due to the inability to verify level or pressure, the SIT must be returned to operable status within 72 hours. Section 7.4 of NUREG-1366 (Ref. 5) discusses surveillance requirements in technical specifications for the instrument channels used in the measurement of water level and pressure in SITs. The following statement is made in Section 7.4 of NUREG-1366 (Ref. 5):

or in accordance with the Risk Informed Completion Time Program

"The combination of redundant level and pressure instrumentation [for any single SIT] may provide sufficient information so that it may not be worthwhile to always attempt to correct drift associated with one instrument [with resulting radiation exposures during entry into containment] if there were sufficient time to repair one in the event that a second one became inoperable. Because these instruments do not initiate a safety action, it is reasonable to extend the allowable outage for them. The [NRC] staff, therefore, recommends that an additional condition be established for the specific case, where 'One accumulator [SIT] is inoperable due to the inoperability of water level and pressure channels,' in which the completion time to restore the accumulator to operable status will be 72 hours. While technically inoperable, the accumulator would be available to fulfill its safety function during this time and, thus, this change would have a negligible increase in risk."

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS

B.1

If one SIT is inoperable for a reason other than boron concentration or the inability to verify level or pressure, the SIT must be returned to OPERABLE status within 24 hours. In this Condition, the required contents of three SITs cannot be assumed to reach the core during a LOCA.

CE NPSD-994 (Ref. 6) provides a series of deterministic and probabilistic findings that support 24 hours as being either "risk beneficial" or "risk neutral" in comparison to shorter periods for restoring the SIT to OPERABLE status. CE NPSD-994 (Ref. 6) discusses best-estimate analysis for a typical PWR that confirmed that, during large-break LOCA scenarios, core melt can be prevented by either operation of one low pressure safety injection (LPSI) pump or the operation of one high pressure safety injection (HPSI) pump and a single SIT. CE NPSD-994 (Ref. 6) also discusses plant-specific probabilistic analysis that evaluated the risk-impact of the 24 hour recovery period in comparison to shorter recovery periods.

Insert

ACTIONS

~~C.1 and C.2~~

D.1 and D.2

If the SIT cannot be restored to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and pressurizer pressure reduced to < 1837 psia within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Specification 3.5.2, "SITs - Shutdown", further requires the plant to be in Mode 5 within 24 hours if the SIT inoperability was discovered but not restored while in the applicability of Specification 3.5.1, "SITs - Operating".

D.1

~~If more than one SIT is inoperable, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.~~

Reviewer's note: the TSTF Bases state that this Condition is only applicable to plants that have not adopted a RICT Program.

(continued)

Insert for page B 3.5.1-8

C.1

With two or more SITs inoperable, the Required Action is to restore all but one SIT to OPERABLE status within 1 hour to regain this safety function. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of sufficient SITs to regain safety function. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when two or more SITs are intentionally made inoperable. The Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one SIT is inoperable for any reason and additional SITs are found to be inoperable, or if two or more SITs are found to be inoperable at the same time.

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS

A.1

Condition A addresses the specific condition where the only affected ECCS subsystem is a single LPSI subsystem. The availability of at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is implicit in the definition of Condition A.

If LCO 3.5.3 requirements are not met due only to the existence of Condition A, then the inoperable LPSI subsystem components must be returned to OPERABLE status within 7 days of discovery of Condition A. This 7 day Completion Time is based on the findings of the deterministic and probabilistic analysis that are discussed in Reference 6. Seven days is a reasonable amount of time to perform many corrective and preventative maintenance items on the affected LPSI subsystem. Reference 6 concluded that the overall risk impact of this Completion Time was either risk-beneficial or risk-neutral.

The Configuration Risk Management Program (CRMP) in TRM Section 5.0.500.19 applies when Condition A is entered.

B.1

or in accordance with the Risk Informed Completion Time Program

If one or more ECCS trains are inoperable, except for reasons other than Condition A (one LPSI subsystem inoperable), and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC study (Ref. 4) using a reliability evaluation and is a reasonable amount of time to effect many repairs.

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS. The individual components are inoperable if they are not capable of performing their design function, or if supporting systems are not available.

(continued)

ACTIONS

B.1 (continued)

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. The intent of this Condition is to maintain a combination of OPERABLE equipment such that 100% of the ECCS flow equivalent to 100% of a single OPERABLE train remains available. This allows increased flexibility in plant operations when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an emergency DG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact with one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

With one or more components inoperable, such that 100% of the equivalent flow to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered.

Insert

D.1, D.2, and D.3

~~C.1, C.2, and C.2~~

If the inoperable train cannot be restored to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and pressurizer pressure reduced to < 1837 psia and RCS Tc reduced to < 485°F within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems.

(continued)

Insert for page B 3.5.3-7

C.1

Condition C is applicable with one or more trains inoperable for reasons other than Condition A. The allowed Completion Time is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses and flow must be restored to 100% of the ECCS flow equivalent to a single OPERABLE ECCS train within the 1 hour Completion Time, or a Completion Time determined under the Risk Informed Completion Time Program. The Completion Time is based on the need to restore the ECCS flow to within the safety analysis assumptions.

The Condition is modified by a Note stating it is not applicable when the second ECCS train is intentionally made inoperable. The Required Actions are not intended for voluntary removal of redundant systems or components from service. The Required Actions are only applicable if one ECCS train is inoperable for any reason and the second ECCS train is found to be inoperable, or if two ECCS trains are found to be inoperable at the same time.

BASES

LCO

The RWT ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA) and to cool and cover the core in the event of a LOCA, that the reactor remains subcritical following a DBA, and that an adequate level exists in the containment sump to support ESF pump operation in the recirculation mode.

To be considered OPERABLE, the RWT must meet the limits established in the SRs for water volume, boron concentration, and temperature.

APPLICABILITY

In MODES 1, 2, 3, and 4, the RWT OPERABILITY requirements are dictated by the ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWT must be OPERABLE to support their operation.

Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level."

ACTIONS

A.1

With RWT boron concentration or borated water temperature not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change boron concentration or temperature and that the contents of the tank are still available for injection and core cooling.

or in accordance with the Risk Informed Completion Time Program

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS (continued)

B.1

With RWT borated water volume not within limits, it must be returned to within limits within 1 hour. In this condition, neither the ECCS nor Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the unit in a MODE in which these systems are not required. The allowed Completion Time of 1 hour to restore the RWT to OPERABLE status is based on this condition since the contents of the tank are not available for injection and core cooling.

C.1 and C.2

If the RWT cannot be restored to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.5.1

RWT borated water temperature shall be verified to be within the limits assumed in the accident analysis. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The SR is modified by a Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating temperature limits of the RWT. With ambient temperatures within this range, the RWT temperature should not exceed the limits.

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS

C.1, C.2, and C.3 (continued)

Required Action C.2 requires that one door in the affected containment air lock must be verified to be closed. This action must be completed within the 1 hour Completion Time. This specified time period is consistent with the ACTIONS of LCO 3.6.1, which requires that containment be restored to OPERABLE status within 1 hour.

Additionally, the affected air lock(s) must be restored to OPERABLE status within the 24 hour Completion Time. The specified time period is considered reasonable for restoring an inoperable air lock to OPERABLE status, assuming that at least one door is maintained closed in each affected air lock.

D.1 and D.2

If the inoperable containment air lock cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.2.1

Maintaining containment air locks OPERABLE requires compliance with the leakage rate test requirements of the Containment Leakage Rate Testing Program. This SR reflects the leakage rate testing requirements with regard to air lock leakage (Type B leakage tests). The acceptance criteria were established during initial air lock and containment OPERABILITY testing. The periodic testing requirements verify that the air lock leakage does not exceed the allowed fraction of the overall containment leakage rate. The Frequency is required by the Containment Leakage Rate Testing Program and includes testing of the airlock doors following each closing, as specified.

(continued)

BASES

ACTIONS (continued)

A.1 and A.2

In the event one required containment isolation valve in one or more penetration flow paths is inoperable except for purge valve leakage not within limit (refer to Action D), the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve (including a de-activated non-automatic valve), a blind flange, and a check valve with flow through the valve secured. Compliance with this Action is established via: 1) Administrative controls (i.e., permit) on the de-activated automatic valve, closed manual valve, blind flange, or check valve, and 2) Administrative controls (i.e., permit or Locked Valve/Breaker/Component Control lock) on vents, drains, and test connections located within the containment penetration. Instruments (i.e., flow/pressure transmitters) located within the penetration that are not removed from service for maintenance nor open to the atmosphere are considered a closed loop portion of the associated penetration; therefore, isolation valves associated with instruments meeting this criteria need not be isolated nor otherwise administratively controlled to comply with the requirements of this Action. For penetrations isolated in accordance with Required Action A.1, the device used to isolate the penetration should be the closest available one to containment. Required Action A.1 must be completed within the 4 hour Completion Time. The 4 hour Completion Time is reasonable, considering the time required to isolate the penetration and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4.

For affected penetration flow paths that cannot be restored to OPERABLE status within the 4 hour Completion Time and that have been isolated in accordance with Required Action A.1, the affected penetration flow paths must be verified to be isolated on a periodic basis. This is necessary to ensure that containment penetrations required to be isolated following an accident and no longer capable of being automatically isolated will be in the isolation position

or in accordance with the Risk Informed Completion Time Program

(continued)

following isolation

BASES

ACTIONS

A.1 and A.2 (continued)

should an event occur. This Required Action does not require any testing or device manipulation. Rather, it involves verification, through a system walkdown, that those isolation devices outside containment and capable of being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside containment" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

Condition A has been modified by a Note indicating that this Condition is only applicable to those penetration flow paths with two containment isolation valves. For penetration flow paths with only one containment isolation valve and a closed system, Condition C provides appropriate actions.

Required Action A.2 is modified by a Note that applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these devices, once they have been verified to be in the proper position, is small.

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS (continued)

B.1

With two required containment isolation valves in one or more penetration flow paths inoperable except for purge valve leakage not within limit (refer to Action D), the affected penetration flow path must be isolated within 1 hour. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve (including a de-activated non-automatic valve), and a blind flange. Compliance with this Action is established via: 1) Administrative controls (i.e., permit) on the de-activated automatic valve, closed manual valve, or blind flange, and 2) Administrative controls (i.e., permit or Locked Valve/Breaker/Component Control lock) on vents, drains, and test connections located within the containment penetration. Instruments (i.e., flow/pressure transmitters) located within the penetration that are not removed from service for maintenance nor open to the atmosphere are considered a closed loop portion of the associated penetration; therefore, isolation valves associated with instruments meeting this criteria need not be isolated nor otherwise administratively controlled to comply with the requirements of this Action. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1. In the event the affected penetration is isolated in accordance with Required Action B.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.2, which remains in effect. This periodic verification is necessary to assure leak tightness of containment and that penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days for verifying each affected penetration flow path is isolated is appropriate considering the fact that the valves are operated under administrative controls and the probability of their misalignment is low.

Condition B is modified by a Note indicating this Condition is only applicable to penetration flow paths with two containment isolation valves. Condition A of this LCO addresses the condition of one containment isolation valve inoperable in this type of penetration flow path.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

With one or more required penetration flow paths with one containment isolation valve inoperable, the inoperable valve must be restored to OPERABLE status or the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve (including a de-activated non-automatic valve), and a blind flange. Compliance with this Action is established via: 1) Administrative controls (i.e., permit) on the de-activated automatic valve, closed manual valve, or blind flange and 2) Administrative controls (i.e., permit or Locked Valve/Breaker/Component Control lock) on vents, drains, and test connections located within the containment penetration. Instruments (i.e., flow/pressure transmitters) located within the penetration that are not removed from service for maintenance nor open to the atmosphere are considered a closed loop portion of the associated penetration; therefore, isolation valves associated with instruments meeting this criteria need not be isolated nor otherwise administratively controlled to comply with the requirements of this Action. A check valve may not be used to isolate the affected penetration. Required Action C.1 must be completed within the 4 hour Completion Time. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program. The specified time period is reasonable, considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4. In the event the affected penetration is isolated in accordance with Required Action C.1, the affected penetration flow path must be verified to be isolated on a periodic basis. This is necessary to assure leak tightness of containment and that containment penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days following isolation for verifying that each affected penetration flow path is isolated is appropriate considering the valves are operated under administrative controls and the probability of their misalignment is low.

Condition C is modified by a Note indicating that this Condition is only applicable to those penetration flow paths with only one containment isolation valve and a closed system. The only credited closed systems are the Steam Generating and the Containment Pressure Monitoring Systems. This Note is necessary since this Condition is

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

written to specifically address those penetration flow paths which are neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere (10 CFR 50, APP. A, GDC 57).

Required Action C.2 is modified by a Note that applies to valves and blind flanges located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is small.

D.1, D.2, and D.3

In the event one or more required containment purge valves in one or more penetration flow paths are not within the purge valve leakage limits, purge valve leakage must be restored to within limits, or the affected penetration must be isolated. The method of isolation must be by the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve with resilient seals, or a blind flange. A purge valve with resilient seals utilized to satisfy Required Action D.1 must have been demonstrated to meet the leakage requirements of SR 3.6.3.6. Compliance with this Action is established via: 1) Administrative controls (i.e., permit) on the de-activated automatic valve with resilient seals or blind flange, and 2) Administrative controls (i.e., permit or Locked Valve/Breaker/Component Control lock) on vents, drains, and test connections located within the containment penetration. Instruments (i.e., flow/pressure transmitters) located within the penetration that are not removed from service for maintenance nor open to the atmosphere are considered a closed loop portion of the associated penetration; therefore, isolation valves associated with instruments meeting this criteria need not be isolated nor otherwise administratively controlled to comply with the requirements of this Action. The specified Completion Time is reasonable, considering that one containment purge valve remains closed so that a gross breach of containment does not exist.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

BASES

ACTIONS

D.1, D.2 and D.3 (continued)

In accordance with Required Action D.2, this penetration flow path must be verified to be isolated on a periodic basis. The periodic verification is necessary to ensure that containment penetrations required to be isolated following an accident, which are no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those isolation devices outside containment capable of being mispositioned are in the correct position.

following isolation

For the isolation devices inside containment, the time period specified as "prior to entering MODE ~~4~~ from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

following isolation

For the required containment purge valve with a resilient seal that is isolated in accordance with Required Action D.1, SR 3.6.3.6 must be performed at least once every 92 days. This assures that degradation of the resilient seal is detected and confirms that the leakage rate of the containment purge valve does not increase during the time the penetration is isolated. The normal Frequency for SR 3.6.3.6, 184 days, is based on an NRC initiative, Generic Issue B-20 (Ref. 3). Since more reliance is placed on a single valve while in this Condition, it is prudent to perform the SR more often. Therefore, a Frequency of once per 92 days was chosen and has been shown to be acceptable based on operating experience.

following isolation

E.1 and E.2

If the Required Actions and associated Completion Times are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

LCO (continued)

containment spray actuation signal and automatically transferring suction to the containment sump on a recirculation actuation signal. Each spray train flow path from the containment sump shall be via an OPERABLE shutdown cooling heat exchanger.

Therefore, in the event of an accident, the minimum requirements are met, assuming that the worst case single active failure occurs.

Each Containment Spray System typically includes a spray pump, a shutdown cooling heat exchanger, spray headers, nozzles, valves, piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWT upon an ESF actuation signal and automatically transferring suction to the containment sump.

APPLICABILITY

In MODES 1, 2, and 3, and Mode 4 with RCS pressure ≥ 385 psia, a DBA could cause a release of radioactive material to containment and an increase in containment pressure and temperature, requiring the operation of the containment spray trains.

In MODE 4 with RCS pressure < 385 psia and MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Thus, the Containment Spray System is not required to be OPERABLE in these MODES.

ACTIONS

A.1

With one containment spray train inoperable, the inoperable containment spray train must be restored to OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE spray train is adequate to perform the iodine removal, hydrogen mixing, and containment cooling functions. The 72 hour Completion Time takes into account the redundant heat removal capability afforded by the Containment Spray System, reasonable time for repairs, and the low probability of a DBA occurring during this period.

or in accordance with the Risk Informed Completion Time Program

(continued)

BASES

ACTIONS (continued)

B.1 and B2

If the inoperable containment spray train cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 with RCS pressure < 385 psia within 84 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 4 with RCS pressure < 385 psia allows additional time for the restoration of the containment spray train and is reasonable when considering that the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

Insert

Reviewer's note: the TSTF Bases state that this Condition is only applicable to plants that have not adopted a RICT Program.

~~C.1~~

~~With two containment spray trains inoperable, the unit is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.~~

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Verifying the correct alignment for manual, power operated, and automatic valves in the containment spray flow path provides assurance that the proper flow paths will exist for Containment Spray System operation (positioned to take suction from the RWT on a containment spray actuation test signal [CSAS]). This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these were verified to be in the correct position prior to being secured. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This SR does not require any testing or valve manipulation. Rather, it involves verifying, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

(continued)

Insert for page B 3.6.6-6

C.1

With two containment spray trains inoperable, the Required Action is to restore at least one containment spray train to OPERABLE status within one hour to regain some capability to perform iodine removal, hydrogen mixing, and containment cooling functions. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when two containment spray trains are intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one containment spray train is inoperable for any reason and a second containment spray train is found to be inoperable, or if two containment spray trains are found to be inoperable at the same time.

D.1 and D.2

If the Required Action and associated Completion Time of Condition C of this LCO is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Alternately, the Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

ACTIONS (continued)

E.1 (continued)

or more MSIVs inoperable while in MODE 1 requires entry into LCO 3.0.3.

F.1

With one MSIV inoperable in MODE 1, time is allowed to restore the component to OPERABLE status. Some repairs can be made to the MSIV with the unit hot. The 4 hour Completion Time is reasonable, considering the probability of an accident occurring during the time period that would require closure of the MSIVs.

Condition F is entered when one MSIV is inoperable in MODE 1, including when both actuator trains for one MSIV are inoperable. When only one actuator train is inoperable on one MSIV, Condition A applies.

The 4 hour Completion Time is consistent with that normally allowed for containment isolation valves that isolate a closed system penetrating containment. These valves differ from other containment isolation valves in that the closed system provides an additional means for containment isolation.

Insert

H ~~G~~.1

If the MSIV cannot be restored to OPERABLE within 4 hours, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 2 within 6 hours and Condition I ~~H~~ would be entered. The Completion Time is reasonable, based on operating experience, to reach MODE 2, and close the MSIVs in an orderly manner and without challenging unit systems.

I ~~H~~.1 and I ~~H~~.2

Condition I ~~H~~ is modified by a Note indicating that separate Condition entry is allowed for each MSIV.

Since the MSIVs are required to be OPERABLE in MODES 2 and 3, the inoperable MSIVs may either be restored to OPERABLE status or closed. When closed, the MSIVs are already in the position required by the assumptions in the safety analysis.

(continued)

Insert for page B 3.7.2-7

G.1

With two or more MSIVs inoperable, the Required Action is to restore all but one MSIV to OPERABLE status within 1 hour to regain a method of main steam line isolation. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of sufficient required MSIVs. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when two or more MSIVs are intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one MSIV is inoperable for any reason and additional MSIVs are found to be inoperable, or if two or more MSIVs are found to be inoperable at the same time.

BASES (continued)

ACTIONS (continued)

~~H~~ I.1 and ~~H~~ I.2 (continued)

The 4 hour Completion Time is consistent with that allowed in Condition F.

Inoperable MSIVs that cannot be restored to OPERABLE status within the specified Completion Time, but are closed, must be verified on a periodic basis to be closed. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, MSIV status indications available in the control room, and other administrative controls, to ensure these valves are in the closed position.

~~I~~ J.1 and ~~I~~ J.2

If the MSIVs cannot be restored to OPERABLE status, or closed, within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from MODE 2 conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies that the closure time of each MSIV is within the limit given in Reference 5 with each actuator train on an actual or simulated actuation signal and is within that assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the Inservice Testing Program. This SR is normally performed upon returning the unit to operation following a refueling outage. The MSIVs should not be full stroke tested at power.

The Frequency for this SR is in accordance with the Inservice Testing Program. This Frequency demonstrates the valve closure time at least once per refueling cycle.

(continued)

BASES (continued)

APPLICABILITY

The MFIVs must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and steam generators. This ensures that, in the event of an HELB, a single failure cannot result in the blowdown of more than one steam generator.

In MODES 1, 2, 3, and 4, the MFIVs are required to be OPERABLE, except when they are closed and deactivated or isolated by a deactivated and closed power operated valve, in order to limit the amount of available fluid that could be added to containment in the case of a secondary system pipe break inside containment. When the valves are closed or isolated by a closed power operated valve, they are already performing their safety function.

In MODES 5 and 6, steam generator energy is low. Therefore, the MFIVs are not required.

ACTIONS

The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each penetration flow path.

Insert

~~A.1 and A.2~~

~~With one MFIV inoperable, action must be taken to close or isolate the inoperable valves within 72 hours.~~ When these valves are closed or isolated, they are performing their required safety function (e.g., to isolate the line).

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves, and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths.

A.2.1

reasonable (editorial)

Inoperable MFIVs that are closed to comply with Required Action ~~A.1~~ must be verified on a periodic basis to be closed. This is necessary to ensure that the assumptions in ~~the~~ safety analysis remain valid. The ~~seven~~ day completion time is ~~responsible~~, based on engineering judgement, MFIV status indications available ~~in~~ the control room, and other administrative control~~s,~~ to ensure these valves are in the closed position.

7 (editorial change)

following isolation

(continued)

Insert for page B 3.7.3-3)

A.1, A.2.1, and A.2.2

With one or more MFIVs inoperable, action must be taken to restore the MFIV(s) to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program OR to close or isolate the inoperable valves within 72 hours.

Insert

BASES

ACTIONS (continued)

~~B.1 and B.2~~

~~If more than one MFIV in the same flow path cannot be restored to OPERABLE status, then there may be no system to operate automatically and perform the required safety function. Under these conditions, valves in each flow path must be restored to OPERABLE status, closed, or the flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8 hour Completion Time is reasonable to close an MFIV or otherwise isolate the affected flow path.~~

Inoperable MFIVs that cannot be restored to OPERABLE status within the Completion Time, but are closed or isolated, must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day following isolation Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls to ensure that these valves are closed or isolated.

C.1 and C.2

If the MFIVs cannot be restored to OPERABLE status, closed, or isolated in the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

Insert for page B 3.7.3-4

<u>B.1, B.2.1, and B.2.2</u>

With two valves in the same flow path inoperable, action must be taken to restore one valve to OPERABLE status within 8 hours or in accordance with the Risk Informed Completion Time Program <u>OR</u> isolate the affected flow path. If more than one MFIV in the same flow path cannot be restored to OPERABLE status, then there may be no system to operate automatically and perform the required safety function. Under these conditions, valves in each flow path must be ~~restored to OPERABLE status,~~ closed or the flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8 hour Completion Time is reasonable to restore an MFIV to OPERABLE status, or to close an MFIV or otherwise isolate the affected flow path.

Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

ACTIONS

A.1

The condition for this ACTION is modified by a Note that states separate Condition entry is allowed for each SG. This is acceptable because only one SG is required for RCS heat removal after a design basis accident, and because this Condition provides the appropriate Required Action and Completion Time for one inoperable ADV line on each SG.

With one ADV line on a SG inoperable, action must be taken to restore that ADV line to OPERABLE status within 7 days to meet the LCO for each SG that has entered this Condition. The 7-day Completion Time takes into consideration the redundant capability afforded by the remaining OPERABLE ADV lines, the safety grade MSSVs, and the non-safety grade backup of the SBCS.

B.1

With two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs, action must be taken to restore one ADV line on each SG to OPERABLE status within 24 hours. The 24 hour Completion Time is reasonable to repair inoperable ADV lines, based on the availability of the Steam Bypass Control System and MSSVs, and the low probability of an event occurring during this period that requires the ADV lines.

Insert

NOTE:

Entry into Condition B for all four ADV lines simultaneously inoperable is not intended for voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable.

Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

Insert for page B 3.7.4-5

(Second paragraph for Action B.1)

The Condition is modified by a Note stating the Risk Informed Completion Time is not applicable when all ADVs are intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if two or more ADV lines are found inoperable with both ADV lines inoperable on one or more SGs and the last ADV line is found to be inoperable, or if all ADV lines are found to be inoperable at the same time.

BASES

APPLICABILITY

In MODES 1, 2, and 3, the AFW System is required to be OPERABLE and to function in the event that the MFW System is lost. In addition, the AFW System is required to supply enough makeup water to replace steam generator secondary inventory, lost as the unit cools to MODE 4 conditions.

In MODE 4, the AFW System may be used for heat removal via the steam generator.

In MODES 5 and 6, the steam generators are not normally used for decay heat removal, and the AFW System is not required.

A note prohibits the application of LCO 3.0.4.b to an inoperable AFW Train. There is an increased risk associated with entering a MODE or other specified condition in the applicability with an AFW train inoperable and the provisions of LCO 3.0.4.b which allows entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

ACTIONS

<u>A.1</u>

or in accordance with the Risk Informed Completion Time Program

If one of the two steam supplies to the turbine driven AFW pumps is inoperable, or if a turbine driven pump is inoperable while in MODE 3 immediately following refueling (prior to MODE 2), action must be taken to restore OPERABLE status within 7 days. The 7 day Completion Time is reasonable based on the following reasons:

a. For the inoperability of a steam supply to the turbine-driven AFW pump, the 7 day Completion time is reasonable since there is a redundant steam supply line for the turbine driven pump.

b. For the inoperability of a turbine-driven AFW pump while in MODE 3 immediately subsequent to a refueling outage, the 7 day Completion time is reasonable due to the minimal decay heat levels in this situation.

c. For both the inoperability of a steam supply line to the turbine-driven pump and an inoperable turbine-driven AFW pump while in MODE 3 immediately following a refueling outage, the 7 day Completion time is reasonable due to the availability of redundant OPERABLE motor driven AFW pumps.

(continued)

BASES

ACTIONS

A.1 (continued)

TSTF-505 states that it is necessary to adopt TSTF-439, "Eliminate Second Completion Times..." in order to adopt TSTF-505 for those RAs that are affected by both travelers. APS has submitted an LAR adopting TSTF-439 (ML15065A031). These marked-up pages reflect the deletions that will be made when the TSTF-439 LAR is approved by the NRC. A marginal note of "TSTF-439" will be added where deletions are made to reflect TSTF-439 on the following pages.

~~The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.~~

~~The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 7 days and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.~~

Condition A is modified by a Note which limits the applicability of the Condition to when the unit has not entered MODE 2 following a refueling. Condition A allows the turbine-driven AFW pump to be inoperable for 7 days vice the 72 hour Completion Time in Condition B. This longer Completion Time is based on the reduced decay heat following refueling and prior to the reactor being critical.

It should be noted that when in this Condition with one steam supply to the turbine driven AFW pump inoperable, that the AFA train of AFW is considered to be inoperable.

B.1

With one of the required AFW trains (pump or flow path) inoperable, action must be taken to restore OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program. This Condition includes the loss of two steam supply lines to the turbine driven AFW pump. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the AFW System, the time needed for repairs, and the low probability of a DBA event occurring during this period. Two AFW pumps and flow paths remain to supply feedwater to the steam generators. ~~The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.~~

~~The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.~~

(continued)

Insert

Insert for page B 3.7.5-6

C.1

With two AFW trains inoperable in MODE 1, 2, or 3, the Required Action is to restore at least one AFW train to OPERABLE status within 1 hour to regain a method of decay heat removal. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one AFW train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second AFW train is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one AFW train is inoperable for any reason and a second AFW train is found to be inoperable, or if two AFW trains are found to be inoperable at the same time.

In MODE 4, with two AFW trains inoperable, operation is allowed to continue because only one motor driven AFW pump (either the essential or the non-essential pump) is required in accordance with the Note that modifies the LCO. Although it is not required, the unit may continue to cool down and start the SDC.

BASES

ACTIONS (continued)

D ~~C~~.1 and ~~C~~.2

When either Required Action A.1 , B.1, or C.1 ~~or B.1~~ cannot be completed within the required Completion Time, ~~or if two AFW trains are inoperable in MODES 1, 2, and 3,~~ the unit must be placed in a ~~MODE in which~~ the LCO does not apply.

Reviewer's note: this is deleted in the TSTF Bases

To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within 12 hours.

This Condition includes the loss of 2 AFW pumps. This Condition also includes the situation where one steam supply to the turbine driven AFW pump is inoperable, coincident with another ("B" or "N") AFW train inoperable.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

Included as last paragraph in new "C.1" above.

~~In MODE 4, with two AFW trains inoperable, operation is allowed to continue because only one motor driven AFW pump (either the essential or the non-essential pump) is required in accordance with the Note that modifies the LCO. Although it is not required, the unit may continue to cool down and start the SDC.~~

E ~~D~~.1

Required Action E ~~D~~.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status. Completion Times are also suspended at the time the conditions is entered. The Completion Time is resumed with the time remaining when the Condition was entered upon restoration of one AFW train to OPERABLE status.

With all three AFW trains inoperable in MODES 1, 2, and 3, the unit is in a seriously degraded condition with no TS related means for conducting a cooldown, and only limited means for conducting a cooldown with nonsafety grade equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to OPERABLE status. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.

(continued)

BASES

ACTIONS (continued)

~~E~~F.1

Required Action ~~E~~F.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status. Completion Times are also suspended at the time the Condition is entered. The Completion Time is resumed with the time remaining when the Condition was entered upon restoration of one AFW train to OPERABLE status.

With one AFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status or to immediately verify, by administrative means, the OPERABILITY of a second train. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.

In MODE 4, either the reactor coolant pumps or the SDC loops can be used to provide forced circulation as discussed in LCO 3.4.6, "RCS Loops - MODE 4."

SURVEILLANCE REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the AFW water and steam supply flow paths provides assurance that the proper flow paths exist for AFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulations; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.5.2

Verifying that each AFW pump's developed head at the flow test point is greater than or equal to the required developed head ensures that AFW pump performance has not degraded during the cycle. Flow and differential head are

(continued)

BASES

APPLICABILITY

In MODES 1, 2, and 3, and in MODE 4, when steam generator is being relied upon for heat removal, the CST is required to be OPERABLE.

In MODES 5 and 6, the CST is not required because the AFW System is not required.

ACTIONS

A.1 and A.2

is inoperable

If the CST ~~level is not within the limit~~, the OPERABILITY of the backup water supply (RMWT) must be verified within 4 hours~~.~~

and once per 12 hours thereafter

OPERABILITY of the RMWT must include initial alignment and verification of the OPERABILITY of flow paths from the RMWT to the AFW pumps, and availability of sufficient total water inventory using the combined CST and RMWT inventories to satisfy the requirements of long-term cooling event which includes both LOCA Long-Term Cooling and Reactor Systems Branch Technical Position 5-1 (RSB 5-1). The CST ~~level~~ must be ~~returned~~ to OPERABLE status within 7 days, as the RMWT may be performing this function in addition to its normal functions. The 4 hour Completion Time is reasonable, based on operating experience, to verify the OPERABILITY of the RMWT. The 7 day Completion Time is reasonable, based on an OPERABLE RMWT being available, and the low probability of an event requiring the use of the water from the CST occurring during this period.

restored (editorial)

Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

BASES

LCO (continued)

not acceptable and would render both the EW System and the SDC system inoperable (Ref. 3). The EW System is inoperable in this situation because it is operating outside of the acceptable limits of the system.

APPLICABILITY

In MODES 1, 2, 3, and 4, the EW System must be prepared to perform its post accident safety functions, primarily RCS heat removal by cooling the SDC heat exchanger.

When the plant is in other than MODES 1, 2, 3 or 4, the requirements for the EW System shall be consistent with the definition of OPERABILITY which requires (support) equipment to be capable of performing its related support function(s).

ACTIONS

or in accordance with the Risk Informed Completion Time Program

A.1

Required Action A.1 is modified by a Note indicating the requirement of entry into the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4," for SDC made inoperable by EW. This note is only applicable in Mode 4. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

With one EW train inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE EW train is adequate to perform the heat removal function. The 72 hour Completion Time is based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this period.

Insert

C

~~B~~.1 and ~~B~~.2

(s)

If the EW train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

(continued)

Insert for page B 3.7.7-3

B.1

With two EW trains inoperable, the Required Action is to restore at least one of the required EW trains to OPERABLE status within 1 hour to regain a heat sink for safety related components. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second EW train is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one EW train is inoperable for any reason and a second EW train is found to be inoperable, or if two EW trains are found to be inoperable at the same time.

BASES

ACTIONS

C

~~B~~.1 and ~~B~~.2 (continued)

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

Verifying the correct alignment for manual, power operated, and automatic valves in the EW flow path provides assurance that the proper flow paths exist for EW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in their correct position.

This SR is modified by a Note indicating that the isolation of the EW components or systems renders those components or systems inoperable but does not necessarily affect the OPERABILITY of the EW System. Isolation of the EW System to the Essential Chiller, while rendering the Essential Chiller inoperable, is acceptable and does not impact the OPERABILITY of the EW System. Isolation of the EW System to the SDC system heat exchanger is not acceptable and would render both the EW System and the SDC system inoperable (Ref. 3). The EW System is inoperable in this situation because it is operating outside of the acceptable limits of the system.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.7.2

This SR verifies proper automatic operation of the EW valves on an actual or simulated actuation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under

(continued)

or in accordance with the Risk Informed Completion Time Program

BASES

ACTIONS

A.1

With one ESPS train inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE ESPS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the ESPS train could result in loss of ESPS function. Required Action A.1 is modified by two Notes. The first Note indicates that the applicable Conditions of LCO 3.8.1, "AC Sources – Operating," must be entered when the inoperable ESPS train results in an inoperable emergency diesel generator. The second Note indicates that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4," should be entered if an inoperable ESPS train results in an inoperable SDC System. This note is only applicable in MODE 4. The 72 hour Completion Time is based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this time period.

Insert

C

~~B~~.1 and ~~B~~.2

(s)

If the ESPS train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.8.1

Verifying the correct alignment for manual and power operated, valves in the ESPS flow path ensures that the proper flow paths exist for ESPS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This

(continued)

Insert for page B 3.7.8-3

B.1

With two ESPS trains inoperable, the Required Action is to restore at least one of the required ESPS trains to OPERABLE status within 1 hour to regain a heat sink for safety related components. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second ESPS train is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one ESPS train is inoperable for any reason and a second ESPS train is found to be inoperable, or if two ESPS trains are found to be inoperable at the same time.

BASES

LCO

The UHS is required to be OPERABLE. The UHS is considered OPERABLE if it contains a sufficient volume of water at or below the maximum temperature that would allow the ESPS to operate for at least 26 days with no makeup following the design basis LOCA without the loss of net positive suction head (NPSH), and without exceeding the maximum design temperature of the equipment served by the ESPS. To meet this condition, the UHS temperature should not exceed 89°F and the level of each ESP should not fall below 12 ft usable water depth during normal unit operation. Since the bottom 1.5 ft of the ESPS is required to meet pump submergence requirements, an actual depth of 13.5 ft is needed to meet the 26 day requirement for inventory purposes.

The 12' is the water volume that would be depleted over 26 days following a design basis LOCA if no makeup were available. The thermal performance analysis utilizes the entire volume inventory of the pond(s) since the entire volume is always available as a heat sink.

APPLICABILITY

In MODES 1, 2, 3, and 4, the UHS is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

When the plant is in other than MODES 1, 2, 3, or 4, the requirements for the UHS shall be consistent with the definition of OPERABILITY, which requires (support) equipment to be capable of performing its related support function(s).

Insert

ACTIONS

~~A.1 and A.2~~ B.1 and B.2

~~If the UHS is inoperable,~~ If the Required Action and associated Completion Time are not met, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

Insert for page B 3.7.9-2

A.1 and A.2

If the UHS is inoperable, the Required Action is to restore the UHS to OPERABLE status within 1 hour. The 1 hour completion time is acceptable because it minimizes risk while allowing time for restoration. Alternatively, a Completion time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating the Risk Informed Completion Time is not applicable when the UHS is intentionally made inoperable. The Required Action is not intended for voluntary removal of systems or components from service. The Required Action is only applicable if the UHS is found to be inoperable.

or in accordance with the Risk Informed Completion Time Program

BASES

APPLICABILITY (continued)

When the plant is in other than MODES 1, 2, 3 or 4, the requirements for the EC System shall be consistent with the definition of OPERABILITY which requires (support) equipment to be capable of performing its related support function(s).

ACTIONS

A.1

EDITORIAL: should read EC

If one EC train is inoperable, action must be taken to restore OPERABLE status within 72 hours. In this condition, one OPERABLE ~~ECW~~ train is adequate to perform the cooling function. The 72 hour Completion Time is reasonable, based on the low probability of an event occurring during this time and the 100% capacity OPERABLE EC train.

Insert

C

~~B~~.1 and ~~B~~.2

at least one

If ~~the~~ EC train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Verifying the correct alignment for manual, power operated, and automatic valves in the EC flow path provides assurance that the proper flow paths exist for EC operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position.

(continued)

Insert for page B 3.7.10-3

<u>B.1</u>

With two EC trains inoperable, the Required Action is to restore at least one train to OPERABLE status within 1 hour to regain a heat sink for safety-related air handling systems. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second EC train is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one EC train is inoperable for any reason and a second EC train is found to be inoperable, or if two EC trains are found to be inoperable at the same time.

BASES (continued)

LCO

Two independent and redundant trains of the CREATCS are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other train. Total system failure could result in the equipment operating temperature exceeding limits in the event of an accident.

The CREATCS is considered OPERABLE when the individual components that are necessary to maintain the control room temperature are OPERABLE in both trains. These components include the cooling coils and associated temperature control instrumentation. In addition, the CREATCS must be OPERABLE to the extent that air circulation can be maintained.

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of irradiated fuel assemblies, the CREATCS must be OPERABLE to ensure that the control room temperature will not exceed equipment OPERABILITY requirements following isolation of the control room.

Movement of spent fuel casks containing irradiated fuel assemblies is not within the scope of the Applicability of this technical specification. The movement of dry casks containing irradiated fuel assemblies will be done with a single-failure-proof handling system and with transport equipment that would prevent any credible accident that could result in a release of radioactivity.

ACTIONS

A.1

With one CREATCS train inoperable, action must be taken to restore OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CREATCS train is adequate to maintain the control room temperature within limits. The 30 day Completion Time is reasonable, based on the low probability of an event occurring requiring control room isolation, consideration that the remaining train can provide the required capabilities, and the alternate safety or nonsafety related cooling means that are available.

Insert →

(continued)

Insert for page B 3.7.12-2

B.1

With two CREATCS trains inoperable in MODE 1, 2, 3, or 4, the Required Action is to restore at least one CREATCS train to OPERABLE status within 1 hour to regain temperature control for the control room following isolation of the control room. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one train. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second CREATCS train is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one CREATCS train is inoperable for any reason and a second CREATCS train is found to be inoperable, or if two CREATCS trains are found to be inoperable at the same time.

BASES (continued)

ACTIONS (continued)

~~B~~C.1 and ~~B~~C.2

In MODE 1, 2, 3, or 4, when Required Action A.1 or B.1 cannot be completed within the required Completion Time, the unit must be placed in a MODE that minimizes the accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

~~C~~D.1

In MODE 5 or 6, if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE CREATCS train must be placed in operation immediately (including supporting systems). This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected.

~~D~~E.1 and ~~D~~E.2

During movement of irradiated fuel assemblies, if Required Action A.1 cannot be completed within the Required Completion Time, the OPERABLE CREATCS train must be placed in operation immediately (including supporting systems) or movement of irradiated fuel assemblies must be suspended immediately. The first action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failure will be readily detected. If the system is not immediately placed in operation, this action requires suspension of the movement of irradiated fuel assemblies in order to minimize the risk of a release of radioactivity that might require isolation of the control room. This does not preclude the movement of fuel to a safe position.

~~E~~F.1 and ~~E~~F.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies with two CREATCS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

(continued)

Reviewer's Note: The TSTF-505 Bases state that this action is not applicable for plants with a RICT Program.

BASES

~~ACTIONS (continued)~~

~~F.1~~

~~If both CREATCS trains are inoperable in MODE 1, 2, 3, or 4, the CREATCS may not be capable of performing the intended function and the unit is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.~~

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

This SR verifies that the heat removal capability of the system is sufficient to meet design requirements. This SR consists of a combination of testing and calculations. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. UFSAR, Section 9.4.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

BASES

ACTIONS

A.2 (continued)

Additionally, the 24 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

TSTF-439 deletions

~~The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DG is inoperable, and that DG is subsequently returned OPERABLE, the LCO may already have been not met for up to 10 days. This could lead to a total of 13 days, since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, the circuit restored OPERABLE, and an additional 10 days (for a total of 23 days) allowed prior to complete restoration of the LCO. The 13 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 13 day Completion Time means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.~~

~~As in Required Action A.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition A was entered.~~

(continued)

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

BASES

ACTIONS

B.3.1 and B.3.2 (continued)

According to Generic Letter 84-15 (Ref. 7), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

B.4

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 10 day Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

When utilizing an extended DG Completion Time (a Completion Time greater than 72 hours and less than or equal to 10 days), the compensatory measures listed below shall be implemented. For planned maintenance utilizing an extended Completion Time, the compensatory measures shall be implemented prior to entering Condition B. For an unplanned entry into an extended Completion Time, the compensatory measures shall be implemented without delay.

1. The redundant DG (along with all of its required systems, subsystems, trains, components, and devices) will be verified OPERABLE (as required by TS) and no discretionary maintenance activities will be scheduled on the redundant (OPERABLE) DG.
2. No discretionary maintenance activities will be scheduled on the station blackout generators (SBOGs).
3. No discretionary maintenance activities will be scheduled on the startup transformers.
4. No discretionary maintenance activities will be scheduled in the APS switchyard or the unit's 13.8 kV power supply lines and transformers which could cause a line outage or challenge offsite power availability to the unit utilizing the extended DG Completion Time.
5. All activity, including access, in the Salt River Project (SRP) switchyard shall be closely monitored and controlled. Discretionary maintenance within the switchyard that could challenge offsite power supply availability will be evaluated in accordance with 10 CFR 50.65(a)(4) and managed on a graded approach according to risk significance.
6. The SBOGs will not be used for non-safety functions (i.e., power peaking to the grid).

(continued)

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

BASES

ACTIONS

B.4 (continued)

7. Weather conditions will be assessed prior to removing a DG from service during planned maintenance activities. Additionally, DG outages will not be scheduled when severe weather conditions and/or unstable grid conditions are predicted or present.

8. All maintenance activities associated with the unit that is utilizing the extended DG Completion Time will be assessed and managed per 10 CFR 50.65 (Maintenance Rule).

9. The functionality of the SBOGs will be verified by ensuring that the monthly start test has been successfully completed within the previous four weeks before entering the extended DG Completion Time.

10. The OPERABILITY of the steam driven auxiliary feedwater pump will be verified before entering the extended DG Completion Time.

11. The system dispatcher will be contacted once per day and informed of the DG status, along with the power needs of the facility.

12. Should a severe weather warning be issued for the local area that could affect the switchyard or the offsite power supply during the extended DG Completion Time, an operator will be available locally at the SBOG should local operation of the SBOG be required as a result of on-site weather related damage.

13. No discretionary maintenance will be allowed on the main and unit auxiliary transformers associated with the unit.

If one or more of the above compensatory measures is not met while in the extended completion time, the corrective action program shall be entered, the risk managed in accordance with the Maintenance Rule, and the compensatory measure(s) restored without delay.

TSTF-439 deletions

~~The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently returned OPERABLE, the LCO may already have been not met for up to 72 hours (3 days). This could lead to a total of 13 days, since initial failure to meet the LCO, to restore the DG. At this time, an offsite circuit~~

(continued)

BASES

ACTIONS

B.4 (continued)

TSTF-439 deletions

~~could again become inoperable, the DG restored OPERABLE, and an additional 72 hours (for a total of 16 days) allowed prior to complete restoration of the LCO. The 13 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 10 day and 13 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.~~

~~As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.~~

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. These features require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and are identical to those specified in ACTION A.2. Mode applicability is as specified in each appropriate TS section.

The Completion Time for Required Action C.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

If at any time during the existence of Condition C (two offsite circuits inoperable) and a required feature becomes inoperable, this Completion Time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition C for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more DGs inoperable. However, two factors tend to decrease the severity of this level of degradation:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Regulatory Guide 1.93 (Ref. 6), with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

(continued)

ACTIONS

C.1 and C.2 (continued)

Condition C applies only when the offsite circuits are unavailable to commence automatic load sequencing in the event of a design basis accident (DBA). In cases where the offsite circuits are available for sequencing, but a DBA could cause actuation of the Degraded Voltage Relays, Condition G applies.

D.1 and D.2

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable resulting in de-energization. Therefore, the Required Actions of Condition D are modified by a Note to indicate that when Condition D is entered with no AC source to a train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems – Operating," must be immediately entered. This allows Condition D to provide requirements for the loss of one offsite circuit and one DG without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition D for a period that should not exceed 12 hours.

In Condition D, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition C (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

BASES

ACTIONS (continued)

E.1

With Train A and Train B DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Regulatory Guide 1.93 (Ref. 6), with both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

F.1 and F.2

The sequencer(s) is an essential support system to both the offsite circuit and the DG associated with a given ESF bus. Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus. Therefore, loss of an ESF bus sequencer affects every major ESF system in the load group. The 24 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining sequencer OPERABILITY. **Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.** This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal. Required Action F.2 is intended to provide assurance that a single failure of a DG Sequencer will not result in a complete loss of safety function of critical redundant required features.

Insert

(continued)

Insert for page B 3.8.1-17

G.1

With three or more required AC sources inoperable, the Required Action is to restore the required AC source(s) to OPERABLE status within 1 hour to regain some level of redundancy in the AC electrical power supplies. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of required AC sources. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when three or more required AC sources are intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if two required AC sources are inoperable for any reason and additional required AC sources are found to be inoperable, or if three or more required AC sources are found to be inoperable at the same time.

BASES

ACTIONS (continued)

~~G~~.1 and ~~G~~.2

H

To ensure offsite circuits will not be lost as a consequence of a DBE, certain conditions must be maintained. Failure to maintain these conditions may result in double sequencing should an accident requiring sequencer operation occur.

An offsite circuit meets its required capability by maintaining either of the following conditions:

1. Steady-state switchyard voltage at or above the minimum level needed to support the offsite circuit's functions. The minimum allowable voltage is the value calculated as follows or 528.5 kV, whichever is less:

Base minimum voltage (provides for emergency loads on PBA-S03 or PBB-S04 and house loads on NAN-S01 or NAN-S02)		518 kV
If the offsite circuit is connected to 1-E-NAN-S05 or 1-E-NAN-S06	add	6.5 kV
If the house load group associated with the offsite circuit is connected to both NBN-S01 and NBN-S02 (tie breaker NBN-S01C closed)	add	4 kV
If the offsite circuit is connected to another unit's PBA-S03 or PBB-S04	add	1.5 kV

This option does not apply if the unit under review is the only Palo Verde unit synchronized to the 525 kV switchyard and its main generator gross MVAR output is > 0 or if the offsite circuit is connected to both PBA-S03 and PBB-S04 in the same unit.

The values used to calculate minimum allowable voltage are based on calculations 01, 02, 03-EC-MA-0221 that analyze many different bus alignment conditions. The values are conservative, with sufficient margin to account for analytical uncertainties and to provide assurance that the degraded voltage relays will not actuate as a result of an accident.

(continued)

ACTIONS

H

~~G~~.1 and ~~G~~.2 (continued)

The highest minimum voltage of 528.5 kV is based on management of the loading of the startup transformer secondary windings to not exceed their rated 70 MVA capacity during a design basis event. When two units are sharing a secondary winding, the associated tie breaker NAN-S03B or NAN-S04B must always be open and fast bus transfer control switch NAN-HK-S03B or NAN-HK-S04B in "Manual" position in at least one of the units.

Meters A-E-MAN-EI-001 and A-E-MAN-EI-002 are used to monitor switchyard voltage. The allowable values take into account metering uncertainties. A voltage dip lasting 35 seconds or less is considered a transient, rather than steady-state condition based on the credited 35 second time delay of the degraded voltage relay. The time delay feature on the meters' alarms may be set up to 35 seconds to avoid nuisance alarms.

2. Associated tie breaker NAN-S03B or NAN-S04B to house load buses NAN-S01 or NAN-S02 open and fast bus transfer control switch NAN-HK-S03B or NAN-HK-S04B in "Manual" position. When two units are sharing a startup transformer secondary winding, this condition must be met in both units.

If the required capability in Condition ~~G~~ is not met, the effects of an AOO or DBA could cause further depression of the voltage at the ESF bus and actuation of the degraded voltage relays. These actuations would result in disconnection of the bus from the offsite circuits. Regulatory Guide 1.93 (Ref. 6) defines this condition as "The Available Offsite Power Sources Are One Less Than the LCO" or "The Available Offsite AC Power Sources Are Two Less Than the LCO," depending on the number of affected circuits. However, degraded post-trip voltage could also cause ESF electrical equipment to be exposed to a degraded condition during the degraded voltage relay time-out period. There is a risk that equipment misoperation or damage could occur during this time. In this scenario, the ESF equipment may not perform as designed following an automatic disconnection of the offsite circuits and reconnection to the diesel generators (DGs), even though adequate power is available from the DG. For certain DBAs, an additional consideration

(continued)

BASES

ACTIONS

H

~~G~~.1 and ~~G~~.2 (continued)

is that the initial sequencing of the ESF equipment onto the offsite circuits, subsequent tripping of the degraded voltage relays, and interruption in equipment credited in the UFSAR Chapter 6 and 15 safety analyses could challenge the credited equipment response times. Therefore, it is appropriate to implement Required Actions that are more stringent than those specified in Condition A or C.

If the required capability in Condition ~~G~~ is not met, the following options are available to restore full or partial Operability. Options are listed in their order of preference.

1. Achieve Condition 1 as discussed above (switchyard voltage at or above the minimum allowable value). This is accomplished by either of the following:

   - Increase switchyard voltage. If more than one Palo Verde unit is operating, switchyard voltage is increased by increasing MVAR output of any Palo Verde unit, or by any number of methods implemented by the Energy Control Center. If only one Palo Verde unit is operating, switchyard voltage is increased by any number of methods implemented by the Energy Control Center while maintaining the generator gross MVAR output of the Palo Verde unit to ≤ 0.

   - Reduce minimum allowable voltage as calculated above. This is achieved by realignment of equipment power sources, if such an option is available.

2. Achieve Condition 2 as discussed above. This is accomplished by ensuring the affected tie breaker (NAN-S03B or NAN-S04B) is open and the fast bus transfer control switch (NAN-HK-S03B or NAN-HK-S04B) is in the "Manual" position. If two units are sharing a startup transformer secondary winding, this condition must be achieved in both units. Although Palo Verde has no formal restrictions on the amount of time that fast bus transfer can be out of service, this option should be used judiciously in order to maintain forced circulation capability.

(continued)

BASES

ACTIONS

H.1 and H.2 (continued)

3. Transfer the safety bus(es) to the diesel generator(s). This is less desirable than option 2, because it would perturb the plant. It would cause the plant to remain in an LCO 3.8.1 condition (A or C, depending on whether one or two buses are transferred).

Options 1 and 2 satisfy Required Action H.1, and Option 3 satisfies Required Action H.2. With more than one offsite circuit that does not meet the required capability, Condition H could be satisfied for each offsite circuit by the use of Required Action H.1 or H.2. The Completion Time for both Required Action H.1 and H.2 is one hour. The one hour time limit is appropriate and consistent with the need to remove the unit from this condition, because the level of degradation exceeds that described in Regulatory Guide 1.93 (Ref. 6) for two offsite circuits inoperable. The regulatory guide assumes that an adequate onsite power source is still available to both safety trains, but in a scenario involving automatic load sequencing and low voltage to the ESF buses, adequate voltage is not assured from any of the power sources for the following systems immediately after the accident signal has been generated (i.e., while the degraded voltage relay is timing out): radiation monitors Train A RU-29 or Train B RU-30 (TS 3.3.9), Train B RU-145; ECCS (TS 3.5.3); containment spray (TS 3.6.6); containment isolation valves (TS 3.6.3); auxiliary feedwater system (TS 3.7.5); essential cooling water system (TS 3.7.7); essential spray pond system (TS 3.7.8); essential chilled water system (TS 3.7.10); control room essential filtration system (TS 3.7.11); ESF pump room air exhaust cleanup system (TS 3.7.13); and fuel building ventilation.

Required Action H.2 is modified by a Note. The reason for the Note is to ensure that the offsite circuit is not inoperable for a time greater than the Completion Time allowed by LCO 3.8.1 Condition A or C. Therefore, if Conditions A or C are entered, the Completion Time clock for Conditions A and C would start at the Time Condition H was entered.

(continued)

ACTIONS (continued)

~~H~~.1 and ~~H~~.2

I

If the inoperable AC electrical power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

Reviewer's Note: The TSTF-505 Bases state that this action is not applicable for plants with a RICT Program.

~~I.1~~

~~Condition I corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The unit is required by LCO 3.0.3 to commence a controlled shutdown.~~

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions).

The SR for demonstrating OPERABILITY of the DGs are based on the recommendations of Regulatory Guide 1.9 (Ref. 3), unless otherwise noted in the Updated FSAR Section 1.8.

The DG capabilities (starting and loading) are required to be met from a variety of initial conditions such as DG in standby condition with the engine hot (SR 3.8.1.15) and DG in standby condition with the engine at normal keep-warm conditions (SR 3.8.1.2, SR 3.8.1.7 and SR 3.8.1.19). Although it is expected that most DG starts will be performed from normal keep-warm conditions, DG starts should be performed with the jacket water cooling and lube oil temperatures within the lower to upper limits of DG OPERABILITY, except as noted above. Rapid cooling of the DG down to normal keep-warm conditions should be minimized.

(continued)

BASES

LCO (continued)

Channel B includes 125 VDC bus PKB-M42, 125 VDC battery bank PKB-F12, and normal battery charger PKB-H12 or backup battery charger PKB-H16.
Channel D includes 125 VDC bus PKD-M44, 125 VDC battery bank PKD-F14, and normal battery charger PKD-H14 or backup battery charger PKB-H16.

An OPERABLE DC electrical power subsystem requires all required batteries and respective chargers to be operating and connected to the associated DC bus(es).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 5 and 6, and during movement of irradiated fuel assemblies are addressed in the Bases for LCO 3.8.5, "DC Sources – Shutdown."

ACTIONS

A.1, A.2, and A.3

Condition A represents one subsystem with one battery charger inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage (2.17 volts per cell (Vpc) times the number of connected cells or 130.2 V for a 60 cell battery at the battery terminals) within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition

or in accordance with the Risk Informed Completion Time Program

(continued)

ACTIONS (condition)

(Required Action A.2) from fully charged condition any discharge that might have occurred due to the charger inoperability.

A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is a good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

or in accordance with the Risk Informed Completion Program

If established battery terminal float voltage cannot be restored to greater than equal to the minimum established float voltage within 2 hours, and the charger is not operating in the current-limiting mode, a faulty charger is indicated. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The 2 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 2 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

(continued)

Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

ACTIONS (continued)

Required Action A.3 limits the restoration time for the inoperable battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used. The backup class 1E charger is used to restore OPERABILITY as no balance of plant non-class 1E battery charger exists. The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status.

B.1

Condition B represents one subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. This condition is exclusive of the status of one battery charger. It is therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected subsystem. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution subsystem.

If one of the required DC electrical power subsystems is inoperable for reasons other than Condition A, the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystem with attendant loss of ESF functions, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

Insert

(continued)

Insert for page B 3.8.4-7

C.1

With two DC electrical power subsystems inoperable, the Required Action is to restore at least one DC electrical power subsystem to OPERABLE status within 1 hour to regain control power for the AC emergency power system. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one required DC electrical power subsystem. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when the second DC electrical power subsystem is intentionally made inoperable resulting in loss of safety function. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one DC electrical power subsystem is inoperable for any reason and a second DC electrical power subsystem is found to be inoperable, or if two DC electrical power subsystem are found to be inoperable at the same time.

BASES

ACTIONS (continued)

C.1 and C.2

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8).

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the battery chargers, which support the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to optimally charge the battery. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the battery manufacturer (2.17 volts per cell (Vpc) times the number of connected cells or 130.2 V for a 60 cell battery at the battery terminals). This voltage maintains the battery plates in a condition that supports maintaining the grid life. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.8.4.2

Deleted

SR 3.8.4.3

Deleted

SR 3.8.4.4 and SR 3.8.4.5

Deleted

(continued)

BASES (continued)

LCO (continued)

disconnected. All other inverters must be connected to their associated batteries and aligned to their associated AC vital instrument buses.

APPLICABILITY

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Inverter requirements for MODES 5 and 6, and during movement of irradiated fuel assemblies are covered in the Bases for LCO 3.8.8, "Inverters – Shutdown."

ACTIONS

A.1

With a required inverter inoperable, its associated AC vital instrument bus becomes inoperable until it is re-energized from its Class 1E constant voltage source regulator.

Required Action A.1 is modified by a Note, which states to enter the applicable conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition A is entered with one AC vital instrument bus de-energized. This ensures the AC vital instrument bus is re-energized within 2 hours via the Class 1E constant voltage regulator.

based on a combination of deterministic defense-in-depth and safety margin inherent in the electrical distribution system with risk insights from the station's internal events PRA model. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

Required Action A.1 allows 7 days to fix the inoperable inverter and return it to service. The 7 day limit is ~~a risk informed Completion Time based on a plant specific risk analysis, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability~~. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC

(continued)

BASES (continued)

ACTIONS

A.1 (continued)

vital instrument bus is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital instrument buses is the preferred source for powering instrumentation trip setpoint devices.

Planned inverter maintenance or other activities that require entry into Required Action A.1 will not be undertaken concurrent with the following:

a. Planned maintenance on the associated train Diesel Generator (DG): or

b. Planned maintenance on another RPS or ESFAS channel that results in that channel being in a tripped condition.

These actions are taken because it is recognized that with an inverter inoperable and the instrument bus being powered by the regulating transformer, instrument power for that train is dependent on power from the associated DG following a loss of offsite power event.

Insert

C

~~B~~.1 and ~~B~~.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

Insert for page B 3.8.7-4

B.1

With two or more required inverters inoperable, the Required Action is to restore all but one required inverter to OPERABLE status within 1 hour to regain AC electrical power to the vital buses. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of at least one required inverter. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a Note stating it is not applicable when two or more required inverters are intentionally made inoperable resulting in loss of safety function. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one required inverter is inoperable for any reason and additional required inverters are found to be inoperable, or if two or more required inverters are found to be inoperable at the same time.

or in accordance with the Risk Informed Completion Time Program

BASES (continued)

ACTIONS

A.1

With one or more required AC buses, load centers, or motor control centers (see Table B 3.8.9.-1), except AC vital instrument buses, in one subsystem inoperable, the remaining AC electrical power distribution subsystem in the other train is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, load centers and motor control centers must be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train (PBA or PBB) without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit; and

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

TSTF-439 deletions

~~The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of~~

(continued)

BASES

ACTIONS

~~A.1 (continued)~~

TSTF-439 deletions

~~failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.~~

~~The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.~~

B.1

With AC vital instrument bus(es) (Channels A or C, or Channels B or D) (see Table B 3.8.9-1) in one train inoperable, the remaining OPERABLE AC vital bus electrical power distribution subsystem is capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital instrument buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated inverter via inverted DC voltage or the Class 1E constant voltage regulator. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

Condition B represents one train without adequate AC vital instrument bus power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of OPERABILITY to the remaining vital instrument buses, and restoring power to the affected electrical power distribution subsystem.

(continued)

BASES

ACTIONS

B.1 (continued)

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate AC vital instrument power. Taking exception to LCO 3.0.2 for components without adequate AC vital instrument power, which would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate AC vital instrument power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital instrument bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital instrument buses, and the low probability of a DBA occurring during this period.

TSTF-439 deletions

~~The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital instrument bus distribution system. At this time, an AC train could again become inoperable, and vital instrument bus distribution restored OPERABLE. This could continue indefinitely.~~

(continued)

BASES

ACTIONS

~~B.1 (continued)~~

TSTF-439 deletions

~~This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.~~

C.1

With DC bus(es) in one train (see Table B 3.8.9-1) inoperable, the remaining DC electrical power distribution subsystem is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or battery charger.

Condition C represents one train without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining DC buses and restoring power to the affected DC electrical power distribution subsystem.

Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

(continued)

BASES

ACTIONS

C.1 (continued)

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 3).

TSTF-439 deletions

~~The second Completion Time for Required Action C.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.~~

~~This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.~~

Insert

(continued)

Insert for page B 3.8.9-8

D.1

With two or more electrical power distribution subsystems inoperable, the Required Action is to restore electrical power distribution subsystem(s) to OPERABLE status within 1 hour. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration. Alternately, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

The Condition is modified by a NOTE stating it is not applicable when the two or more electrical power distribution subsystems are intentionally made inoperable resulting in a loss of safety function. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only applicable if one electrical power distribution subsystem is inoperable for any reason and a second electrical power distribution subsystem is found to be inoperable, or if two or more electrical power distribution subsystems are found to be inoperable at the same time.

BASES

ACTIONS (continued)

~~D~~.1 and ~~D~~.2

E

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

~~E.1~~

~~Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. When more than one Condition is entered, and this results in the loss of a required safety function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation.~~

~~LCO 3.0.3 must be entered immediately to commence a controlled shutdown.~~

Reviewer's Note: The TSTF-505 Bases state that this condition is not applicable to plants with a RICT Program.

ATTACHMENT 4

List of Regulatory Commitments

List of Regulatory Commitments

1. Plant procedures needed to implement the Risk-Informed Completion Time Program shall be in place before the risk-informed completion times (RICTs) can be used.

2. APS will notify the NRC by letter within 60 days of the first use of a RICT in each unit.

3. To ensure the current baseline probabilistic risk assessment (PRA) core damage frequency and large early release frequency values meet Regulatory Guide 1.174 risk limits for small changes in risk, the following will be performed prior to use of the RICT Program in each unit:
   a. Install fuses in Control Room DC ammeter circuits to prevent secondary fires due to multiple fire induced faults.
   b. Install fuses in non-class DC motor circuits to prevent secondary fires due to multiple fire induced faults. Alternatively, post continuous fire watches in FZ14 - Lower Cable Spreading Room, COR2 - Corridor Building 120 ft., and TB-4B - Turbine Building Station DC Equipment Room, and prohibit welding or cutting activities in these areas, any time a RICT is in effect. The alternative would only be credited in lieu of the modification if confirmed to meet Regulatory Guide 1.174 risk limits for the specific plant configuration.
   c. Replace RCP control cables with one-hour fire rated cables. Alternatively, stage an operator at the RCP switchgear to trip the RCPs upon direction from the Control Room, any time a RICT is in effect. The alternative would only be credited in lieu of the modification if confirmed to meet Regulatory Guide 1.174 risk limits for the specific plant configuration.
   d. Install an additional Steam Generator makeup capability to reduce Internal Fire PRA risk.
   e. Implement recovery procedures for breaker coordination on class and non-class motor control centers/distribution panels that impact risk significant functions in the Internal Fire PRA.

4. Supporting requirements of ASME/ANS RA-Sa-2009 SY-C1 and SY-C2 shall be fully met at Capability Category II prior to use of the RICT Program.

5. Validate that the Unit 1 Internal Fire PRA model is bounding for Units 2 and 3 to reflect field-routed cabling or create unit-specific internal fire models for Units 2 and 3 prior to use of the RICT Program at Units 2 and 3.

6. Implementing procedures will prohibit RICT entry, or a RICT entry made shall be exited, for any condition involving a TS loss of function if a PRA functionality determination concludes that compliance with the LCO cannot be restored without placing the TS inoperable trains in an alignment which results in a loss of functional level PRA success criteria.

ATTACHMENT 5

List of Revised Required Actions to Corresponding Probabilistic Risk Assessment Functions

List of Revised Required Actions to Corresponding Probabilistic Risk Assessment Functions

Section 4.0, Item 2 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09, Revision 0, *Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines*, (Reference 2 of this Attachment) identifies the following needed content:

- The license amendment request (LAR) will provide identification of the TS Limiting Conditions for Operation (LCOs) and action requirements to which the RMTS will apply.
- The LAR will provide a comparison of the TS functions to the PRA modeled functions of the structures, systems, and components (SSCs) subject to those LCO actions.
- The comparison should justify that the scope of the PRA model, including applicable success criteria such as number of SSCs required, flow rate, etc., are consistent [with] licensing basis assumptions [i.e., 10 CFR 50.46 emergency core cooling system (ECCS) flow rates] for each of the TS requirements, or an appropriate disposition or programmatic restriction will be provided.

This attachment provides confirmation that the Palo Verde Nuclear Generating Station (PVNGS) PRA models include the necessary scope of SSCs and their functions to address each proposed application of the Risk-Informed Completion Time (RICT) Program to the proposed scope TS LCO Conditions, and provides the information requested for Section 4.0, Item 2 of the NRC Final Safety Evaluation. The scope of the comparison includes each of the TS LCO conditions and associated required actions within the scope of the RICT Program. The PVNGS PRA model has the capability to model directly or through use of a bounding surrogate the risk impact of entering each of the TS LCOs in the scope of the RICT Program.

Table A5-1, *In Scope TS/LCO Conditions to Corresponding PRA Functions*, lists each TS LCO Condition to which the RICT Program is proposed to be applied, and documents the following information regarding the TS with the associated safety analyses, the analogous PRA functions, and the results of the comparison:

- Column "TS LCO/Condition": Lists all of the LCOs and condition statements within the scope of the submittal
- Column "SSCs Covered by TS LCO/Condition": Lists the SSCs addressed by each action requirement
- Column "SSCs Modeled in PRA": Indicates whether the SSCs addressed by the TS LCO/Condition are included in the PRA
- Column "Function Covered by TS LCO/Condition": Contains a summary of the required functions from the design basis analyses
- Column "Design Success Criteria": Lists a summary of the success criteria from the design basis analyses
- Column "PRA Success Criteria": Lists the function success criteria modeled in the PRA
- Column "Comments": Provides the justification or resolution to address any inconsistencies between the TS and PRA functions regarding the scope of SSCs and the success criteria.

Where the PRA scope of SSCs is not consistent with the TS, additional information is provided to describe how the LCO condition can be evaluated using appropriate surrogate events. Differences in the success criteria for TS functions are addressed to demonstrate the PRA criteria provide a realistic estimate of the risk of the TS condition as required by NEI 06-09-A.

The corresponding SSCs for each TS LCO and the associated TS functions are identified and compared to the PRA. This description also includes the design success criteria and the applicable PRA success criteria. Any differences between the scope or success criteria are described in the table. Scope differences are justified by identifying appropriate surrogate events which permit a risk evaluation to be completed using the *Configuration Risk Management Program* (CRMP) tool for the RICT program. Differences in success criteria typically arise due to the requirement in the PRA standard to make PRAs realistic rather than overly conservative, whereas design basis criteria are necessarily conservative and bounding. The use of realistic success criteria is necessary to conform to Capability Category II of the PRA standard as required by NEI 06-09-A.

Examples of calculated RICTs are provided for each individual condition to which the RICT applies (assuming no other SSCs modeled in the PRA are unavailable) in this Attachment under Table A5-2, *Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate.* Actual RICT values will be calculated based on the actual plant configuration using a current revision of the PRA model which represents the as-built/as-operated condition of the plant, as required by NEI 06-09-A and the NRC Final Safety Evaluation, and may differ from the RICTs presented.

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

TS LCO/ Condition	SSCs Covered by TS LCO/ Condition	SSCs Modeled in PRA	Function Covered by TS LCO/ Condition	Design Success Criteria	PRA Success Criteria	Comments
3.3.4 RPS Logic and Trip Initiation	6 channels of RPS Matrix Logic	No	Unit shutdown to protect core fuel design limits and Reactor Coolant System (RCS) pressure boundary	1 of 6 channels	N/A	Note 1
	4 channels of RPS initiating logic	Partial		2 of 4 channels	Same	Note 1
	4 channels of RTCBs	Yes		2 of 4 channels	Same	Note 1
	4 channels of manual trip	No		2 of 4 channels	N/A	Note 1
3.3.6 ESFAS Logic and Manual Trip	6 Matrix Logic Channels	Partial	Initiate safety systems to protect against violating core design limits and RCS pressure boundary, and to mitigate accidents	1 of 6 channels	Same	Note 2
	4 Initiating Logic Channels	Partial		2 of 4 channels	Same	Note 2
	2 Actuation Logic Channels	Partial		1 of 2 channels	Same	Note 2
	4 Manual Trip Channels	Yes		2 of 4 channels	Same	Note 2
3.4.9 Pressurizer Heaters	2 groups of heaters	No	Maintain RCS subcooling margin	2 of 8 groups	N/A	Note 3

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.4.10 Pressurizer Safety Valves	4 SRVs	Yes	Prevent RCS pressure from exceeding safety limit	4 of 4 SRVs	4 of 4 SRVs for limiting anticipated transient without scram (ATWS); 1 of 4 SRVs for non ATWS scenarios	
3.4.12 Pressurizer Vents	4 Pressurizer Vents	Yes	Depressurize the RCS during a SGTR and LOP	a Pressurizer Vent Path to Containment	One of two parallel paths plus isolation valve	
3.5.1 Safety Injection Tanks (SITs)	4 SITS	Yes	Emergency core cooling system (ECCS) injection during a large loss-of-coolant accident (LOCA)	3 of 4 SITs	Same	Note 4

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.5.3 ECCS - Operating	2 High Pressure Injection Pumps (HPSI) 2 Low Pressure Injection Pumps (LPSI) Associated piping, valves and heat exchangers	Yes	Injection from RWT into cold legs Cold leg recirculation from containment sumps	(a) 1 of 2 HPSI pumps for small/medium LOCA; 1 of 2 LPSI pumps for large LOCA	Same	
			Hot leg recirculation from containment sumps	(b) 1 of 2 HPSI pumps for steam generator tube rupture (SGTR) or main steam line break (MSLB)	Same	
				1 of 2 HPSI or LPSI pumps to supply other required ECCS pump suction and RCS cold legs	Same	
				1 of 2 HPSI pumps to supply other required ECCS pumps suction and RCS hot legs	Same	

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.5.5 Refueling Water Tank (RWT)	RWT	Yes	Supply borated water to ECCS and CS system during LOCA injection phase for: (a) containment cooling and depressurization (b) core cooling and replacement inventory (c) negative reactivity for reactor shutdown	RWT boron concentration, temperature, and level within limits	RWT level within limits	The PRA does not explicitly model the impact of out of limit boron or temperature, but conservatively, these can be addressed for the RICT Program by failing the operator action to emergency borate for small boron concentration deviations from required limits and fail the RWT for larger boron concentrations as appropriate per best-estimate analysis. Therefore, the LCO condition can be evaluated using the CRMP.
3.6.2 Containment Air Locks	2 air locks (personnel and emergency)	No	Post-accident containment leakage within limits	2 of 2	N/A	SSCs for the containment air locks can be evaluated by a bounding assessment as permitted by NEI 06-09-A. In this case containment is conservatively considered failed.

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	SSCs Covered by TS LCO/ Condition	SSCs Modeled in PRA	Function Covered by TS LCO/ Condition	Design Success Criteria	PRA Success Criteria	Comments
3.6.3 Containment Isolation Valves	2 active or passive isolation devices on each fluid penetration line	Yes	Each containment penetration isolated within the time limits assumed in the safety analysis	1 of 2 isolation devices per penetration isolate within required stroke time	1 of 2 isolation devices per penetration isolate within required stroke time for: containment purge; radwaste drain; charging; letdown; reactor drain tank (RDT) discharge; RDT Makeup; RDT vent; nitrogen supply; instrument air	Any individual penetrations not explicitly modeled in the PRA have been evaluated to be less than the 1.27" diameter effective LERF threshold for PVNGS. Multiple open penetrations can be modeled by failing a surrogate penetration found in the PRA model.

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.6.6 Containment Spray	2 CS trains	Yes	Containment atmosphere cooling to limit post-accident pressure and temperature Iodine removal to reduce the release of fission product radioactivity from containment to the environment	1 of 2 CS trains	Same	
3.7.2 Main Steam Isolation Valves (MSIVs)	4 MSIVs	Yes	Isolate steam flow from the secondary side of the SGs following a high energy line break (HELB)	MSIV on affected steamline closes, or remaining 3 MSIVs on unaffected steamline close.	1 of 4 MSIVs fail to close	
3.7.3 Main Feedwater Isolation Valves (MFIVs)	8 MFIVs	No	Isolate feedwater flow from the secondary feedwater to the SGs following a HELB	MFIV on affected feedwater path closes	N/A	MFIVs are modeled to open for flow path to feed SG. As a surrogate the RICT will conservatively fail the check valve to steam generator closed (for bypassed feed flow) and containment penetration failed open (for containment challenge of HELB).

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.7.4 Atmospheric Dump Valves (ADVs)	4 ADV lines (one per SG, each with ADV and block valve)	Yes	Cool unit to RHR entry conditions, if preferred heat sink via steam dump to condenser not available Cool down RCS following SGTR to permit termination of primary to secondary break flow	4 of 4 ADVs to cool down unit to design rate of 100°F per hour; 1 of 4 ADVs permit 25°F per hour cooldown for a natural circulation cooldown event. 3 ADVs on intact SG lines	1 of 4 ADVs 1 of 4 ADVs on intact SG lines	The difference between the Design Success Criteria and PRA Success Criteria is due to the Design basis being highly conservative whereas the PRA is realistic. Thermal-hydraulic calculations have determined only 1 ADV is needed for adequate heat removal during the most limiting accident scenarios.

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.7.5 Auxiliary Feedwater (AFW) System	2 motor-driven pumps and 1 turbine-driven pump	Yes	Supply feedwater to the SGs to remove RCS decay heat	1 of 3 pumps for the most limiting event (loss of main feedwater)	Same	
3.7.6 Condensate Storage Tank (CST)	1 CST	Yes	Safety grade source of water to SGs for removing heat from RCS	1 CST aligned with minimum water volume	Same	
3.7.7 Essential Cooling Water (EW) System	2 trains	Yes	Heat transfer system to the ultimate heat sink for the removal of process and operating heat from selected safety related air handling systems during a DBA or transient.	1 of 2 loops with 1 of 2 EW pumps and 1 of 2 heat exchangers	1 of 2 loops with 1 of 2 EW pumps and 1 of 2 heat exchangers	The PRA also credits EW to Nuclear Cooling as a backup for cooling RCP seals.

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.7.8 Essential Spray Pond System (ESPS)	2 trains	Yes	Heat sink for removal of process and operating heat from the EW system.	1 of 2 trains	Same	
3.7.9 Ultimate Heat Sink (UHS)	2 trains	No	Heat sink for removal of process and operating heat from the EW system.	1 of 2 trains	N/A	Per TS Bases, this impacts containment spray when going on recirculation. This is modeled for the RICT by failing the associated train's SDC HX, which fails containment spray recirculation. Two trains inoperable is modeled for the RICT by failure of both spray pond trains.
3.7.10 Essential Chilled Water (EC) System	2 trains	Yes	Heat transfer system to EW for the removal of process and operating heat from selected safety related air handling systems during a DBA or transient.	1 of 2 trains	Same	

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

TS LCO/ Condition	SSCs Covered by TS LCO/ Condition	SSCs Modeled in PRA	Function Covered by TS LCO/ Condition	Design Success Criteria	PRA Success Criteria	Comments
3.7.12 Control Room Emergency Air Temperature Control System (CREATCS)	2 trains	Yes	Provides temperature control for the control room following isolation of the control room.	1 of 2 trains	Same	
3.8.1 AC Sources - Operating	2 offsite circuits, 2 diesel generators (DG), 2 supply trains of diesel fuel oil transfer systems,	Yes	Source of power to ESF system Source of fuel oil to DGs	Automatically power associated ESF buses 1 of 2 trains 1 of 2 trains	Same Same	Two Station Blackout Generators (SBOG) are also credited in the PRA model.
3.8.4 DC Sources - Operating	4 Class 1E DC subsystems	Yes	Provide control power to AC emergency power system, motive and control power to selected safety related equipment and backup 120 VAC vital bus power	Align to provide power to associated equipment from battery and associated charger	Same	

Table A5-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
TS LCO/ Condition	**SSCs Covered by TS LCO/ Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO/ Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.8.7 Inverters - Operating	4 Class 1E Inverters	Yes	Provide uninterruptible power to reactor protection system (RPS) and engineered safety features actuation system (ESFAS)	Align to associated 120 VAC vital bus, with input power from vial AC and associated battery	Same	
3.8.9 Distribution Systems - Operating	Class 1E AC, DC, and 120 volts, alternating (VAC) vital bus electrical power distribution subsystems	Yes	Provide necessary power to ESF systems	Align to provide power to buses	Same	

Notes:

1. Individual reactor trip system (RTS) instrumentation channels for input to the automatic RTS function will be evaluated using a bounding evaluation as permitted by NEI 06-09-A. The PVNGS reactor protection design uses four quality class input channels placed through six channels of matrix logic to develop a trip signal to the reactor trip circuit breakers (RTCBs). The design allows for any one channel to be placed in bypass or trip without impacting the ability to trip the plant or perform testing with the remaining channels. Any channel which was unable to trip the circuitry at its required setpoint criteria would be both inoperable and non-functional for the RICT program. For the RICT Program, the risk for one or more inoperable instrument channels for one trip signal will be evaluated assuming that the probability of failure of all RTCBs has increased by a factor of two. This is a bounding conservative risk assessment as permitted by NEI 06-09-A. It is conservative because: (1) loss of one channel of matrix logic can only impact three of the contacts in the initiation circuit for a RTCB; any of the remaining three will trip the breaker, and (2) the reactor protection system (RPS) logic failure rate with one matrix relay bypassed is at least one order of magnitude less than the reactor trip switchgear (RTSG) breaker failure rate (CE NPSD-277) and is conservatively bounded by increasing the breaker failure rate. Therefore, the RPS is modeled in sufficient detail in the PRA model to capture the risk impacts from unavailability of any channel. The instruments and logic for control functions are separate from and do not impact the RPS. Some

quality class transmitters are shared by RPS and ESFAS, in which case the RICT program would implement the equipment as being non-functional for both the RPS and ESFAS.

2. The ESFAS is made up of 4 quality class input channels, 6 channels of Matrix Logic, 4 channels of Initiation Logic, 2 channels of Actuation Logic, and 4 channels of Manual Trip for 7 Functions; Safety Injection Actuation Signal (SIAS), Containment Isolation Actuation Signal (CIAS), Recirculation Actuation Signal (RAS), Containment Spray Actuation Signal (CSAS), Main Steam Isolation Signal (MSIS), Auxiliary Feedwater Actuation Signal to SG-1 (AFAS-1), and Auxiliary Feedwater Actuation Signal to SG-2 (AFAS-2). Individual ESFAS instrumentation channels will be evaluated using a bounding evaluation as permitted by NEI 06-09-A. For one or more functions with manual trip or initiation logic channel inoperable, the actuation relays for one train of SIAS, CSAS, AFAS, or RAS will be assumed failed, 1 MSIV per steam generator will be failed for MSIS, and containment pressure mis-calibration will be set to logical True for CIAS. For one or more functions with two initiation logic channels inoperable or with one actuation logic channel inoperable, the initiated equipment for one train of SIAS, CIAS, CSAS, or MSIS is assumed failed, and the initiation relay for AFAS or RAS for one train is failed. For two actuation logic channels inoperable, both trains of the equipment actuated by the associated signal are failed. The train of EFAS taken as failed will be the one sharing power with the channel that is non-functional. This is conservative because: (1) a full train of ESAS-actuated equipment is being assumed unavailable at a point downstream of the logic that is unavailable, (2) for multiple initiation channels or actuation logic inoperable, no credit is taken for operator recovery of the unavailable train except for AFAS and RAS, which have long recovery times, and (3) complete failure of the ESFAS function is assumed for two actuation logic channels inoperable. Therefore, the ESFAS is modeled in sufficient detail in the PRA model to capture the risk impacts from unavailability of any channel. The instruments and logic for control functions are separate from and do not impact the ESFAS. Some quality class transmitters are shared by RPS and ESFAS, in which case the RICT program would implement the equipment as being non-functional for both the RPS and ESFAS.

3. The pressurizer heaters will be evaluated for the RICT Program by a bounding assessment as permitted by NEI 06-09-A. The function of the heaters is to maintain subcooled conditions in the RCS for decay heat removal using forced or natural circulation when cooling down to shutdown cooling conditions. In the PRA, this is addressed by failing the operator action to align LPSI for shutdown cooling. This is conservative since it fails long-term cooling of the core.

4. The success criteria in the PRA are consistent with the design basis criteria for large LOCA scenarios. For medium LOCA scenarios, the PRA success criteria do not require SITs based on realistic analyses consistent with the PRA standards for Capability Category II. Boron concentration out of limits will be evaluated for the RICT Program by a bounding assessment as permitted by NEI 06-09-A. This is conservative by failing the operator action to emergency borate for small boron concentration deviations from required limits and failing the SIT for larger boron concentrations as appropriate per best-estimate analysis.

Table A5-2: Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate

TS/LCO Condition	RICT Estimate[1]
3.3.4 RPS Logic and Trip Initiation Condition A - One Matrix Logic channel inoperable	30 days
3.3.6 ESFAS Logic and Manual Trip Condition A - One or more Functions with one Matrix Logic channel inoperable	2 days[2]
3.3.6 ESFAS Logic and Manual Trip Condition B - One or more Functions with one Manual Trip or Initiation Logic channel inoperable	2 days[2]
3.3.6 ESFAS Logic and Manual Trip Condition C - One or more Functions with two Initiation Logic channels inoperable	2 days[2]
3.3.6 ESFAS Logic and Manual Trip Condition D - One or more Functions with one Actuation Logic channel inoperable	2 days[2]
3.3.6 ESFAS Logic and Manual Trip Condition E - One or more Actuation Logic channels inoperable	7 days
3.4.9 Pressurizer Condition B - One pressurizer heater group inoperable	30 days
3.4.9 Pressurizer Condition C - Two pressurizer heater groups inoperable	30 days
3.4.10 Pressurizer Safety Valves Condition A - One pressurizer safety valve inoperable	30 days
3.4.12 Pressurizer Vents Condition A - Two or three pressurizer vents inoperable	30 days
3.4.12 Pressurizer Vents Condition B - All pressurizer vents inoperable	30 days
3.5.1 Safety Injection Tanks (SITs) Conditions A and B - One SIT inoperable	30 days
3.5.1 Safety Injection Tanks (SITs) Condition C - Two or more SITs inoperable	30 days
3.5.3 Essential Core Cooling System Condition A - One LPSI subsystem inoperable	30 days

Table A5-2: Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate	
TS/LCO Condition	**RICT Estimate[1]**
3.5.3 Essential Core Cooling System Condition B - One or more trains inoperable	30 days
3.5.3 Essential Core Cooling System Condition C - Less than 100% of ECCS flow equivalent to a single OPERABLE train available	10 days
3.5.5 Refueling Water Tank (RWT) Conditions A and B - RWT boron concentration or borated water temperature not within limits	10 days
3.6.2 Containment Air Locks Condition C - One or more containment air locks inoperable	25 days
3.6.3 Containment Isolation Valves Condition A - One or more penetration flow paths with one required containment isolation valve inoperable	13 days
3.6.3 Containment Isolation Valves Condition B - One or more penetration flow paths with two required containment isolation valve inoperable	10 days
3.6.3 Containment Isolation Valves Condition C - One or more penetration flow paths with one required containment isolation valve inoperable	16 days
3.6.3 Containment Isolation Valves Condition D - One or more penetration flow paths with one or more containment purge valves not within leakage limits	30 days
3.6.6 Containment Spray System Condition A - One containment spray train inoperable	30 days
3.6.6 Containment Spray System Condition C - Two containment spray trains inoperable	30 days
3.7.2 Main Steam Isolation Valves (MSIVs) Condition F - One MISV inoperable	30 days
3.7.2 Main Steam Isolation Valves (MSIVs) Condition G - Two or more MISVs inoperable	30 days

Table A5-2: Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate	
TS/LCO Condition	**RICT Estimate[1]**
3.7.3 Main Feedwater Isolation Valves (MFIVs) Condition A One or more MFIVs inoperable	16 days
3.7.3 Main Feedwater Isolation Valves (MFIVs) Condition B - Two valves in the same flow path inoperable	15 days
3.7.4 Atmospheric Dump Valves (ADVs) Condition A - One ADV line inoperable	30 days
3.7.4 Atmospheric Dump Valves (ADVs) Condition B - Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs	30 days
3.7.5 Auxiliary Feedwater System (AFW) Condition A - One steam supply to turbine driven AFW pump inoperable	30 days
3.7.5 Auxiliary Feedwater System (AFW) Condition B - One AFW train inoperable	22 days
3.7.5 Auxiliary Feedwater System (AFW) Condition C - Two AFW trains inoperable	2 days
3.7.6 Condensate Storage Tank (CST) Condition A - CST inoperable	< 1 hr[3]
3.7.7 Essential Cooling Water System (EW) Condition A - One EW train inoperable	30 days
3.7.7 Essential Cooling Water System (EW) Condition B - Two EW trains inoperable	30 days
3.7.8 Essential Spray Pond System (ESPS) Condition A - One ESPS train inoperable	30 days
3.7.8 Essential Spray Pond System (ESPS) Condition B - Two ESPS trains inoperable	28 days
3.7.9 Ultimate Heat Sink (UHS) Condition A - UHS inoperable	30 days
3.7.10 Water (EC) System Condition A- One EC train inoperable	30 days
3.7.10 Water (EC) System Condition B - Two EC trains inoperable	30 days
3.7.12 Control Room Emergency Air Temperature Control System (CREATCS) Condition B - Two CREACTS trains inoperable	30 days

Table A5-2: Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate	
TS/LCO Condition	**RICT Estimate[1]**
3.8.1 AC Sources - Operating Condition A - One required offsite circuit inoperable	30 days
3.8.1 AC Sources - Operating Condition B - One Diesel Generator (DG) inoperable	30 days
3.8.1 AC Sources - Operating Condition C - Two required offsite circuits inoperable	30 days
3.8.1 AC Sources - Operating Condition D - One required offsite circuit inoperable AND one DG inoperable	30 days
3.8.1 AC Sources - Operating Condition E - Two DGs inoperable	3 days
3.8.1 AC Sources - Operating Condition F - One automatic load sequencer inoperable	22 days
3.8.1 AC Sources - Operating Condition G - Three or more required AC sources inoperable	3 days
3.8.4 DC Sources - Operating Condition A - One battery charger on one subsystem inoperable	30 days
3.8.4 DC Sources - Operating Condition B - One DC electrical power subsystem inoperable	3 days
3.8.4 DC Sources - Operating Condition C - Two DC electrical power subsystems inoperable	<1 hr[4]
3.8.7 Inverters - Operating Condition A - One required inverter inoperable	30 days
3.8.7 Inverters - Operating Condition B - Two or more required inverters inoperable	30 days
3.8.9 Distribution Systems - Operating Condition A - One AC electrical power distribution subsystem inoperable	7 days
3.8.9 Distribution - Operating Condition B - One AC vital instrument bus electrical power distribution subsystem inoperable	30 days

Table A5-2: Units 1/2/3 In Scope TS/LCO Conditions RICT Estimate	
TS/LCO Condition	**RICT Estimate[1]**
3.8.9 Distribution Systems - Operating Condition C - One DC electrical power distribution subsystem inoperable	6 days
3.8.9 Distribution Systems - Operating Condition D - Two or more electrical power distribution subsystems inoperable	6 hrs

Notes:

1. RICTs are based on the internal events, internal flood, internal fire, and seismic PRA model calculations. RICTs calculated to be greater than 30 days are capped at 30 days based on NEI 06-09-A. RICTs are rounded to nearest number of days for illustrative purposes.
2. This was evaluated with all of the EFAS signals being impacted to account for the "or more" condition of the LCO and thus, is a bounding value.
3. The evaluation did not credit using the Reactor Makeup Water Tank to back up the Condensate Storage Tank, as it is not currently not credited in the PRA model due to lack of testing of the flow path.
4. The evaluation assumed the worst case of Train A and B batteries and chargers out of service concurrently.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (Agencywide Documents Access and Management System (ADAMS) Accession No., ML071200238) dated May 17, 2007
2. Nuclear Energy Institute (NEI) 06-09, *Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document,* Nuclear Energy Institute, Revision 0-A, (ADAMS Accession No. ML12286A322) dated November, 2006

ATTACHMENT 6

Information Supporting Consistency with Regulatory Guide 1.200, Revision 2

Information Supporting Consistency with Regulatory Guide 1.200, Revision 2

Introduction

NEI 06-09, Revision 0, *Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines*, (Reference 1 of this Attachment), Section 2.3.4 states that the probabilistic risk assessment (PRA) shall be reviewed to the guidance of Regulatory Guide (RG) 1.200, Revision 2 (Reference 2 of this Attachment), for a PRA which meets Capability Category II for the supporting requirements (SRs) of the internal events at power PRA standard, and that deviations from these capability standards shall be justified and documented. APS has performed its review of the PRA to the guidance in RG 1.200, Revision 2. Section 4.0, Item 3 of the NRC Final Safety Evaluation (Reference 3 of this Attachment), for NEI 06-09-A requires the license amendment request (LAR) to include a discussion of the results of peer reviews and self-assessments conducted for the plant-specific PRA models which support the RMTS, including the resolution or disposition of any identified deficiencies (i.e., findings and observations from peer reviews). The scope of this information includes the internal events PRA model and other models for which additional standards have been endorsed by a revision to RG 1.200.

This attachment provides information on the technical adequacy of the PVNGS PRA internal event, internal flood, internal fire, and seismic models which support the Risk-Informed Completion Time (RICT) Program, in support of the LAR to revise Technical Specifications (TS) to implement NEI 06-09-A. This information is consistent with the requirements of Item 3 of Reference 3 of this Attachment and addresses each PRA model for which a RG 1.200-endorsed standard exists. The information is provided as follows:

- Table A6-1 *Internal Events PRA Peer Review A & B Findings*
- Table A6-2 *Internal Events PRA Self-Assessment ASME SRs Not Met to Capability Category II*
- Table A6-3 *Internal Flood PRA Peer Review ASME SRs Not Met to Capability Category II*
- Table A6-4 *Seismic PRA Peer Review ASME SRs Not Met to Capability Category II*
- Table A6-5 *Internal Fire PRA Peer Review ASME SRs Not Met to Capability Category II*

Note that the other external hazards have been screened out in accordance with RG 1.200, were peer reviewed in accordance with RG 1.200, Revision 2, and are further discussed in Attachment 8 of this Enclosure. Shutdown modes of operation are not in the scope of the RICT Program and thus, low power and shutdown PRA models are not addressed. No other PRA standards are endorsed by RG 1.200, Revision 2.

All peer review findings associated with not-met ASME SRs are identified in this attachment and those not yet met will be fully addressed prior to use of the RICT Program, therefore satisfying the technical adequacy requirements of NEI 06-09-A. This attachment indicates the only two SRs in ASME/ANS RA-Sa-2009 (Reference 4 of this Attachment), associated with the PVNGS PRA models that are currently not fully met at Capability Category II are SY-C1 and SY-C2.

APS has committed in Attachment 4 of this Enclosure to fully meet these SRs at Capability Category II prior to use of the RICT program.

Since the associated peer review(s), no changes have been made to the internal event, internal flood, seismic, or internal fire PRA models that would constitute an upgrade as defined by ASME/ANS RA-Sa-2009; thus no additional peer reviews are required to support implementation of the RICT Program. PVNGS has a PRA model maintenance process consistent with ASME/ANS RA-Sa-2009 reflecting the as-built, as-operated station and ensures future changes (i.e., design changes, procedure changes, and equipment performance monitoring) are periodically reflected in the PRA models. The PRA model maintenance program was previously described in the RITS 5b license application which was approved by Reference 5 of this Attachment.

Internal Events PRA

A peer review of the PVNGS internal events PRA was conducted in April 1999 in accordance with the reactor owners group peer review process (References 6 and 7 of this Attachment). APS subsequently performed a self-assessment of the PVNGS internal events models in December 2010 consistent with RG 1.200, Revision 2, using the current endorsed standard ASME/ANS RA-Sa-2009 and exceptions/objections in RG 1.200 Revision 2 Appendix B.

Internal Flood PRA

A peer review of the PVNGS internal flood PRA was conducted in October 2010 (Reference 8 of this Attachment) consistent with RG 1.200, Revision 2, using the current endorsed standard ASME/ANS RA-Sa-2009 and exceptions/objections in RG 1.200 Revision 2 Appendix A.

Seismic PRA

A peer review of the PVNGS seismic PRA was conducted in December 2013 (Reference 9 of this Attachment) consistent with RG 1.200, Revision 2 and the current endorsed standard ASME/ANS RA-Sa-2009 and exceptions/objections in RG 1.200 Revision 2 Appendix A.

Internal Fire PRA

A peer review of the PVNGS internal fire PRA was conducted in October 2012 (Reference 10 of this Attachment) consistent with RG 1.200, Revision 2, using the current endorsed standard ASME/ANS RA-Sa-2009. Subsequently, a focused-scope peer review of the internal fire PRA was conducted in December 2014 (Reference 11 of this Attachment) to address ASME PRA Standard SRs not-met to Capability Category II requirements and those SRs not-reviewed in the prior October 2012 internal fire PRA peer review.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	**Sub-element(s)**	**Level**	**Status**	**Finding(s)**	**Disposition**
SY-10	SY-20	A	Closed	Demand failures of batteries are not considered (i.e., if there is a demand for [direct current] DC, battery failure is more likely). Only charger failures, bus faults, circuit breaker failures, battery faults, maintenance and failure to restore after maintenance are modeled.	The finding has been resolved and closed by an update of the PRA model. Demand failure of batteries has been added to the model.
DA-04	DA-8	A	Closed	The following common cause factors are significantly lower than Idaho National Engineering Environmental Laboratory (INEEL) recommended values: pumps gamma and delta factors, [emergency diesel generator] EDG failure to start beta, and auxiliary feedwater] AFW pumps failure to run beta generic pumps - beta. Note: these are based on generic sources; therefore there is a concern that the values are significantly different from INEEL generic data. A sensitivity evaluation was performed which put these values to those similar to INEEL recommended values caused a CDF increase of approximately 7%.	The finding has been resolved and closed by an update of the PRA model. The PRA model common cause factors have been revised consistent with the NRC common cause database.
DE-07	DE-7	A	Closed	In general, human actions across systems appear to treat dependency appropriately. There are some cases where dependencies across systems are not properly addressed. RE-AFA-LOCAL is used redundantly to 1ALFW-2HRS-HR in sequences 7634, 14966, etc. [per PRA Study, 13-NS-C29 Rev. 3, PRA Change Documentation] per C-29 Rev. 3	The finding has been resolved and closed by an update of the PRA model. The PRA model human action dependencies across systems have been addressed.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	**Sub-element(s)**	**Level**	**Status**	**Finding(s)**	**Disposition**
QU-03	QU-18, QU-19	A	Closed	Currently, RE-AFA-LOCAL is being used to recover 1AFAP01-TPAFS. This is a hardware failure basic event. An evaluation should be done to determine the fraction of the basic event that is recoverable. This appears in numerous sequences (e.g. 7830 & 14989 [per PRA Study 13-NS-C29 Rev.3] [per C-29 Rev.3]).	The finding has been resolved and closed by an update of the PRA model. The PRA model recovery action for the AFA pump has been modified to appropriately consider the fraction of recoverable events.
QU-04	QU-18, QU-19	A	Closed	Currently, RE-AFA-LOCAL is inappropriately being used to recover some [Stuck Open Safety Valve] SOSV events. The initial failure of the AFW Pump A causes a primary safety lift. The recovery of AFW Pump A would not prevent a lift. Therefore, RE-AFA-LOCAL should not be used when the primary safety valves lift.	The finding has been resolved and closed by an update of the PRA model. The PRA model recovery has been removed from stuck open safety valve events.
HR-04	HR-9	A	Closed	It was stated in the opening presentations that the operators would take manual control of the AFW flow path globe valves. This action is not modeled. The current model appears not to include any action to control flow with the exception of local manual control.	The finding has been resolved and closed by an update of the PRA model. The PRA model now credits remote manual operation of the AFW flow path valves.
SY-12	SY-18	A	Closed	Batteries C and D appear to have at least a 24-hour mission time prior to depletion. This results in instrumentation being available to adequately control AFW. The bases for the 24-hour mission time are not documented.	The finding has been resolved and closed by an update of the PRA documentation. The basis for the 24 hour mission time is provided.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
HR-06	HR-20	A	Closed	The cycling of the AFW flow path globe and gate valves to maintain AFW flow is not modeled.	The finding has been resolved and closed by an update of the PRA model. The PRA model now includes cycling of the AFW flow path valves.
IE-7	IE-12	B	Closed	The Interfacing Systems Loss of Coolant Accident (ISLOCA) treatment for the shutdown cooling suction line appears to have some questionable assumptions. First, it is assumed that the Low Temperature Over Pressure (LTOP) valve would always open. While this is the most likely scenario, the LTOP valve can fail to open. Qualitative arguments were made that should this happen, the resulting LOCA would be inside containment (primarily based on relative pipe lengths). This ignores the fact that the high stress points and stress concentration points are outside containment. Furthermore, the shutdown cooling warmup crossover piping was not considered.	The finding has been resolved and closed by an update of the PRA model which now includes failure of the LTOP valve to open and includes the shutdown cooling warm up crossover piping.
IE-8	IE-5	B	Closed	Loss of multiple vital 125 VDC and loss of multiple vital 120VAC buses are not considered as initiators.	The finding has been resolved and closed by an update of the PRA model which now includes loss of multiple vital 125 VDC and 120 VAC buses as initiators.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
AS-02	AS-04	B	Closed	A discussion of Reactor Vessel Rupture was not found. An internal fire PRA was not performed so accident sequences were not generated to capture the impact of a fire. Also there does not appear to be coding of locations for basic events. (FIVE methodology was used to assess fire impact). Internal flooding is also not specifically included in the accident sequences and no spatial data appears to have been developed (same could be used for fire and flooding). Industry Degraded Core Rulemaking (IDCORE) methodology was used to perform flooding evaluation and this determined that there are no critical flooding areas.	The finding has been resolved and closed by an update of the PRA model which now includes reactor vessel rupture event. Separate internal fire and internal flood models have subsequently been created to address the remainder of the finding.
AS-5	AS-24	B	Closed	The Modular Accident Analysis Program (MAAP) analyses used to support timing for human actions look only at a selected set of parameters of interest and neglect to look at the status of other systems which may affect timing and/or success criteria. One particular example is that the Turbine Bypass System is assumed to "always work" when evaluating the time available for recovery of AFW.	The finding has been resolved and closed by an update of the PRA model. Additional MAAP analyses have been performed and associated human reliability actions added to the PRA model to address the status of other systems which impact event timing.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
SY-02	SY-1	B	Closed	There is no document that specifies the content, requirements, and formatting for each system study. This would aid external observers and newcomers in understanding the intent of the system analysis documentation.	The finding has been resolved and closed by an update of the PRA documentation. The PRA model system studies have been abandoned and replaced with more specific documentation of how systems are modeled in the PRA.
SY-03	SY-3	B	Open, but will be closed by meeting ASME PRA Std SR SY-C1	Many of the assumptions contained in the AFW analysis address plant phenomena, but contain no plant references. For example, AF024, states no significant diversion paths were identified. But no detailed discussion is provided. There are several piping taps from the condensate storage tank (CST). From a walkdown some of these taps occur high in the tank, while others associated with the condensate transfer pumps are low in the tank. It is not clear that potential diversions through the condensate transfer pumps have been examined. The drawings that illustrate the flow destination for the pumps are not referenced in the AFW system study: DGP-001, ECP-001, and EWP-001. It also appears that the assumptions themselves are not independently reviewed. As a result, the independent reviews of the system studies are not complete. Each individual assumption should have plant documentation and an independent review. The system study independent review would then only need to ensure that the assumption is applicable to and reflects the model itself. This appears to be what is done now, but without an independent review of the assumptions.	The specific issue of AFW diversion flow paths has been addressed and documented. However, the more general issue of references for system analysis modeling is a subset of meeting the requirements of ASME SR SY-C1, which is listed as "Open" in Table A6-2. See Table A6-2 item SR SY-C1 for disposition of the more general issue associated with this finding.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
SY-05	SY-4	B	Open, but will be closed by meeting ASME PRA Std SR SY-C1	It is difficult to verify that the systems are in agreement with the as-built conditions. The current software is only capable of displaying a two by three portion of the fault tree. When attempting to verify the AFW system, only a sample of the fault tree was examined. From the portion examined no discrepancies were identified. There were no direct references between the fault tree supports and the plant drawings. For example the power supplies to the motor driven pumps are contained in the fault tree, but a plant drawing reference is not directly linked to this dependency. The back of the system study does provide a list of references, but the specific references are not linked to dependencies. Not only does this make review by outside personnel difficult, it makes internal independent reviews difficult as well.	This issue is part of ASME SR SY-C1, which is listed as "Open" in Table A6-2. See Table A6-2 item SR SY-C1 for disposition of this finding.
DA-01	DA-4	B	Closed	In quantifying the failure rate of the turbine driven AFW pump to start and run, failures were not considered based on modifications to prevent turbine overspeed trips due to excessive condensation in steam lines. That is, failures that occurred prior to 1995 (that were determined to be due to excessive condensation), were removed from consideration. A reduction in the impact of these failures would be more appropriate than eliminating these failures from consideration.	The finding has been resolved and closed by an update of the PRA documentation. Sufficient plant operating experience has elapsed since this finding was provided to substantiate exclusion of condensate line overspeed events from the failure rate of the AFA pump. This evidence was documented as part of the data update.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	**Sub-element(s)**	**Level**	**Status**	**Finding(s)**	**Disposition**
DA-02	DA-06	B	Closed	Currently for demanded components, the failure likelihood is assumed directly related to the surveillance interval. The equation used is 1-exp(-lambda*(interval)/2). This assumption is predicted on the assumption that the likelihood of failure on demand is purely proportional to the hourly failure likelihood. This is not necessarily true. Analysis should be done to ensure that the demand failure likelihoods are appropriately calculated. There are components of the demand failure rate that are not proportional to time such as shock and human errors.	The finding has been resolved and closed by an update of the PRA documentation. This issue has been resolved by providing the requested evidence in the PRA documentation.
DA-9	DA-9	B	Closed	When grouping components together for data, are component specific data differences reviewed. (i.e. are a disproportionate number of failures attributed to one component but spread out over several)? Also are the numbers of demands/run hrs comparable?	The finding has been resolved and closed by an update of the PRA documentation. This issue has been resolved by considering component specific differences in the grouping of components.
DA-07	DA-13	B	Closed	The NSAC document referenced in evaluating the loss of offsite power (LOSP) frequency and duration (NSAC-203, "Losses of Offsite Power at U.S. Nuclear Power Plants thru 1993") is not current. More recent NSAC and EPRI documents are available as a reference source. These documents have the potential to increase the likelihood of offsite power recovery since LOP events and their duration have trended downward.	The finding has been resolved and closed by an update of the PRA model and documentation. Subsequent updates of the PRA model have used the current EPRI loss of offsite power data.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
DA-08	General	B	Closed	Plant specific data was derived from a limited number of years data (1994 thru 1996)	The finding has been resolved and closed by an update of the PRA model and documentation. Plant specific data has subsequently been updated up to 2013.
HR-01	HR-1, HR-14	B	Closed	Guidance effectively describes the quantification process. Two areas were identified for possible improvements: 1. The process and degree of operation input and review is not documented. Operation input as described appears to be marginal. It was stated that operator input was always obtained for knowledge based actions and was obtained as required for complete skill and rule-based actions. A better practice would be to have all actions developed with operator input. 2. The process for selecting Human Reliability Analyses (HRAs) was not described. A process is identified in Systematic Human Action Reliability Procedure (SHARP). It appears that the SHARP process was not used. However, an undocumented, iterate process between the system analyst and the human action analyst appears to be adequate.	The finding has been resolved and closed by an update of the PRA documentation. This issue has been addressed by upgrading the human reliability analysis documentation to address the issues. The HFEs have been placed into the EPRI HRA calculator, which provides a consistent and detailed documentation of the HRAs.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
HR-08	HR-25	B	Closed	A sensitivity study to determine human action dependencies was not performed nor documented with the PRA results. This is considered to be a good practice to ensure dependent human actions are not inappropriately used. A sensitivity analysis was performed during this review. No issues were noted.	The finding has been resolved and closed by an update of the PRA documentation. The requested sensitivity analysis was performed and documented on human action dependencies.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
HR-09	HR-20	B	Closed	Human Action (HA) 1AFN-MSIS----HR is failure of the operator to override [main steam isolation signal] MSIS and align the N pump. This action includes diagnosis error. The action 1AFN-MSIS-ND-HR, is a modification factor to remove the diagnosis component of 1AFN-MSIS----HR. In the quantification of these two elements [PRA Study 13-NS-B62, Human Reliability Analysis] (13-NS-B62, p90 and 91) it is stated that 1AFN-MSIS-ND-HR is to be used with 1AFN-MSIS----HR when it occurs in conjunction with failure to align or utilize the code pumps, i.e., in conjunction with another human action (HA) that had an equivalent diagnosis element. This is considered appropriate. However, as seen in cutset 10 and others, these two HAs are being used together in cutsets which do not include another HA with the equivalent diagnosis element. This is inappropriate. In cutset 10, the initiator is loss of 125 VDC PKB-M42 which results in loss of one AFW pump, an MSIS, failure of the downcomer valves, failure of the turbine-driven AFW pump and the 1AFN-MSIS----HR/1AFN-MSIS-ND-HR combination. This does not appear to be appropriate because there is no other HA which includes the requisite diagnosis error. This is contrary to the stated application conditions in 13-NS-B62. The above discussion also applies for the 1AFW-MFW-----HR/1AFW-MFW-ND-HR combination and any other equivalent combinations. After looking at models in more detail, found that there was another Human Action in the chain. Direct solution of the trees would yield a cutset with two [Human Error Probabilities] HEPs. A recovery analysis pattern removed the two related Human actions and replaced them with the pairings discussed above. The concept appears to be appropriate but the manner in which it is applied is confusing at least in this case.	The finding has been resolved and closed by an update of the PRA documentation. The subject human reliability analysis and associated documentation for operator override of the MSIS and aligning the N pump has been revised to account for this issue.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
DE-02	DE-1, DE-3, DE-5	B	Closed	As mentioned earlier there is no guidance for the system analysis process. This applies to the dependency aspect of the process as well. Section 3.3 of a system study lists the dependencies associated with the system. In general, the table appears to completely describe the dependencies associated with the system. I did notice several cases in the high pressure safety injection (HPSI) system study where the component numbers were not identified: 1PHAM37-480-1PW/GHLIA1-2, 1PHBM38-480-1PW/GHI2-9, 1SAARAS-TRA--1AT/GRASA-K405 [MOV 674], etc. In some cases, it was possible to determine the component dependency. In other cases, it was not. Each component and its associated dependency should be explicitly identified. The dependencies associated with hot leg injection appear to be improperly identified. MOV-321 should be 4PKCM43-125--1PW and MOV-331 should be 4PKDM44-125--1PW. The plant references for the dependencies are not directly linked to unique component dependencies. Instead, the references are listed in a single large mass in Appendix D. It would probably save time and lead to better traceability if the references are directly associated with each dependency. There are no plant references associated with the [heating, ventilation and air conditioning] HVAC dependencies dedicated to the HPSI system. This applies to 1EWAECOOLWA--1OP, 1EWBECOOLWB--1OP, 1PHBM38-480-1PW, 1SPAESPA---1OP, etc. The plant references could be a simple as [Updated Final Safety Analysis Report] UFSAR text if direct failure is assumed to be as complicated as design heat-up calculations.	The finding has been resolved and closed by an update of the PRA documentation. References for dependencies and HVAC success criteria have been added to the PRA documentation.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
DE-05	DE-4	B	Closed	Although dependencies are identified in the system analysis, there is no dependency matrix. A dependency matrix is a valuable tool for reviewers and newcomers to the group. I believe that our evaluation of Accident Sequences would have been much more comprehensive with a dependency matrix. There are no plant references associated with the HVAC dependencies dedicated to the HPSI system. This applies to 1EWAECOOLWA--1OP, 1EWBECOOLWB--1OP, 1PHBM38-480-1PW, 1SPAESPA---1OP, etc. The plant references could be a simple as UFSAR text if direct failure is assumed to as complicated as design heat-up calculations.	The finding has been resolved and closed by an update of the PRA documentation. A dependency matrix has been added to the PRA documentation.
DE-08	DE-7	B	Closed	Since the general rule is documented as one-recovery action per sequence [13-NS-B62] (B-062), exceptions should be noted and justified. For example, the GT recovery and the AFW PP A recovery actions are credited redundantly. This is probably appropriate, but the paragraph in B-062 indicates this is not typically done. Therefore justifying the exceptions is probably appropriate.	The finding has been resolved and closed by an update of the PRA documentation. Exceptions to the recovery actions were justified.
DE-10	DE-12, DE-13, DE-14	B	Open, but will be closed by meeting ASME PRA Std SR SY-C1	The documentation is considered marginal largely based on the lack of traceability of the system studies to plant documentation for each component dependency.	This issue is part of ASME SR SY-C1, which is listed as “Open” in Table A6-2. See Table A6-2 item SR SY-C1 for disposition of this finding.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
QU-01	QU-1	B	Closed	The quantification report describes the quantification, but the process is difficult to follow unless knowledgeable about the code used and the specific steps to follow. It is sometimes hard to determine the basis for the delete term logic and the recovery patterns.	The finding has been resolved and closed by an update of the PRA documentation.
QU-05	QU-18, QU-19	B	Closed	It would probably be a good idea to delete the front *s in the recover search equations. I did not find any instances where this caused a problem in the existing model, but it could be causing problems by accidentally selecting the middle of a basic event verses the beginning.	The finding has been resolved and closed by an update of the PRA model recovery instructions.
QU-07	QU-25, QU-26, QU-28	B	Closed	Even though the data bases contain error factors and their code has the capability to easily perform numerical uncertainty analyses, APS did not perform any uncertainty analyses for this update of the Probabilistic Safety Assessment (PSA) and they did not document any sensitivity studies on the impact of key assumptions as part of this PSA update.	This issue has been addressed by performing and documenting the quantitative uncertainty analysis.
MU-03	MU-4	B	Closed	The types of changes tracked by the PRA and how this information is obtained are not specified in enough detail within the procedure.	The finding has been resolved and closed by an update of the PRA model update procedure.
MU-08	MU-11, MU-12	B	Closed	There is limited guidance on what needs to be considered for reevaluation when a significant change to the PRA models takes place.	The finding has been resolved and closed by an update of the PRA model update procedure.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings					
Observation ID	**Sub-element(s)**	**Level**	**Status**	**Finding(s)**	**Disposition**
HR-03	HR-4, HR-5, HR-6, HR-7	B	Closed	In the HRA document (B62), Section 4.2, concludes that miscalibration and common cause miscalibration of critical sensors is negligible at PVNGS. This is not consistent with the results from other PRAs. Specifically, the first supporting paragraph of dedicated teams does not minimize exposure to common cause, it actually maximizes common cause. PVNGS's staff previously identified this item.	The finding has been resolved and closed by an update of the PRA model common cause modeling to match the NRC common cause database treatment.
AS-03	AS-6, AS-7, AS-8, AS-24	B.	Closed	There are some differences between treatment of a small LOCA associated with a pipe break and an induced small LOCA (pressurizer safety valve reclosure) in the transient event trees. For example: • In the small LOCA event tree, successful high pressure injection and recirculation lead to questioning whether containment heat removal is successful. In the Transient Type 2 and Transient Type 3 event trees, RCS integrity can be lost if pressurizer safety valves do not reset after lifting. In the sequences from these event trees where high pressure injection and recirculation are successful, the question relating to containment heat removal is not asked. • In the small LOCA event tree, RCS depressurization and use of low pressure injection and recirculation are considered if high pressure injection or recirculation fails. In the Transient Type 2 and Transient Type 3 event trees, consideration of RCS depressurization and use of low pressure systems is not included because the likelihood of high pressure injection or high pressure recirculation are small. It would seem that this assumption should apply to both cases, or not.	The finding has been resolved and closed by an update of the PRA model and documentation.

Table A6-1 Internal Events PRA Peer Review A and B Level Findings

Observation ID	Sub-element(s)	Level	Status	Finding(s)	Disposition
SY-13	SY-17, SY-20	B	Closed	The control system study states that only single failures that cause the failure mode of interest are considered. For the Auxiliary Feed Actuation System (AFAS) generated signals, which results [these result] in modeling common cause only. Although this approach may provide a good estimate of the failure rate of these safety signals, it does not necessarily provide the confidence that the signals are appropriately modeled. For AFAS, it appears that since the AFW flow path valves must cycle that control system dependencies may have been missed. That is, normally engineered safety features actuation system] (ESFAS) relays appeared to be locked-out following actuation, but for the AFAS valves, the relays need to react to the process system steam generator (S/G) low and high level. It is likely that 120 VAC Vital Bus A and B are needed.	The finding has been resolved and closed by an update of the PRA model and documentation to add the indicated control system dependencies.

Table A6-2 Internal Events PRA Self-Assessment of ASME SRs Not Met to Capability Category II

SR	Status	Self-Assessment Comments	Disposition
SY-C1	Open	System analysis documentation developed during the Individual Plant Examination (IPE) was abandoned prior to issuance of the ASME PRA. Key elements of the system analysis documentation have been subsequently captured in other PRA documentation that is not designated as system analysis documentation.	This SR will be fully met by updating the system analysis documents per the requirements of SR SY-C1 prior to use of the RICT Program.
SY-C2	Open	The following subsections of SR SY-C2 are not met: c, e, j, o, p. The original system analysis documentation developed during the IPE PRA development was abandoned prior to the issuance of the ASME PRA Standard. Other subsections of SR SY-C2 (a, b, d, f, g, h, i, k, l, m, n, q, r, s) are met by alternate documentation generated when the system analysis documentation was abandoned.	As indicated, most elements of this SR are addressed in PRA model documentation. However, there is no single document which captures all of the elements and includes the not met subsections of SR SY-C2. This SR will be fully met by updating the system analysis documents per the requirements of SR SY-C2 prior to use of the RICT Program.

Table A6-3 Internal Flood PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
IFSO-B2	Closed	As noted in SRs IFSO-A1, IFSO-A3, and IFSO-A5, some areas of the documentation do not provide sufficient detail about the process used. Specific items for which improved documentation is needed include: a. Documentation of sources in the Turbine Building. b. The basis for screening sources in the Fuel, Radwaste, and Turbine Buildings (i.e., the way in which the specified criteria are met for each source is not documented). For example, a walkdown during the peer review revealed that there is section of the wet pipe fire protection (FP) system running above the turbine cooling water (TC) pumps that could potentially spray both pumps. It is not clear based on 13-NS-C093 and 13-NS-C094 that this impact was considered and dispositioned. Likewise, feedline breaks in the turbine building are assumed to be bounded by the loss of main feedwater initiating event, but may have different impacts such as loss of instrument air due to humidity impacts. c. The temperature and pressure of flood sources.	This finding has been resolved by a documentation update. The following PRA studies have been revised to provide detail about the specific items needed for improvement: a. PRA Study 13-NS-C094 section 4.2.6 was revised to include the flooding sources in the Turbine Building. b. Revised PRA Study 13-NS-C094 sections 4.2.5 and 4.2.6 to include justification for screening sources in the Fuel, Radwaste, and Turbine Building. c. The temperatures and pressures of the plant fluid systems do not need to be defined as all flooding impacts are inherently considered due to the Assumption 2 in PRA Study 13-NS-C096 which identifies that all equipment in the flood area in which a flood initiates, is assumed failed. Therefore it is not necessary to describe systems in terms of pressure and temperature to determine potential flood induced failure modes.
IFEV-A7	Closed	Potential flooding mechanisms are primarily limited to failures of components. Human-induced flooding is screened based on plant maintenance practices (see 13 NS-C093, Section 3.2, Item 4 and 13-NS-C097, Section 3.5). This does not indicate that there was any search of plant operating experience and plant maintenance procedures to verify no potential for human-induced flood mechanisms.	This finding has been resolved by a documentation update. PRA Study 13-NS-C097 Section 4.1 was revised to document the review of human and maintenance induced flooding events. A review of PVNGS maintenance guidance documentation and procedures via plant personnel discussions did not identify any maintenance procedures which would lead to an internal flooding scenario.

Table A6-3 Internal Flood PRA Peer Review ASME SRs Not Met to Capability Category II

SR	Status	Finding(s)	Disposition
IE-C5	Closed	Generic pipe failure frequencies from EPRI TR-1013141 were not converted to a per reactor-year basis as required by SR IE-C5.	This finding has been resolved by a documentation update. PVNGS has revised the quantification studies to clarify that the results are specifically in units of "per critical-reactor year" that is directly applicable to At-Power operating plant states. In addition, to support PRA applications that relate to risk in terms of annualized risk, the engineering studies documenting the quantification and results were revised to also provide converted core damage frequency (CDF) and large early release frequency (LERF) in units of "per reactor-year" [per calendar-year].
IFQU-A7	Closed	Sources of model uncertainty and related assumptions for the Internal Flooding (IF) quantification are documented in 13-NS-C099, Section 3.1.3. As noted in other SRs related to assumptions and sources of uncertainty, there is no characterization of the impact of these assumptions and sources of uncertainty on the IF model as would be required by backward reference to SRs QU-E4 and QU-F4 in SR IFQU-A7.	This finding has been resolved by a documentation update. PRA Study 13-NS-C099 Section 4.4 was revised to incorporate the characterization of model uncertainty sources. Each assumption and source of model uncertainty has been characterized according to the draft Pressurized Water Reactor Owners Group (PWROG) PA-RMSC-0594.

Table A6-3 Internal Flood PRA Peer Review ASME SRs Not Met to Capability Category II

SR	Status	Finding(s)	Disposition
IFSN-A16	Closed	Based on the decision trees in the Scenario document 13-NS-096 Revision 0, (example Figure 4.2.1.1-1, Sequence 040A1S02), many flood sources that can be isolated have been screened out based a simple assertion that the flood can be isolated without documenting any of the following: a. Whether flood indication is available in the control room, b. How and where the flood source can be isolated, and c. Whether procedures exist for isolation and how much time is available for isolation. Based on a discussion with the plant PRA personnel, the peer review team judged the screening to be reasonable, but documentation is not adequate. The review team judged this to be met at [Cat] C I, but even for this, proper documentation is needed as noted in the finding.	This finding has been resolved by a documentation update. PRA Study 13-NS-C096 section 3.1.1 was revised to describe the reason for screening out successfully isolated floods.
IFSN-A6	Closed	RG 1.200 Revision 2 documents a qualified acceptance of this SR. The NRC resolution states that to meet Capability Category II, the impacts of flood-induced mechanisms that are not formally addressed (e.g., using the mechanisms listed under Capability Category III of this requirement) must be qualitatively assessed using conservative assumptions.	This finding has been resolved by a documentation update. Assumption 2 in PRA study 13-NS-C096 was rewritten to clarify that all components within a flood area where the flood originates were assumed susceptible and failed as a result of the flood, spray, steam, jet impingement, pipe whip, humidity, condensation and temperature concerns except when component design (e.g., water-proofing), spatial effects, low pressure source potential or other reasonable judgment could be used for limiting the effect.

Table A6-3 Internal Flood PRA Peer Review ASME SRs Not Met to Capability Category II

SR	Status	Finding(s)	Disposition
IFEV-A6	Closed	There is no evidence in 13-NS-C097 that a search was made for plant-specific operating experience, plant design features, and conditions that may impact flood likelihood and no Bayesian updating was performed. However, adjustments are made to some initiating event frequencies based on system run times to account for differences between impacts when the pumps are running or in standby.	This finding has been resolved by a documentation update. PRA Study13-NS-C097 Section 4.1 was revised to add evidence of the search for plant specific operating experience. The PVNGS Site Work Management System database and License Event Reports were searched for flood type events. Additionally, the PVNGS maintenance procedures were reviewed for flood prevention guidelines. It was determined that none of the flood events identified represented a credible internal flooding scenario which would require additional modeling efforts. Additionally, the lack of internal flooding events does not provide sufficient information to perform a Bayesian update to the initiating event data, and therefore, no update was performed.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
SHA-E1	Closed	Insufficient site-specific velocity profile documentation exists to review the base case profile and possible uncertainties in the site shear-wave velocity profile. Because the site fundamental soil resonance may be near 1 second, a period that may be near a critical structural resonance, documentation of the epistemic uncertainty and aleatory variability of the site velocity profile should be developed.	This issue was resolved and reflected in the PRA model and documentation. New site specific data was subsequently collected as part of the NTTF 2.1 analysis.
SHA-E2	Closed	The evaluation and incorporation of uncertainties in the site response velocity profile may not be properly incorporated because of insufficient or unreviewable site-specific data and/or its documentation. Also, the site response evaluation was completed using a Senior Seismic Hazard Analysis Committee (SSHAC) Level 1 (L1) process which does not meet the ASME general Capability Category II guidelines.	A SSHAC L3 analysis was performed subsequent to the seismic PRA development as part of the NTTF response to the NRC 50.54f letter on Fukushima. The SSHAC L3 analysis produced a site hazard curve which is bounded by the SSHAC L1 hazard curve developed and used in the Seismic PRA model. Therefore, the issue is resolved by the updated SSHAC L3 hazard analysis.
SFR-A1	Closed	Some of the dispositioning in the complete seismic equipment list (SEL) does not have adequate documentation to justify screening of selected components. For example, component 1ENANS01 (13.8 kV Non-Class 1E Switchgear 1ENANS01) is dispositioned (screened) by the statement "Seismically induced failure of NA system (non-seismic class) assumed addressed through seismic LOSP." The median fragility of seismic LOSP is 0.3 g. For this screening to be viable, APS should demonstrate that the median fragility of 1ENANS01 is significantly higher than 0.3 g. However, these are non-Class 1E electrical components. This type of screening argument is used many times within the complete SEL presented in Appendix B of CN-RAM-12-015.	This issue was resolved and reflected in the PRA model and documentation. Contractor performed walkdown and screening evaluation to compare the estimated seismic capacities of selected Non-Safety Related equipment to the capacity assigned to loss of offsite power (LOSP). Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
SFR-C6	Closed	The CDF is dominated by peak ground acceleration (PGA) in the range of about 0.3 g. Therefore, the effect of using input motion at the 0.3g PGA level should be examined. Contrary to the self-assessment, the soil data is not sufficient to justify a Cv = 0.5. The effect of using Cv = 1.0 should be examined.	This issue was resolved and reflected in the PRA model and documentation. Contractor performed evaluation of increased uncertainty for soil properties. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.
SFR-F2	Closed	The top seven cutsets involve seismic failure events (SF-TBBLD, SF-SOIL, and SF-MF) that are potentially conservative with respect to seismic fragility and may be resulting in a seismic CDF that is not accurately reflecting the true plant response to seismic events. More analysis is required to either justify the seismic fragilities presented or to refine those values. Event SF-TBBLD represents structural failure of the turbine building, resulting in collapse onto the underground pipe tunnel from the CST. The concrete cover over the pipe tunnel is postulated to fail, resulting in failure of the AFW piping from the CST to the AFW pumps. There is the potential that the turbine building failure might not fail the pipe tunnel. Event SF-MF involves seismic failure of main feedwater piping outside of containment (balance of plant). The fragility of this piping is based on a "generic" evaluation of SC-II components and is given a median acceleration of 0.21 g.	This issue was resolved and reflected in the PRA model and documentation. Contractor performed seismic fragility investigation for PVNGS Unit 1 Main Feedwater (FW) system. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
SFR-F3	Closed	The draft report LTR-RAM-II-12-074 indicates that the draft relay assessment uses the IPEEE relay assessment as the starting point but accounts for the updated seismic hazard curve at the site. However, the report includes the following statement in Section 2.3 (Unaddressed Relays): "This list [unaddressed relays] included 69 such relays. Of the relays that have been included in the SPRA, their seismic fragility events are found in many of the dominant CDF cutsets".	This issue was resolved and reflected in the PRA model and documentation. LTR-RAM-II-12-074, Revision 2 incorporated the 69 previously unaddressed relays. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II

SR	Status	Finding(s)	Disposition
SPR-B1	Closed	CN-RAM-12-015, Rev. 0, Palo Verde SPRA Model Development, identifies the following for the Self-Assessment for SPR-B1: "The S-PRA relies on an internal events model that is assumed to be compliant with CCII of the PRA Standard." It is understood that the PVNGS PRA model received an industry PRA peer review in 1995 per the CEOG guidelines when the PRA model existed in the Risk Spectrum software environment. The current PVNGS PRA model has since been converted to the CAFTA software environment. APS has since performed a self-assessment of the PVNGS FPIE PRA model against the ASME/ANS Standard, but a number of SRs do not meet Capability Category II. Furthermore, as discussed in Section 4.2 of CN-RAM-12-024, there are five (5) open items from the FPIE HRA. Open Item #5 addresses that many values of T1/2 were not provided in the HRA Calculator, which indicates that the time required to perform the actions may not be accurate (FPIE SR HR-G5). In addition, Section 4.3.1.4 identifies that PVNGS only uses the Cause-Based Decision Tree Method, which is known to underestimate the impact of time constrained HEPs and as a result, current expectation for meeting supporting requirement HR-G3 is to use a combination of CBDTM and HCR methods to ensure that timing is accurately reflected.	The first part of this finding is considered resolved based on conducting a RG 1.200 self-assessment of the internal events PRA model described elsewhere in this Enclosure and subsequent peer reviews of the internal flood and internal Fire PRA models which are based on the internal events PRA model. The second part of this finding is considered resolved by CN-RAM-12-024 Revision 1 that updated the seismic HEPs based on timing and closed all open items from Revision 0. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II

SR	Status	Finding(s)	Disposition
SPR-B6	Closed	The review team could find no evidence that operator actions following relay chatter events were reviewed to ensure task does not change (e.g., additional execution steps to reset relay) if action is in response to relay chatter-induced failure.	This issue was resolved and reflected in the PRA model and documentation. LTR-RAM-II-12-074, Revision 2 performed a comprehensive relay assessment to address this finding. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.
SPR-B7	Closed	Complementary success logic is added in the SPRA logic on a sequence basis for the SIET via the SHIP software, but not for each basic event that represents a seismically-induced failure. This is a limitation of the PRA technology and software which was also noted in the Surry report. As such, this SR is assessed as Not Met. However, SR SPR-B7 has been modified in the proposed revision of the PRA Standard (i.e., Addendum B). At the moment this calculation note's publication CCI/II of the equivalent SR in Addendum B (SPR-B5) reads as follows: "In the systems-analysis models, for each basic event that represents a significant seismically-caused failure, INCLUDE the complementary "success" state where applicable to a particular SSC, and DEFINE the criterion used for the term "significant" in this activity". Based on the wording of the new version, success logic addressing significant seismically caused failures are included in the model. With reference to the new wording of SR SPR-B5, this SR could be assessed as met at CCI/II.	This finding is considered resolved based on meeting Addendum B of the ASME PRA Std, which changed the requirement for this supporting requirement.

Table A6-4 Seismic PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
SPR-B10	Closed	Row SPR-B10 in Table 4.5-2 of CN-RAM-12-015 (i.e., the summary table of the SPRA self-assessment) identifies the need to examine the effect of including a seismically-induced "small-small" LOCA. The self-assessment identifies that Section 5.1.3.9 discusses modeling a concurrent "small" LOCA. Section 5.1.3.9 identifies that a seismic-induced Small LOCA probabilistically models a seismic-induced LOSP. It is assumed that this scenario would also address the scenario for a Seismic-induced LOSP with a potential for a "small small" LOCA.	CN-RAM-12-015 Revision 1 addressed this finding. Re-quantification was performed to reflect updated hazard, updated fragility information and updated S-PRA modeling following the resolution of Findings and Observations from the industry peer review.

Table A6-5 Internal Fire PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
FSS-D2	Closed	Generic HGL calculations were performed using CFAST and documented in Hughes report 0001-0014-002-002, Rev 1. The CFAST HGL results have not been applied in a manner consistent with the limitations and assumptions described in the report.	This finding has been resolved by PRA model and documentation changes. Generic CFAST evaluations were revised to be specific to account for the limitations and assumptions of the area being modeled.
FQ-E1	Closed	Several Human Failure Events (HFEs) were discovered to have a failure probability set to zero during the quantification instead of the documented screening value of 1.0 developed during the HRA task. Having the HEPs set to zero potentially impacts the quantification results and the ability to identify significant contributors to CDF, such as initiating events, accident sequences, equipment failures, common cause failures, and operator errors. There is no documentation that shows that a review of the importance of components and basic events to determine that they make logical sense was performed. There is no documentation that a review of nonsignificant cutsets or sequences was performed.	This finding has been resolved by PRA model and documentation changes. HFEs documented to have a screening value of 1.0 have been revised in the model to use this screening value. All HFE tools were reviewed, updated to be consistent with the HRA Calculator source database, and validated. A review of component and basic event importance to ensure they make logical sense was subsequently conducted and documented. Conduct of cutset reviews was added to the PRA documentation.

Table A6-5 Internal Fire PRA Peer Review ASME SRs Not Met to Capability Category II			
SR	**Status**	**Finding(s)**	**Disposition**
UNC-A1	Closed	The following statement was made after several sensitivity results tables: "Because of the way the cutsets were created, the numbers are not correct. The exercise here is to show the ratios." This negates any of the results reported in the results table. The uncertainty analysis, for the most part, does not include any review of the uncertainty results. Therefore, how the PRA model was affected and a check for the reasonableness was not documented. Therefore it is not clear that a check for reasonableness was performed. There is a statement in the Uncertainty Analysis notebook that this analysis was not performed for LERF. Upon review of the notebook it was found that for some uncertainty analyses were run for both CDF and LERF. A review of the uncertainty analysis should be performed and all uncertainty analysis should be performed for CDF and LERF. Many instances were found where assumptions were found in notebooks that were not documented in the assumption section. This could lead to missing an area that needs to be addressed in the uncertainty analysis. (Review documents and verify that where the word "assumes" is used that an actual assumption is being made.)	This finding has been resolved by PRA model and documentation changes. The sensitivity results were reviewed and documented to show ratios of results. Documentation has been updated to include how the PRA model is affected by model uncertainty and related assumptions. Sources of LERF uncertainty and assumptions have been identified and documented. All assumptions used in the development of the PRA model have been reviewed and documented. Instances of modeling simplification or conservatism were so noted versus declared as default assumptions. Assumptions with the potential to significantly impact results were addressed in the Uncertainty and Sensitivity analyses

References

1. NEI 06-09-A, *Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document,* Nuclear Energy Institute, Revision 0, dated November 2006 (ADAMS No. ML12286A322)

2. Regulatory Guide 1.200, *An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,* Revision 2, March 2009

3. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (Agencywide Documents Access and Management System (ADAMS) Accession No., ML071200238) dated May 17, 2007

4. ASME/ANS RA-Sa-2009, *Standard for Level1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications, Addendum A to RA-S-2008,* ASME, New York, NY, American Nuclear Society, La Grange Park, Illinois, dated February 2009

5. NRC Letter *Palo Verde Nuclear Generating Station, Units 1,2, And 3 Issuance of Amendments Re: Adoption of TSTF-425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control RITSTF Initiative 5b"* (ADAMS Accession No., ML112620293), dated December 15, 2011

6. Palo Verde Engineering Evaluation 3579223 Revision 1, dated April 10, 2011

7. ABB Combustion Engineering Owners Group Final Report, *Palo Verde Nuclear Generating Station Units 1, 2, and 3 Probabilistic Safety Assessment Peer Review Report*, dated November 1999

8. Westinghouse Letter LTR-RAM-II-10-082, *Focused Scope RG 1.200 PRA Peer Review Against the ASME/ANS PRA Standard Requirements for the Palo Verde Nuclear Generating Station Probabilistic Risk Assessment*, dated November 5, 2010

9. Westinghouse Letter LTR-RAM-II-13-005, *Peer Review of the Palo Verde Nuclear Generating Station Seismic Probabilistic Risk Assessment Against the Seismic PRA Standard Supporting Requirements of the ASME/ANS Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications*, dated February 13, 2013

10. Westinghouse Letter LTR-RAM-12-13, *Fire PRA Peer Review Against the Fire PRA Standard Supporting Requirements from Section 4 of the ASME/ANS PRA Standard for the Palo Verde Nuclear Generating Station Fire Probabilistic Risk Assessment*, dated January 2, 2013

11. Hughes Associates Report 001014-RPT-01, *Palo Verde Nuclear Generating Station Fire PRA Focused-Scope Peer Review Report*, Revision 0, dated January 22, 2015

ATTACHMENT 7

Information Supporting Technical Adequacy of PRA Models without PRA Standards Endorsed by Regulatory Guide 1.200, Revision 2

Information Supporting Technical Adequacy of PRA Models without PRA Standards Endorsed by Regulatory Guide 1.200, Revision 2

This attachment is not applicable to the PVNGS submittal. APS' proposal solely uses PRA models in its Risk-Informed Completion Time Program for which there are standards endorsed by the NRC in Regulatory Guide 1.200, Revision 2.

ATTACHMENT 8

Information Supporting Justification of Excluding Sources of Risk Not Addressed by the PVNGS PRA Models

Information Supporting Justification of Excluding Sources of Risk Not Addressed by the PVNGS PRA Models

Introduction

Section 5.0, Item 5 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A, requires that the license amendment request (LAR) provide a justification for excluding any risk sources determined to be insignificant to the calculation of configuration-specific risk, and provide a discussion of any conservative or bounding analyses to be applied to the calculation of risk-informed completion times (RICTs) for sources of risk not addressed by the PRA models.

Scope

NEI 06-09-A and the associated Pressurized Water Reactor Owners Group (PWROG) guidance (Reference 2 of this Attachment) do not provide a specific list of hazards to be considered in an RICT Program. However, NUREG-1855, *Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making* (Reference 3 of this Attachment), provides guidance on how to treat uncertainties associated with PRA in risk-informed decision making relative to hazards that are not considered in the PRA model. Specifically, Section 6.3.3.1 of NUREG-1855 provides the following list of external hazards that should be addressed either via a bounding analysis or included in a PRA calculation:

- Aircraft impacts
- External flooding
- Extreme winds and tornados (including generated missiles)
- External fires (addressed in Table A8-1, *Screening Summary of External Hazards*, by the following two External Hazards: Forest or Range Fire and Industrial or Military Facility Accident)
- Accidents from nearby facilities
- Pipeline accidents (e.g., natural gas)
- Release of chemicals stored at the site
- Seismic events
- Transportation accidents
- Turbine-generated missiles

The scope of this Attachment considers the above hazards for PVNGS, except for seismic events which are addressed by the PRA model.

Technical Approach

The guidance contained in NEI 06-09-A states that all hazards that contribute significantly to incremental risk of a configuration must be quantitatively addressed in the implementation of risk-managed TSs. Consistent with NUREG-1855, the process includes the ability to address external hazards by:

- Screening the hazard based on a low frequency of occurrence
- Bounding the potential impact and including it in the decision-making
- Developing a PRA model to be used to calculate RICTs and associated Risk Management Action Times (RMATs)

ASME/ANS PRA Standard RS-S-2008 (Reference 4 of this Attachment) has endorsed the following set of five external hazard screening criteria:

1) The hazard would result in equal or lesser damage than the events for which the plant has been designed. This requires an evaluation of plant design bases to estimate the resistance of plant structures and systems to a particular external hazard.
2) The hazard has a significantly lower mean frequency of occurrence than another event (taking into account the uncertainties in the estimates of both frequencies), and the hazard could not result in worse consequences than the other event.
3) The hazard cannot occur close enough to the plant to affect it. Application of this criterion needs to take into account the range of magnitudes of the hazard for the recurrence frequencies of interest.
4) The hazard is included in the definition of another event.
5) The hazard is slow in developing, and it can be demonstrated that sufficient time exists to eliminate the source of the threat or to provide an adequate response.

The review of external hazards considers two aspects of the contribution to risk. The first is the contribution from the occurrence of beyond design basis conditions (i.e., winds greater than design). These beyond-design-basis conditions challenge the functionality of the systems, structures, and components (SSCs) to support safe shutdown of the plant. The second aspect addressed are the challenges caused by external conditions that are within the design basis, but still require some plant response to assure safe shutdown (i.e., high winds causing loss of offsite power). While the plant design basis assures that the safety-related equipment necessary to respond to these challenges are protected, the occurrence of these conditions nevertheless causes a demand on these systems and can impact configuration risk.

Note that when the effect of a particular hazard is not able to be mitigated using the plant SSCs, then there is no impact on the changes in risk calculated to support the RICT Program, and these hazards can be screened out of the RICT Program as well. Only events which create a demand for mitigation equipment are potentially relevant to the RICT Program.

The review and disposition of each external hazard is addressed in Table A8-1.

Table A8-1 Screening Summary of External Hazards			
External Hazard	**Screening Result**		
	Screened? (Y/N)	**Screening Criterion (Note a)**	**Comment**
Aircraft Impact	Y	PS2 PS4	Airport hazard meets 1975 Standard Review Plan (SRP)(Reference 5*) requirements. Additionally, airways hazard bounding analysis per NUREG-1855 is < 1E-6/y.
Avalanche	Y	C3	Not applicable to the site because of climate and topography.
Biological Event	Y	C3 C5	Sudden influxes not applicable to the plant design (closed loop systems for ECWS and CWS). Slowly developing growth can be detected and mitigated by surveillance.
Coastal Erosion	Y	C3	Not applicable to the site because of location.
Drought	Y	C5	Plant design eliminates drought as a concern and event is slowly developing.
External Flooding	Y	PS2	Plant design meets 1975 SRP (Reference 5*) requirements.
Extreme Wind or Tornado	Y	PS2 PS4	The plant design basis tornado has a frequency < 1E-7/y. The spray pond nozzles (not protected against missiles) have a bounding median risk < 1E-7/y.
Fog	Y	C1	Limited occurrence because of arid climate and negligible impact on the plant.
Forest or Range Fire	Y	C3	Not applicable to the site because of limited vegetation.
Frost	Y	C1	Limited occurrence because of arid climate.
Hail	Y	C1 C4	Limited occurrence and bounded by other events for which the plant is designed. Flooding impacts covered under Intense Precipitation.
High Summer Temperature	Y	C1	Plant is designed for this hazard. Associated plant trips have not occurred and are not expected.
High Tide, Lake Level, or River Stage	Y	C3	Not applicable to the site because of location.

Table A8-1 Screening Summary of External Hazards

External Hazard	Screening Result		
	Screened? (Y/N)	Screening Criterion (Note a)	Comment
Hurricane	Y	C4	Covered under Extreme Wind or Tornado and Intense Precipitation.
Ice Cover	Y	C3 C1	Ice blockage causing flooding is not applicable to the site because of location (no nearby rivers and climate conditions). Plant is designed for freezing temperatures, which are infrequent and short in duration.
Industrial or Military Facility Accident	Y	PS2	Explosive hazard impacts and control room habitability impacts meet the 1975 SRP requirements (Regulatory Guides 1.91 and 1.78).
Internal Flooding	N	None	PRAs addressing internal flooding have indicated this hazard typically results in CDFs ≥ 1E-6/y. Also, the ASME/ANS PRA Standard requires a detailed PRA for this hazard which is addressed in the PVNGS Internal Flooding PRA.
Internal Fire	N	None	PRAs addressing internal fire have indicated this hazard typically results in CDFs ≥ 1E-6/y. Also, the ASME/ANS PRA Standard requires a detailed PRA for this hazard which is addressed in the PVNGS Internal Fire PRA.
Landslide	Y	C3	Not applicable to the site because of topography.
Lightning	Y	C1	Lightning strikes causing loss of offsite power or turbine trip are contributors to the initiating event frequencies for these events. However, other causes are also included. The impacts are no greater than already modeled in the internal events PRA.
Low Lake Level or River Stage	Y	C3	Not applicable to the site because cooling is provided by treated wastewater piped from Phoenix.
Low Winter Temperature	Y	C1 C5	Extended freezing temperatures are rare, the plant is designed for such events, and their impacts are slow to develop.

Table A8-1 Screening Summary of External Hazards			
External Hazard	Screening Result		
	Screened? (Y/N)	Screening Criterion (Note a)	Comment
Meteorite or Satellite Impact	Y	PS4	The frequency of meteorites greater than 100 lb striking the plant is around 1E-8/y and corresponding satellite impacts is around 2E-9/y.
Pipeline Accident	Y	C3	Pipelines are not close enough to significantly impact plant structures.
Release of Chemicals in Onsite Storage	Y	PS2	Plant storage of chemicals meets 1975 SRP requirements.
River Diversion	Y	C3	Not applicable to the site because of location.
Sand or Dust Storm	Y	C1 C5	The plant is designed for such events. Also, a procedure instructs operators to replace filters before they become inoperable.
Seiche	Y	C3 C1	Not applicable to the site because of location. Onsite reservoirs and spray ponds designed for seiches.
Seismic Activity	N	None	PRAs addressing seismic activity have indicated this hazard typically results in CDFs ≥ 1E-6/y. Also, the ASME/ANS PRA Standard requires a detailed PRA or Seismic Margins Assessment (SMA) for this hazard which is addressed in the PVNGS Seismic PRA.
Snow	Y	C1 C4	The event damage potential is less than other events for which the plant is designed. Potential flooding impacts covered under external flooding.
Soil Shrink-Swell Consolidation	Y	C1 C5	The potential for this hazard is low at the site, the plant design considers this hazard, and the hazard is slowly developing and can be mitigated.
Storm Surge	Y	C3	Not applicable to the site because of location.
Toxic Gas	Y	C4	Toxic gas covered under release of chemicals in onsite storage, industrial or military facility accident, and transportation accident.

Table A8-1 Screening Summary of External Hazards

External Hazard	Screening Result		
	Screened? (Y/N)	**Screening Criterion (Note a)**	**Comment**
Transportation Accident	Y	PS2 PS4 C3 C4	Potential accidents meet the 1975 SRP requirements. Bounding analyses used for offsite rail shipment of chlorine gas and onsite truck shipment of ammonium hydroxide. Marine accident not applicable to the site because of location. Aviation and pipeline accidents covered under those specific categories.
Tsunami	Y	C3	Not applicable to the site because of location.
Turbine-Generated Missiles	Y	PS2	Potential accidents meet the 1975 SRP requirements.
Volcanic Activity	Y	C3	Not applicable to the site because of location.
Waves	Y	C3 C4	Waves associated with adjacent large bodies of water are not applicable to the site. Waves associated with external flooding are covered under that hazard.

*See references of this Attachment
Note a - See Table A8-2, *Progressive Screening Approach for Addressing External Hazards*, for descriptions of the screening criteria.

Table A8-2 Progressive Screening Approach for Addressing External Hazards			
Event Analysis	**Criterion**	**Source**	**Comments**
Initial Preliminary Screening	C1. Event damage potential is < events for which plant is designed.	NUREG/CR-2300 (Reference 6*) and ASME/ANS Standard RA-Sa-2009	
	C2. Event has lower mean frequency and no worse consequences than other events analyzed.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	
	C3. Event cannot occur close enough to the plant to affect it.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	
	C4. Event is included in the definition of another event.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	Not used to screen. Used only to include within another event.
	C5. Event develops slowly, allowing adequate time to eliminate or mitigate the threat.	ASME/ANS Standard	
Progressive Screening	PS1. Design basis hazard cannot cause a core damage accident.	ASME/ANS Standard RA-Sa-2009	
	PS2. Design basis for the event meets the criteria in the NRC 1975 Standard Review Plan (SRP).	NUREG-1407 (Reference 7*) and ASME/ANS Standard RA-Sa-2009	
	PS3. Design basis event mean frequency is < 1E-5/y and the mean conditional core damage probability is < 0.1.	NUREG-1407 as modified in ASME/ANS Standard RA-Sa-2009	
	PS4. Bounding mean CDF is < 1E-6/y.	NUREG-1407 and ASME/ANS Standard RA-	

Table A8-2 Progressive Screening Approach for Addressing External Hazards			
Event Analysis	**Criterion**	**Source**	**Comments**
		Sa-2009	
Detailed PRA	Screening not successful. PRA needs to meet requirements in the ASME/ANS PRA Standard.	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	

*See references of this Attachment

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238, dated May 17, 2007

2. WCAP-16952-NP, *Supplemental Implementation Guidance for the Calculation of Risk-Informed Completion Time and Risk Managed Action Time for RITSTF Initiative 48,* August 2010

3. NUREG-1855, *Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making,* Volume 1, March 2009

4. American Society of Mechanical Engineers and American Nuclear Society, *Addenda to ASME/ANS RA-S-2008 Standard for Levei1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications,* ASME/ANS RA-Sa-2009, New York (NY), February 2009.

5. NUREG-75/087, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition,* 1975

6. NUREG/CR-2300, *PRA Procedures Guide*, January 1983

7. NUREG-1407, *Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities*, June 1991

ATTACHMENT 9

Baseline Core Damage Frequency and Large Early Release Frequency

Baseline Core Damage Frequency and Large Early Release Frequency

Section 4.0, Item 6 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide the plant specific total core damage frequency (CDF) and large early release frequency (LERF) to confirm that these are less than 1E-4/year and 1E-5/year respectively, thus assuring that the potential risk increases allowed under the RMTS program are consistent with Regulatory Guide (RG) 1.174, Revision 1 (Reference 2 of this Attachment). RG 1.174, Revision 2 (Reference 3 of this Attachment) issued by the NRC in May 2011, did not revise these limits.

This attachment demonstrates that the total CDF and total LERF are less than the guidance of RG 1.174, such that the risk metrics of NEI 06-09-A may be applied to the PVNGS Risk-Informed Completion Time (RICT) Program.

Table A9-1, *Total Unit 1/2/3 Baseline Average Annual CDF/LERF*, provides the CDF and LERF values that resulted from a quantification of the baseline average annual models (References 4, 5, 6, 7, and 8 of this Attachment), which include contributions from internal events, internal flooding, internal fire, and seismic hazards. Other external hazards are below accepted screening criteria and do not contribute significantly to the totals.

The CDF and LERF for each unit at PVNGS are the same because each unit is nearly identical to the others by design and through the modification process. There are small differences between the units that have been evaluated and found to have minimal risk significance. Examples include:

- Unit 1 has a manual transfer switch between each of its four trains of safety-related inverters and their backup regulated power source, while the other two units have automatic transfer switches.
- Field routed cabling

As demonstrated in the table, the total CDF and total LERF are within the guidance of RG 1.174 to permit small changes in risk which may occur during implementation of RICTs. Therefore, the PVNGS RICT Program is consistent with NEI guidance.

Table A9-1: Total Unit 1/2/3 Baseline Average Annual CDF/LERF[1] (After Issues Listed in Attachment 4 are Resolved)		
Hazard	**CDF (per rx-yr)**	**LERF (per rx-yr)**
Internal Events	1.3E-6	4.3E-8
Internal Flooding	4.1E-7	1.9E-8
Seismic	2.8E-5	5.3E-6
Internal Fire	2.8E-5	2.4E-6
Total	**5.8E-5**	**7.8E-6**

Note:

1. The Baseline Average Annual CDF/LERF include average maintenance unavailability of structures, systems, and components (SSCs). The configuration risk management program model used for the RICT Program does not include maintenance unavailability of SSCs unless specific to the configuration.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238, dated May 17, 2007

2. Regulatory Guide 1.174, *An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,* Revision 1 November 2002

3. Regulatory Guide 1.174, *An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,* Revision 2, May 2011

4. PVNGS Study 13-NS-B067, *At-Power PRA Quantification,* Revision 6

5. PVNGS Study 13-NS-C042, *At-Power Level 2 PRA LERF Quantification*, Revision 1

6. PVNGS Study 13-NS-F004, *Fire PRA - Quantification and Screenings*, Revision 0

7. PVNGS Study 13-NS-C099 "Internal Flooding PRA - PRA Modeling and Quantification, Revision 2

8. Westinghouse Calculation CN-RAM-12-022, *Palo Verde Seismic Probabilistic Risk Assessment - Quantification,* Revision 1

ATTACHMENT 10

Justification of Application of At-Power PRA Models to Shutdown Modes

Justification of Application of At-Power PRA Models to Shutdown Modes

This attachment is not applicable to the PVNGS submittal. APS is not proposing to apply the Risk-Informed Completion Time Program in shutdown modes, but only in Modes 1 and 2.

ATTACHMENT 11

Probabilistic Risk Assessment Model Update Process

Probabilistic Risk Assessment Model Update Process

Summary

Section 4.0, Item 8 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A, requires that the license amendment request (LAR) provide a discussion of the licensee's programs and procedures which assure the probabilistic risk assessment (PRA) models which support the RMTS are maintained consistent with the as-built/as-operated plant. Palo Verde Nuclear Generating Station (PVNGS) Procedure 70DP-0RA03 *Probabilistic Risk Assessment Model Control* (Reference 2 of this Attachment), controls update and maintenance of the PRA models. This procedure is in full compliance with ASME/ANS RA-Sa-2009, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (Reference 3 of this Attachment) for PRA model maintenance and update.

This attachment describes the administrative controls and procedural processes applicable to the configuration control of PRA models used to support the Risk-Informed Completion Time (RICT) Program, which will be in place to ensure that these models reflect the as-built/as-operated plant. Plant changes, including physical modifications and procedure revisions, will be identified and reviewed prior to implementation to determine if they could impact the PRA models. The PRA Configuration Control Program will ensure these plant changes are incorporated into the PRA models as appropriate. The process will include discovered conditions associated with the PRA models, which will be addressed through the PVNGS Corrective Action Program.

Should a plant change or a discovered condition be identified that has a significant impact to the RICT Program calculations as defined by the Configuration Risk Management Program (CRMP), an interim update of the PRA model will be implemented. Otherwise, the PRA model change is incorporated into a subsequent periodic model update. Such pending changes are considered when evaluating other changes until they are fully implemented into the PRA models. Periodic PRA model updates are performed no less frequently than every two refueling cycles (i.e., three years), consistent with the guidance of NEI 06-09-A.

PRA Model Update Process

The PRA Configuration Control Program ensures that the applicable PRA model used for the RICT Program reflects the as-built, as-operated plant for the three PVNGS units. The PRA Configuration Control Program delineates the responsibilities and guidelines for updating the full-power internal event, internal flood, internal fire, and seismic PRA models, and includes both periodic and interim PRA model updates. The procedure requires an update to be initiated at least once every three years to reflect industry operating experience (other than data), plant design and procedure changes. An update of PRA model data, including initiating event, component unavailability, component reliability, and common cause data is also required by the procedure to be initiated at least once every five years. The program includes guidance on identifying, evaluating, and documenting potential impacts (e.g., plant changes, plant/industry operational experience, or errors or limitations identified in the model). In addition, guidance is provided on assessing individual and cumulative risk impacts of pending changes. Finally, the PVNGS software quality assurance program records the controlled version of the PRA and CRMP

models and associated references.

Review of Plant Changes for Incorporation into the PRA Model

1) Plant changes or discovered conditions, as defined in the PRA Configuration Control Program, are reviewed for potential impact to the PRA models, including the CRMP model and the subsequent risk calculations which support the RICT Program.

2) Plant changes that meet the criteria defined in the PRA Configuration Control Program (including consideration of the cumulative impact of other pending changes) will be incorporated in the applicable PRA model(s), consistent with the NEI 06-09-A guidance. Otherwise, the change is assigned a priority and is incorporated at a subsequent periodic update consistent with procedural requirements.

3) PRA updates for plant changes are initiated at least once every two refueling cycles, consistent with the guidance of NEI 06-09-A.

4) If a change is required for the CRMP model, but cannot be immediately implemented for a significant plant change or discovered condition, either:
   A. Alternative analyses to conservatively bound the expected risk impact of the change will be performed. In such a case, these alternative analyses become part of the RICT Program calculation process until the plant changes are incorporated into the PRA model during the next update. The use of such bounding analyses is consistent with the guidance of NEI 06-09-A.

   or

   B. Appropriate administrative restrictions on the use of the RICT Program will be put in place until the model changes are completed, consistent with the guidance of NEI 06-09-A.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238, dated May 17, 2007

2. PVNGS Procedure 70DP-0RA03, *Probabilistic Risk Assessment Model Control*

3. ASME/ANS RA-Sa-2009, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications, Addendum A to RA-S-2008,* ASME, New York, NY, American Nuclear Society, La Grange Park, Illinois, February 2009

ATTACHMENT 12

Attributes of the Configuration Risk Management Program Model

Attributes of the Configuration Risk Management Program Model

Introduction

Section 4.0, Item 9 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide a description of probabilistic risk assessment (PRA) models and tools used to support RMTS, including identification of how the baseline PRA model is modified for use in the Configuration Risk Management Program (CRMP) tools, quality requirements applied to the PRA models and CRMP tools, consistency of calculated results from the PRA model and the CRMP tools, and training and qualification programs applicable to personnel responsible for development and use of the CRMP tools. The scope of structures, systems, and components (SSCs) within the CRMP will be provided. This item should also confirm that the CRMP tools can be readily applied for each Technical Specification (TS) limiting condition for operation (LCO) within the scope of the plant specific RMTS submittal.

This attachment describes the necessary changes to the peer-reviewed baseline PRA models for use in the CRMP software to support the Risk-Informed Completion Time (RICT) Program. The process employed to adapt the baseline models for CRMP use is demonstrated: (1) to preserve the core damage frequency (CDF) and large early release frequency (LERF) quantitative results; (2) to maintain the quality of the peer-reviewed PRA models; and (3) to correctly accommodate changes in risk due to time-of-year, time-of-cycle, and configuration-specific considerations. Quality controls and training programs applicable for the CRMP are also discussed in this Enclosure. Additional considerations regarding the Internal Fire PRA model to address implementation of National Fire Protection Association (NFPA) - 805 as the licensing basis for the fire protection program are also discussed at the end of this attachment.

Translation of Baseline PRA Model for Use in CRMP:

The baseline PRA models for internal events, including internal floods, internal fires, and seismic events, are the peer-reviewed models, will be updated as described in Attachment 11 of this Enclosure to reflect the as-built, as-operated plant. These models are modified to include changes that are needed to facilitate configuration-specific risk calculations to support the RICT Program implementation. The baseline models and the changes made to create the CRMP model used in the RICT Program are controlled using plant calculations, which include the necessary quality controls and reviews.

The changes to the models to account for variations in system success criteria based on time-of-year or time-in-operating cycle, and other specific changes needed to properly account for configuration-specific issues, which are either not evaluated in the baseline average annual model or are evaluated based on average conditions encountered during a typical operating cycle, are described in Table A12-1, *Changes Made for Configuration-Specific Risk.*

TABLE A12-1 CHANGES MADE FOR CONFIGURATION-SPECIFIC RISK	
DESCRIPTION	**BASIS FOR CHANGE**
Plant Availability	The baseline PRA models account for the time the reactor operates at power by using a plant availability factor. This is appropriate for determining the average annual (time-based) risk, but the factor is not applicable to configuration-specific risk calculated for the RICT Program. In order to account for the assumption that the plant is always operating in the RICT Program, the frequency of initiating events which include an availability factor are adjusted. This change is necessary to adjust the modeled initiating event frequencies from a "per year" to a "per reactor year" basis for use in the CRMP.
Maintenance Alignment Probabilities	Maintenance alignment probabilities in the baseline PRA models have probabilities based on the fraction of the year the equipment is unavailable. For the CRMP model, the actual configuration of equipment is evaluated, so the maintenance alignment probabilities are set to zero. This is also done for the system initiating events, which include maintenance contributions.
Excluded Maintenance Combinations	The PRA models will not remove excluded maintenance combinations allowed by the technical specifications (i.e., both trains of a single safety system being simultaneously unavailable).
Room Cooling Success Criteria	The baseline PRA models include conservative success criteria for room cooling and do not use average annual criteria; therefore, no changes to the CRMP model for room cooling success criteria are required.
Unfavorable Exposure Time (UET) for anticipated transient without trip (ATWT) Events	The current PVNGS core design reflected in the baseline PRA model for ATWT events includes a UET for variable success criteria based on time of core life (i.e., moderator temperature coefficient early in cycle life). The event is set to the fraction of the year for which the UET applies and will be changed to a probability of 1 or 0 based on operator input using the CRMP tool, depending on the actual time in the operating cycle.

<u>Quality Requirements and Consistency of PRA Model and CRMP Tools</u>

The approach for establishing and maintaining the quality of the PRA models, including the CRMP model, includes both a PRA maintenance and update process described in Attachment 11 of this Enclosure and the use of self-assessments and independent peer reviews described in Attachment 6 of this Enclosure.

The information provided in Attachment 6 demonstrates that the PVNGS internal events, internal flood, internal fire, and seismic PRA models reasonably conform to the associated industry standards endorsed by Regulatory Guide (RG) 1.200, Revision 2 (Reference 2 of this Attachment). This information provides a robust basis for concluding that the PRA models are of sufficient quality for use in risk-informed licensing actions.

The current PRA models will either be combined into a single CRMP model for use in the CRMP software tool, or will be used to generate pre-solved solutions for routine plant configurations which will be entered into the CRMP software tool. PVNGS has been using a single CRMP model in EPRI EOOS for more than eight years based on combined internal events and internal fire models. The CRMP model is rigorously checked against the individual PRA model results to

validate the CRMP model quality. If a new CRMP model including the upgraded internal fire and new seismic PRA models cannot be developed that meets work management and scheduling needs for solution speed, PVNGS will take the approach used by South Texas Project by pre-solving thousands of routine expected configurations and saving the results of those solutions in the CRMP software tool. When unanalyzed configurations occur, PRA would promptly solve the PRA models to determine the RICT as well as comply with existing Maintenance Rule configuration risk monitoring requirements. PVNGS currently has and will continue to provide a qualified PRA engineer on call 24 hours a day, 7 days a week to support Operations and Work Management in assessing the risk of planned and emergent plant configurations.

Changes made to the baseline PRA model in translation to the CRMP model will be controlled and documented in accordance with PVNGS procedure 70DP-0RA03, *Probabilistic Risk Assessment Model Control,* to maintain the existing CRMP model. An acceptance test is performed after every CRMP model update to verify proper translation of the baseline PRA models and acceptance of all approved changes made to the baseline PRA models pursuant to translation to the CRMP model. This testing also verifies correct mapping of plant components to the basic events in the CRMP model.

Training and Qualification

The PVNGS PRA staff is responsible for development and maintenance of the CRMP model. The PRA staff is trained in accordance with the site Engineering personnel training program and has passed specific qualifications on each major element of the PRA development and use. Operations and Work Control staff will use the CRMP tool under the RICT Program and are trained in accordance with a program using National Academy for Nuclear Training (ACAD) documents, which is accredited by INPO.

Application of the CRMP Tool to the RICT Program Scope

PVNGS will use either the EPRI EOOS CRMP tool or the ERIN Engineering PARAGON CRMP tool for RICT Program calculations. The EPRI EOOS program already exists in an approved, issued version to support the RICT Program. PVNGS currently uses an earlier version of the EPRI EOOS tool in the Maintenance Rule CRMP for at-power conditions and the PARAGON tool for low-power/shutdown conditions. APS is transitioning to the PARAGON tool for Maintenance Rule CRMP use in all modes of operation. ERIN Engineering is in the process of developing a new PARAGON version that will support the RICT Program requirements. PVNGS plans to select one of these programs for use in the RICT Program. The selected program will meet RG 1.174 (Reference 3 of this Attachment) and PVNGS software quality assurance requirements.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238, dated May 17, 2007

2. Regulatory Guide 1.200, *An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,* Revision 2, dated March 2009

3. Regulatory Guide 1.174, An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Revision 2, May 2011

ATTACHMENT 13

Key Assumptions and Sources of Uncertainty

Key Assumptions and Sources of Uncertainty

Introduction

Section 4.0, Item 10 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide a discussion of how the key assumptions and sources of uncertainty were identified, and how their impact was assessed and dispositioned. This attachment provides that discussion.

Process for Identification of Key Assumptions and Sources of Uncertainty

Sources of model uncertainty and related assumptions, defined consistent with Regulatory Guide 1.200, Revision 2, (Reference 2 of this Attachment) and the ASME/ANS RA-Sa-2009, *Standard for Levei1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications, Addendum A to RA-S-2008* (Reference 3 of this Attachment), have been identified for the PVNGS PRA models using the guidance of NUREG-1855 (Reference 4 of this Attachment) and EPRI TR-1016737 *Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessment* (Reference 5 of this Attachment).

The detailed process of identifying, characterizing and qualitative screening of model uncertainties is found in Section 5.3 of NUREG-1855 and Section 3.1.1 of EPRI TR-1016737. The process in these references was mostly developed to evaluate the uncertainties associated with the internal events PRA model; however, the approach can be applied to other types of hazard groups.

Disposition of Key Assumptions and Sources of Uncertainty

The list of assumptions and sources of uncertainty were reviewed to identify those which would be significant for the evaluation of configuration-specific changes in risk. If the PVNGS model used a non-conservative treatment, or methods which are not commonly accepted, the underlying assumption or source of uncertainty was reviewed to determine the impact on RICT Program calculations. Only those assumptions or sources of uncertainty that could significantly impact the configuration risk calculations were considered key for this application.

The internal events PRA models are used to support the internal fire and seismic PRA, and so the assumptions and uncertainties evaluated would apply to these PRA models as well.

Key assumptions and sources of uncertainty for the RICT Program application are identified and dispositioned in Table A13-1, *Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations.*

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
The only plant system modeled in the PRA that is shared between the three units is the station blackout generators (SBOGs). Simultaneous multiple unit station blackout conditions are screened out based on low probability. SBOGs are assumed aligned to one unit only during an event.	SBOGs can be aligned to multiple units to supply limited loads.	The existing PRA model conservatively does not credit SBOGs in more than one unit. Further, the plant design for FLEX and beyond FLEX modifications / capabilities provide additional 480V and 4160V supplies to safety buses not currently credited in the PRA models. For RICT Program implementation, PVNGS will consider, based on plant conditions and associated risk levels, risk management actions (RMAs) for use of FLEX equipment such as 480V and 4160V generators when electric power systems to risk significant equipment are unavailable under a RICT.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Reactor Coolant Pump (RCP) Seal Leak or Rupture	RCP Seal Leak or Rupture is not modeled as a loss of reactor coolant system (RCS) inventory safety function. Based on Westinghouse WCAP-15749 (Reference 6 of this Attachment) and pump seal vendor information, it was concluded that because of the very tight clearances, leakage into the seal package from the RCS is limited to about 17 gpm per pump. Each of the four RCPs has a seal package which consists of three seals. As a result, even if the seal package on all four RCPs failed, the total leak rate would be within the capacity of two charging pumps and does not qualify as a LOCA. An analysis showed that continuing to model RCP seal leakage and requiring charging pumps to mitigate the leakage represented an insignificant contribution to CDF or LERF, even assuming one of the three seals on each pump failed. The analysis also showed that modeling catastrophic failure due to operator failure to secure the pumps upon loss of cooling and seal injection was an insignificant contributor to CDF or LERF.	If RCP seal parameters are not within normal limits indicating potential seal degradation while a RICT is in effect, RMAs will be used to ensure availability of charging pumps or other plant SSCs which can mitigate excessive RCP seal leakage.
Loss of Coolant Accident (LOCA) Frequencies	NUREG/CR-6928 (Reference 7 of this Attachment) restated the results from NUREG-1829 (Reference 8 of this Attachment). The LOCA frequencies are based upon expert elicitations. The LOCA sizes identified by the NRC are different from those estimated for PVNGS.	The slight variance in the range of break sizes for different LOCAs is not significant and is judged to have minimal impact on LOCA frequencies, within the uncertainties associated with the expert elicitation values, and of insignificant impact to RICT calculations. No special measures are required for the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Loss of Off-site Power (LOSP) Frequency	The national LOSP data presented in the latest EPRI events reports (References 4 and 5 of this Attachment) were used to obtain point-estimates for switchyard-centered and severe weather-related LOSP frequencies. The EPRI Reports indicate that the generic LOSP data is subject to user modifications and screenings to fit the local plant designs and environmental conditions. This approach of LOSP screening is considered reasonable and necessary to avoid erroneous skewing of the LOSP data. The frequency of extreme weather LOSP category was obtained as that of the frequency of tornado occurrence with category F2 or higher. The frequency of grid-related LOSP was obtained by Bayesian updating the reported value for western region (Western Electricity Coordinating Council) in the Draft NRC NUREG/CR-INEEL/EXT-04-02326 (Reference 9 of this Attachment).	The LOSP frequencies are based on recent industry data and are appropriate to represent plant-specific conditions. SBOGs, as well as other additional electric power supplies, are available on site to mitigate LOSP. RMAs will consider, based on plant conditions and associated risk levels, these alternate AC sources for applications of the RICT Program where LOSP events significantly contribute to configuration risk.
LOSP Associated Non-Recovery Probabilities	The probabilities of offsite power non-recoveries were obtained from Table 4-1 of the draft NRC NUREG/CR-INEEL/EXT-04-02326. The error factors associated with LOSP frequencies and LOSP non-recovery probabilities were obtained from NUREG/CR-INEEL/EXT-04-02326 (when provided); otherwise, by using available in-house statistical programs for lognormal and Weibull distributions.	The offsite power non-recovery probabilities are based on the best available data and are appropriate to represent plant-specific conditions. SBOGs, as well as other additional electric power supplies, are available on site to mitigate LOSP. RMAs will consider, based on plant conditions and associated risk levels, these alternate AC sources for applications of the RICT Program where LOSP events significantly contribute to configuration risk.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Battery Life Assumptions	The PVNGS batteries are not credited in the long-term, because they are conservatively assumed to be discharged after 2 hours. Although the IEEE Class 1E batteries are designed to operate for 2 hours, Engineering has determined that the class batteries' life is at least 6 hours. Thus they are available for power recovery at the 3-hour point on the incident timeline.	Crediting the actual higher capacities of the batteries and updated load shedding actions from Fukushima-driven procedure changes would result in longer RICTs due to the additional mitigation capabilities made available. Therefore, the current PRA model use for the RICT Program is conservative and acceptable.
Human Failure Events (HFEs) during a seismic event	Accessibility for completion of non-screened HFEs during a seismic event is assumed possible for all non-screened HFEs other than those which are assumed to fail in the cases of corridor building or turbine building collapse. Both the collapse of the corridor building and turbine building and their impact on the access to the Main Steam Support Structure (MSSS) is considered in the seismic PRA model. There is a pinch point that leads into the MSSS that could restrict movement into the MSSS which would prevent local MSSS actions from being performed.	A sensitivity analysis was performed evaluating the impact of not crediting the subject HFEs and there was minimal impact on the CDF and LERF. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Seismic performance shaping factors (PSFs) with respect to seismic-induced flooding	Seismic-only PSFs applied to the internal events human error probabilities (HEPs) will over-ride the flooding PSFs based on the consideration that the seismic events are more global events than the specific flooding events. No additional modifications are made to the internal events HEP to consider the possibility of seismic-induced flooding events.	This is considered a conservative assumption. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
The seismic PRA HFE dependency analysis	The seismic PRA dependency analysis assumes that once an accident sequence is initiated, the operator action timing for a seismically-induced event is similar to that of an internally-induced event for main control room actions.	The modification of the timing available due to seismic considerations may result in a longer response or identification time and consequently a higher HEP. Therefore, the current seismic PRA model used for the RICT Program is acceptable.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Seismic PRA weighting factors applied to three approaches	There is no standardized method to calculate HEPs in a seismic PRA. Therefore, a mean HEP for each basic event was calculated by combining three accepted approaches [Surry, Kernkraftwerk Muhleberg (KKM), and Swiss Federal Nuclear Safety Inspectorate (ENSI) provided in Reference 10 of this Attachment] using weighting factors of 0.7, 0.15, and 0.15, respectively.	More emphasis was given to the Surry method since it was a selective combination of previous approaches and the most recently performed and published method. However, the Surry method has the potential to be the least conservative approach among the three methods. A sensitivity analysis was performed that ran the seismic PRA model using only the KKM and ENSI approaches, equally weighted. The change in CDF and LERF was -1.63% and 0.42%. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Relay chatter correlation	Relay chatter between relays of the same manufacturer, model number, and plant location (i.e., building and elevation) was assumed to be fully correlated. Also, each relay identified as a control switch, push button, or motor starter is fully correlated with other generic, like components.	This is a conservative assumption because the demand experienced by a relay is dictated by in-cabinet response and not the in-structure response spectra (ISRS) upon which the binning is based. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Simplified Relay Fragility Parameters	Low-risk importance relays (based on Risk Achievement Worth) were treated with a simplified fragility analysis and higher risk importance relays (10 different types) were treated with a detailed fragility analysis. The simplified relay chatter fragility analysis assumed a βc of 0.35 based on engineering judgment.	This assumption is reasonable given that none of the βc values for the relays evaluated using the detailed fragility analysis were determined to have a βc below 0.33 and most had βc of around 0.5. Therefore, the current seismic PRA model used for the RICT Program is acceptable.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Seismic failure of relays and basic event mapping	For the relays modeled in the seismic PRA, the basic event associated with the seismic failure of the relay must be mapped to an existing internal events target basic event. A key source of modeling uncertainty is associated with the mapping of seismic basic events. Failure modes postulated for the PVNGS internal events model may not fully align with their assigned seismic counterparts.	PRA analyst experience is credited in the selection of the appropriate internal events PRA model component failure modes to reflect postulated seismic PRA model component failure modes. This selection was performed by Westinghouse PRA seismic experts and reviewed by APS PRA engineers. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Seismic PRA uses internal events PRA as a starting point	The PVNGS seismic PRA assumes that the internal events PRA that is used as a starting point meets the requirements of Capability Category II of the PRA standard.	The internal events PRA that was used to develop the seismic PRA was evaluated separately for its PRA quality and was determined to meet Capability Category II of the PRA standard with the exception of System Notebook documentation, which is a commitment herein to fully address prior to RICT Program use. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Success criteria for seismic PRA	If not otherwise specified, the success criteria associated with the internal events PRA logic are considered valid and applicable to accident sequences initiated by a seismic event. However, a standard 24-hour mission time may not be suitable for a seismic-induced accident scenario because of the longer time needed for offsite power recovery.	The base case seismic PRA uses a 24-hour mission time for the run time of mitigating equipment. A sensitivity case was developed to assess the impact of using a 72-hour mission time for equipment run failures. The change in overall CDF and LERF for this case is 2.73% and 0.69%, respectively.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Seismic failure correlation	Seismic failures are assumed to be completely correlated. This assumption implies that a single basic event is used to model the seismic failure of components that are identified as pertaining to the same fragility. There is one exception to this where failures in the steam path in the Turbine Building are not considered correlated with failures of the feedwater lines.	The validity of this assumption of complete correlation is still being discussed at the industry level. This is considered a conservative assumption. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Seismically–induced LOSP	The seismically-induced LOSP is assumed to bound the fragility of non-seismic class system. This assumption implies that a number of non-seismic class systems are not addressed with a specific seismic failure.	The basis for this assumption is that seismically-induced LOSP has a generally low seismic capacity. Scenarios where the non-seismic support systems incur seismically-induced failures while offsite power is still available are considered realistic only for very low magnitude seismic events. Therefore, the most significant mitigating equipment will still be available. This is considered a conservative assumption. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Seismic PRA LOSP recovery	In the seismic PRA, LOSP recovery is not credited for any seismic event above the safe shutdown earthquake (SSE), while it is credited with unchanged probability for a seismic event below the SSE.	It is realistic to consider that offsite power recovery is available for low magnitude seismic events. The selection of the SSE as a threshold between recovery/no-recovery of offsite power is arbitrary and conservative. Therefore, the current seismic PRA model used for the RICT Program is acceptable.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Screening of equipment in the Seismic Equipment List (SEL)	Screening of equipment in the SEL is based on fragility analysis. Equipment screened by the fragility team as inherently rugged is not modeled in the seismic PRA for seismic-induced failure. In order to quantitatively capture the impact of screened out equipment, generic fragility parameters for the building that housed the screened out equipment were used. The screened equipment is modeled through a surrogate basic event at a system level.	Using a surrogate event for a number of components that have been screened out introduces a conservative failure mode. The uncertainty introduced by the use of surrogate equipment for the seismic class I system is judged to have a limited impact on the model. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Operators tripping the reactor above operating basis earthquake (OBE)	It is assumed that the operators will always trip the reactor in case of a seismic event above OBE even if the option for a controlled shutdown is allowed.	This is considered a conservative assumption. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Train N Auxiliary Feedwater (AFN) pump is assumed to remain functional following a design basis earthquake	The AFN pump is assumed to remain functional with small breaks or leaks at instrument tubing. The fragility analysis associated with the AFN pump only addresses the pump and not the entire piping network.	A sensitivity case was developed to assess the uncertainty in crediting the AFN pump and not the associated piping network. The capacity of the AFN pump was reduced to the same system level fragility parameters associated with the instrument air system. CDF and LERF increased by 0.08% and 0.03%, respectively, and indicated little significance of uncertainty in this simplification of the analysis. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
Main steam line relief valves not explicitly included in the SEL	Main steam line relief valves are screened out of the analysis on the basis that the steam generator and related piping and valves are considered very rugged. For this reason, the seismic failure of the main steam line relief valves is not modeled.	A sensitivity case is developed to assess the impact of this assumption. A fully dependent seismic failure across all 20 relief valves is modeled. CDF and LERF values did not change when compared to the base case results. This indicates that no significant uncertainty. Therefore, the current seismic PRA model used for the RICT Program is acceptable.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Structural failures of buildings	Structural failures of buildings are assumed to result in major collapse and failure of all equipment inside the building.	This is a conservative assumption since the fragility parameters provided are addressing the beginning of the structural failure, and a failure of limited areas of the building may result in failure of only a limited amount of equipment inside the building. The most significant example of this assumption is the structural failure of the Turbine Building assumed to be also impacting and failing the CST tunnel. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
The Anticipated Transient Without Trip (ATWT) logic for seismic PRA	The ATWT logic for seismic PRA assumes that the RCS pressure will be above the high-pressure safety injection pump shutoff head for only a short period of time.	Moderator temperature coefficient (MTC) and ATWT pressure transient are not influenced by the fact that the event is initiated by a seismic event rather than a spurious failure. Therefore, the success criteria developed for the internal events ATWT are considered valid for the seismic PRA. Therefore, the current seismic PRA model used for the RICT Program is acceptable.
All flood scenarios on the 40-ft and 51-ft elevations of the Auxiliary Building assume that a pipe failure drains the Refueling Water Tank (RWT).	A cutset review showed that the contribution of Fire Protection (FP) initiators is very low and that the internal flood results are not being skewed by this conservatism.	This is a conservative approach and should not have a significant impact on the baseline internal flood model. This would not have a significant impact on the RICT Program.
A single internal events PRA model was developed to quantify the plant flood risk for multiple units.	Since there are no significant differences between the units, the Unit 1 system, structure, or component (SSC) designators were used. It was therefore assumed that the quantification results are applicable to all units.	It is a realistic assumption that the Unit 1 SSC designators are used, since there are no major differences between the three units in terms of internal flood. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
All components within a flood area where the flood originates were assumed to be susceptible and failed as a result of the flood, spray, steam, jet impingement, pipe whip, humidity, condensation and temperature concerns except when component design (e.g., waterproofing) spatial effects, low pressure source potential or other reasonable judgment could be used for limiting the effect.	This is a conservative assumption that simplifies the impacted component list. Uncertainty exists as to exactly where flooding would occur, the impact due to the geometry of the room and equipment, and the direction of the spray or splash for a given scenario. This assumption raises CDF.	This is a conservative approach that simplifies the impacted component list. This would not have a significant impact on the RICT Program.
Block walls are not credited in the analysis and are treated as typical plant walls.	Unless a treatment is non-conservative, the block walls are analyzed on an individual basis. The amount of water that could flow through the gaps is unknown. This has no impact as there were no scenarios where the failure of block walls would lead to a non-conservative treatment.	This has no impact and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Breaks in pipes less than or equal to two inches in equivalent diameter were only considered if the break would directly result in a plant trip or result in a flood-induced equipment failure that would result in a plant trip or immediate shutdown.	The basis for this assumption is as follows: 1. It provides a practical limit to bound the scope of the analysis to potentially large flow rate and significant consequence events. 2. Pipe sizes of less than or equal to two-inch diameter do not accurately reflect plant fluid system flood impacts (i.e. two-inch diameter pipes produce significantly smaller flood rates). 3. At low flow rates typical of pressure boundary failure in pipes less than or equal to two inches, the operator response time is longer and less stressful. Such conditions enhance operator actions significantly to successfully mitigate the breaks in small bore pipes. However, piping less than two inches in diameter is considered on an individual basis when necessary for spray and flooding events. Specifically these events are considered in rooms without drains. Piping less than two inches was also considered for spatially specific spray events, however none were modeled and a detailed discussion of the possible events are documented.	This is a conservative approach and is of low consequence to RICT.
Closed-loop systems and tanks were assumed to instantaneously release the entire system inventory.	This is a conservative approach that allows for the consideration of all consequences and does not require time-based calculations.	This is a conservative approach and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Control Room staff would be unable to respond effectively to multiple events immediately following the flooding event.	HEP and PSF adjustments were made during the early stages of a flooding event to account for the additional stress influencing factors. The CDF is higher with this assumption.	This is a conservative approach and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
No addition to the control room crew is credited early into a flood event when assessing human actions.	Operator actions to isolate the flood source are required shortly after detecting that a Pressure Boundary Failure (PBF) has occurred. Often when responding to flood events, operators are responding to multiple alarms.	It is a realistic assumption that there would be no addition to the control room crew early into the flood event when assessing human actions. This would not have a significant impact on the RICT Program.
It is assumed that pipes that are larger than 3" were capable of producing major floods unless it was determined that the piping was not capable of producing a major flood.	The assumption is conservative as it includes additional piping that may not be conducive to major flooding. Since major floods are not a major contributor to the PBF frequency, its contribution to risk would be considered minimal.	This is a conservative approach and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
External tanks were not considered as a flood source unless there is a normally available pathway into the plant whereby the tank contents could empty into a room within the main plant structures.	External tanks that rupture would not normally propagate into the plant. There were no tanks identified in the internal flood PRA that propagated into the plant. It was assumed that the impact of an external tank rupture was bounded by the evaluation performed for internal events. Breach of an external tank was assumed to discharge to the yard area and there would be no flood-induced failures of PRA-related components.	There is no significant impact on the model. This would not have a significant impact on the RICT Program.
Floods are assumed to fail all equipment in the initiating room and then propagate out of the room to surrounding flood areas.	Cases in which equipment is deemed as sufficiently high or flood barriers are not expected to retain water to sufficient flood levels are treated on an individual basis. Additionally, splitting the flood areas would generate an unreasonable number of scenarios with no added insight. The top cutsets are not impacted, however if very specific isolation actions were taken this assumption could be significant.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Floods are assumed to propagate down pipe chases before stairwells in situations where pipe chases are not surrounded by a curb and/or a door must be opened to enter into the stairwell.	Water will flow down the path of least resistance; therefore a pipe chase is the preferred path rather than a stairwell with a door.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Floods are assumed to propagate through doorways which open out, away from the initiating flood area more readily rather than doorways which open in, towards the initiating flood area.	The hydrostatic load that a door can handle is based on whether the door closes against the frame or away (with relation to the room that the flood initiates). A door that is against the frame can withstand a greater load as opposed to away from the door frame.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Floor drains were assumed to be capable of controlling water levels for spray events.	This assumption is based on the expectation that a spray event will not result in a significant accumulation of standing water. During plant walkdowns it was observed that drain entrances were maintained in proper working condition and free of debris. Drains were not credited for any flood or major flood events. It was assumed that spurious actuation of system relief valves would discharge a limited amount of inventory to a discharge tank. Such events were screened out as potential flood sources.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Grouping boundary condition sets for the LERF analysis results in conservative modeling of the containment isolation valves.	Grouping boundary condition sets for the LERF analysis is a conservative approach. The LERF contribution of sequences that have been grouped for the LERF analysis and involve failure of containment isolation valves is considered very low.	This is a conservative approach and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
The piping layout for flood sources included in the internal flood PRA was shown and estimated to be similar for all three units.	To the extent possible, the similarities were confirmed during the plant walkdowns. Therefore, Units 2 and 3 pipe lengths were assumed to be identical to Unit 1 pipe lengths. There are no major differences between the three units.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
It is assumed that if a PBF were to occur in the Safety Injection (SI) or Chemical & Volume Control (CH) system piping, the operator would isolate the flood at one of the two pipe headers connecting the RWT to the CH and SI systems.	There are no operator procedures for isolating a flood event; therefore the most conservative and bounding location to isolate a flood of the SI or CH is one of the two pipe headers. Isolating at this point results in the loss of at least one train of ECCS, causing a trip. Therefore, the overall impact on the model is small.	This is a conservative assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
It is assumed that spurious actuation of system relief valves would discharge a limited amount of inventory to a discharge tank and such events were screened out as potential flood sources.	Spurious actuation of a system relief valve was not determined to be a credible flood source because the inventory that was released would be retained within the flood area and would not lead to an applicable initiating event. The risk is considered negligible as this is not considered to be a significant source of inventory.	This is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Limited or no access to an area where flood initiation occurs was assumed.	There was no credit taken for mitigation when the equipment relied on for mitigation was located in the flood initiation area. Operators cannot get into flooded areas.	This is of low consequence to RICT. This would not have a significant impact on the RICT Program.
Only one internal flood initiating event is assumed to occur at a time.	The occurrence of simultaneous multiple independent internal flood events were considered to be very unlikely and were not considered in this evaluation. This is consistent with PRA modeling.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
The breach of isolation barrier(s) that may result in a maintenance-induced flood event was assumed to have no impact on altering the propagation paths related to other flooding mechanisms (i.e., pipe failure) for the flood source.	This is a simplifying assumption that has negligible impact on the model. Propagation pathways were made to be conservative for all scenarios	This is a conservative assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
The indirect effects of a PBF on the operability of a closed looped system were considered to be immediate.	Closed looped systems were considered to be normally operating and providing cooling to equipment that is relied on to maintain the plant in a power production state. It was therefore assumed that operator actions cannot be performed in a timely manner to preclude a plant trip. Most closed loop systems have a limited system capacity. A PBF would drain the system and in most cases, operator action to isolate the PBF would not be feasible. This assumption is conservative and raises CDF.	This is a conservative assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.
The spill rate resulting from a PBF of a potential unlimited flood source that causes a spray event is low enough (i.e., <100 gpm) to have no significant impact on the operation of the affected system.	For a potentially unlimited source, a PBF that resulted in a spray event (<100 gpm) would take an extraordinary amount of time to cause a loss of that system. Additionally, for most of the large nearly unlimited sources, the makeup capabilities of the system would generally exceed the flow rate generated by a spray event. It was therefore assumed that such systems have sufficient design margin to maintain the operability of the system and a plant trip would not occur. Note that for systems with a low system capacity (e.g., the CH system) this assumption was not valid.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
The flow rate from a PBF is assumed static at the maximum possible rate and the scenario is only ended when the source was exhausted or isolated.	The spill rate for a particular break resulting from a piping PBF is assumed to be the highest flow rate possible from the system or piping. For tanks, the break spill rate is assumed to be constant at an assumed flow rate. For systems requiring pumps, the break spill rate is assumed to be the realistic pump flow rate. The spill is assumed to continue in the originating flood area until the flood source is isolated or its water supply is limited or exhausted.. The accumulation of flood water in a flood area was considered halted when the flood source was terminated, or when outflow from the flood area matches or exceeds the inflow of flood water to the flood area. A constant maximum spill rate minimizes the time to reach the critical heights for SSCs that are susceptible to flooding. Spill rates were assumed to fall within the following categories: • Spray events: 100 gpm • Flood events: greater than 100 gpm but less than 2000 gpm (or maximum capacity of the system, whichever is lower) • Major flood events: greater than 2000 gpm (or the maximum capacity of the system, whichever is lower)	This is a conservative assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
The treatment of main steamline break and main feedwater line break internal events analysis was assumed to address the impact of these events in assessing whether main feedwater can be recovered following a reactor trip.	Recovery of feedwater is important for secondary side heat removal. The internal events analysis was believed to provide sufficient analysis to be used in the internal flooding PRA model.	This is of low consequence to RICT. This would not have a significant impact on the RICT Program.
It was assumed that minimal or no dependency existed between flood-specific and large early release specific Human Failure Events (HFEs).	The flood Human Reliability Analysis (HRA) did not include large early release specific HFEs. HFEs specific to large early releases (i.e., post-core damage operator actions) are generally performed several hours after the initiating event occurs. No dependency between early and late operator actions. There is no impact on the model.	This is of low consequence to RICT. This would not have a significant impact on the RICT Program.
The fire areas defined by the Fire Hazards Analysis (FHA) (which is contained in Updated Final Safety Analysis Report Appendix 9B Sections 9B.2.1 through 9B.2.22) will substantially contain the adverse effects of fires originating from any currently installed fixed ignition source or reasonably expected transient ignition source. Fire zone boundaries are similarly assumed adequate or combined.	Fire areas are required by regulation to be "sufficiently bounded to withstand the hazards associated with the area" as defined in Generic Letter 86-10 (Enclosure 1 Section 4). Fire zone boundaries are similarly assumed adequate; however, because fire zones have a lesser pedigree than fire areas, their boundaries are verified adequately in this notebook by a FHA review and plant walkdowns. Fire zone boundaries that appear unable to withstand the fire hazards within the zone are combined. The internal fire PRA utilizes fire compartments which generally align with fire zones, but may be a combination of several fire zones.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations		
Assumption / Uncertainty	**Discussion**	**Disposition for RICT**
Systems and equipment not credited in the fire -induced risk model (e.g., systems for which cable routing will not be performed) are assumed to be failed in the fire -induced risk model. These systems and equipment are failed in the worst possible failure mode, including spurious operation. It is assumed that any fire will minimally result in a loss of main feedwater and subsequent reactor trip. This is a simplifying and conservative assumption and is typical of internal fire PRA s. However, it may not be true for all fires.	The assumption that any fire fails all equipment lacking cable routing information has the potential to affect the assessed fire risk. The assumption that any fire will minimally result in a loss of main feedwater and subsequent reactor trip likely adds conservatism to the internal fire PRA results. However, the degree of conservatism is relatively small compared with other modeling uncertainties, since main feedwater will trip for most transient events. The impact of these assumptions was evaluated by a sensitivity analysis case which concluded that the risk reduction due to crediting all components assumed always failed was small.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program. There are no systems/components that are assumed failed in the Internal Fire PRA model that are within the RICT Program.
It is assumed that the Reactor Protection System (RPS) design is sufficiently fail-safe and redundant to preclude fire -induce failure to scram, or random failure to scram during a fire event, as a risk significant contributor.	RPS design is sufficiently fail-safe and redundant to preclude fire -induced failure to scram: Consistent with the guidance in NUREG/CR-6850 (Reference 11) Section 2.5.1, types of sequences that can generally be eliminated from consideration in internal fire PRA include sequences for which a low frequency argument can be made, and use ATWT as a specific example, because fire -induced failures will almost certainly remove power from the control rods, resulting a trip, rather than cause a "failure to scram" condition.	It is a realistic assumption and is of low consequence to RICT. This would not have a significant impact on the RICT Program. The low frequency of a fire occurring coincident with the low probability of independent failure to scram results in a negligible contribution to fire risk.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Properly sized and coordinated electrical protective devices are assumed to function within their design tripping characteristics, thus preventing initiation of secondary fires through circuit faults created by the initiating fire.	Electrical protection design calculations provide the documentation of the electrical coordination between overcurrent protective devices. An evaluation was performed to assess the internal fire PRA power supply coordination requirements in accordance with NUREG/CR-6850, and provides a link to relevant PVNGS electrical coordination calculations that demonstrate selective tripping capability for each credited internal fire PRA power supply (Reference 11 of this Attachment). When selective tripping cannot be demonstrated, the internal fire PRA model will credit recovery procedures planned to correct the coordination.	It is a realistic assumption and is of low consequence to RICT. Electrical coordination will either be established or recovery procedures will be implemented to correct the coordination.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
It is assumed that internal fire PRA targets were assigned the appropriate radiant heat flux damage and temperature damage criteria depending on the cable insulation information available. In other words, all raceways containing cables with thermoplastic or unknown cable insulation were assigned a radiant heat flux damage threshold of 6 kW/m^2 and 205 °C. All raceways containing cables with thermoset insulation only may be assigned a radiant heat flux damage threshold of 11 kW/m^2 and 330 °C, but have been initially assigned the thermoplastic damage thresholds.	All raceways containing cables were assigned a radiant heat flux damage threshold of 6 kW/m^2 and 205 °C. Raceways containing cables with thermoset insulation only may be assigned a radiant heat flux damage threshold of 11 kW/m^2 and 330 °C, but have been initially assigned the thermoplastic damage thresholds. A brief review of the dominant scenarios identified the existence of thermoplastic insulated cables within the target raceways.	It is a realistic assumption and is of low consequence to RICT. It was concluded that minimal benefit could be obtained by further analysis to identify and model raceways containing only thermoset insulation.

Table A13-1 Disposition of Key Assumptions/Sources of Uncertainty Impacting Configuration Risk Calculations

Assumption / Uncertainty	Discussion	Disposition for RICT
Planned plant modifications and recovery actions are assumed in the base case model. These modeled modifications are assumed to correct the fire vulnerability and not introduce any new failure modes.	This approach introduces uncertainty in the results because the actual modifications may vary from those assumed or they may not function as modeled. The assumed modifications are documented in the internal fire PRA studies. Plant and model configuration and control mechanisms are in place to ensure that the Internal Fire PRA model will be updated to correct the as-installed modifications. One specific planned plant modification is the installation of an additional Steam Generator makeup capability in each unit to address internal fire PRA risk. A sensitivity was performed that removes this modification from the model	This assumption that the planned plant modifications will be installed and tested/operated as assumed in the Internal Fire PRA model has significant impact on the RICT Program. The assumption is realistic since the PRA analysis will provide details to the design modifications group in developing the plant modifications and procedures. The PRA model will reflect the as-built/as-operated plant configuration prior to implementation of the RICT Program, including the installation of an additional Steam Generator makeup capability in each unit.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238,dated May 17, 2007

2. Regulatory Guide 1.200, *An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,* Revision 2, March 2009

3. ASME/ANS RA-Sa-2009, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications, Addendum A to RA-S-2008,* ASME, New York, NY, American Nuclear Society, La Grange Park, Illinois, February 2009

4. NUREG-1855, *Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making,* March 2009

5. EPRI TR-1016737, *Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments,* December 2008

6. WCAP-15749, *Guidance for the Implementation of the CEOG Model for Failure of RCP Seals Given Loss of Seal Cooling,* Revision 0, December 2008

7. NUREG/CR-6928, *Industry-Average Performance for Components and Initiating Events at U.S. Commercial Nuclear Power Plants,* January 2007

8. NUREG-1829, *Estimating Loss-of-Coolant Accident (LOCA) Frequencies through the Elicitation Process*, Draft

9. NUREG/CR-INEEL/EXT 04-0236, *Evaluation of Loss of Offsite Power Events at Nuclear Power Plants: 1986-2003 (Draft)*, October 2004

10. Westinghouse Calculation Note CN-RAM-12-022, Revision 1, Palo Verde Seismic Probabilistic Risk Assessment - Quantification, dated December 2, 2013

11. NUREG/CR-6850, *Fire PRA Methodology for Nuclear Power Facilities*, September 2005

ATTACHMENT 14

Program Implementation

Program Implementation

Introduction

Section 4.0, Item 11 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide a description of the implementing programs and procedures regarding the plant staff responsibilities for the RMTS implementation, and specifically discuss the decision process for risk management action (RMA) implementation during a Risk-Informed Completion Time (RICT). This attachment provides the required description.

RICT Program Procedures

A procedure will be developed to outline the requirements and responsibilities for the RICT Program. It will provide guidance on departmental responsibilities and management authority for RICT Program application, and for required training, implementation, and monitoring of the RICT Program, including development and maintenance of the Configuration Risk Management Program (CRMP) software tool and model reflecting the as-built, as-operated plant.

The RICT Program will be implemented by site procedures, which will fully address all aspects of the guidance of NEI 06-09-A. Operations, specifically the control room staff, is responsible for compliance with Technical Specifications (TS) requirements, and will be responsible for implementation of a RICT and any RMAs determined to be appropriate for the plant configuration. Use of a RICT and associated RMAs will be approved by the Plant Manager prior to entering an extended completion time (CT) for pre-planned activities. For emergent conditions requiring an extended CT, the use of the RICT program will be approved by the applicable Operation's Shift Manager or Plant Manager.

PVNGS Procedure 02DP-9RS01, *Operational Risk Management,* (Reference 2 of this Attachment) addresses existing site controls for risk management during equipment outages. This procedure will be supplemented to address the additional guidance of NEI 06-09-A for detailed implementation of the RICT Program. It will provide guidance to PVNGS personnel on the following topics:

- Performing a Tier 2 assessment for a RICT prior to entry into the TS Limiting Condition of Operation (LCO)
- Plant conditions for which the RICT Program is applicable
- Conditions under which a RICT may not be used, or may not be voluntarily entered for the calculation of RICTs and RMA Times (RMATs).
- Implementation of RICT Program front stops and 30-day back stop limit
- Plant configuration changes, i.e., recalculating the RICT and RMAT within the lesser of the affected RA completion time or 12 hours of any change.
- Conditions for exiting a RICT
- Requirements to identify and implement RMAs when the RMAT is exceeded or is anticipated to be exceeded in accordance with PVNGS Protected Equipment procedure, 40DP-9AP21, and NEI 06-09-A

- The use of RMAs, including the conditions under which they may be credited in RICT calculations
- Crediting probabilistic risk assessment (PRA) functionality
- Approval processes for use of a RICT
- Determining PRA availability from detailed PRA functionality characteristics for each Technical Specification LCO
- A RICT cannot be entered if PRA functionality must be lost in order to restore the LCO
- Determining PRA availability of degraded SSCs consistent with NEI 06-09
- Cases where CDF and/or LERF exceed 1E-3/yr and/or 1E-4/yr as delineated in NEI 06-09
- Analyzing conditions for Common Cause Failures (CCFs), planned and emergent configurations, in accordance with NEI 06-09-A and the guidance of Regulatory Guide 1.177 (Reference 3 of this Attachment).

RICT Program Training

The scope of the training for the RICT Program will include training on rules and processes for the new TS program, CRMP software, TS Actions included in the program, and procedures. This training will be conducted for the following PVNGS personnel, as applicable:

- Plant General Manager
- Selected members of the PVNGS management and supervisory team
- Unit Operations Managers
- Operations Work Control Managers
- Operations Personnel (Licensed and Non-Licensed)
- Work Control Manager
- Work Control Personnel
- Work Week Managers
- Operations Training
- Nuclear Regulatory Affairs
- Selected Maintenance Personnel
- Site Engineering
- Probabilistic Risk Assessment (PRA) Engineers
- Fire Protection Personnel
- Other Management (e.g., Outage Management)

Training will be carried out in accordance with PVNGS training procedures and processes. These procedures were written based on the Institute of Nuclear Power Operations (INPO) Accreditation (ACAD) requirements, as developed and maintained by the National Academy for Nuclear Training. PVNGS has planned three levels of training for implementation of the RICT Program. They are described below:

User Training

This is the most detailed training and is intended for the individuals who will be directly involved in the implementation of the RICT Program. This level of training includes the following attributes:

- Specific training on the revised TS
- Record Keeping Requirements
- Case Studies
- Hands-on time with the CRMP tool calculating a RMAT and RICT
- Identifying appropriate RMAs
- Determining PRA Functionality
- Other detailed aspects of the administration and deployment of the RICT Program

Management Training

This training is applicable for supervisors, managers, and other personnel who need a broad understanding of the RICT Program. It is significantly more detailed than Site Awareness Training (described below), but it is different from User Training in that hands-on time with the CRMP tool and case studies are not included. The concepts of the RICT Program will be taught, but this group of personnel will not be qualified to perform the tasks for actual implementation of the RICT Program.

Site Awareness Training

This training is intended for the remaining personnel who require an awareness of the RICT Program. These employees need basic knowledge of RICT Program requirements and procedures. This training will address RICT Program concepts that are important to disseminate throughout the organization. Training will include a site wide communication plan for the RICT program coordinated through the PVNGS Communications Department.

References

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines (TAC No. MD4995),* ML071200238, dated May 17, 2007

2. PVNGS Procedure 02DP-9RS01 *Operational Risk Management,* Rev 1

3. Regulatory Guide 1.177, *An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications*, Revision 1, May 2011

ATTACHMENT 15

Monitoring Program

Monitoring Program

Section 4.0, Item 12 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide a description of the implementation and monitoring program as described in Regulatory Guide (RG) 1.174, *An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,* Revision 1, (Reference 2 of this Attachment) and NEI 06-09-A. (Note that RG 1.174, Revision 2 (Reference 3 of this Attachment), issued by the NRC in May 2011, made editorial changes to the applicable section referenced in the NRC safety evaluation for Section 4.0, Item 12.)

This attachment provides a description of the process applied to monitor the cumulative risk impact of implementation of the Risk-Informed Completion Time (RICT) Program, specifically the calculation of cumulative risk of extended Completion Times (CTs). Calculation of the cumulative risk for the RICT Program is discussed in Step 14 of Section 2.3.1 and Step 7.1 of Section 2.3.2 of NEI 06-09-A. General requirements for a Performance Monitoring Program for risk-informed applications are discussed in RG 1.174, Element 3.

The calculation of cumulative risk impact is required by the RICT Program at least every refueling cycle, not to exceed 24 months, consistent with the guidance in NEI 06-09, Revision 0. For the assessment period evaluated, data is collected for the risk increases associated with each application of the RICT Program for both core damage frequency (CDF) and large early release frequency (LERF), and the total risk calculated by summing the contributors to risk associated with each RICT application. This is the change in CDF or LERF above the zero maintenance baseline levels while a RICT was in effect (i.e., beyond the front-stop CT). The change in risk is converted to an average annual value.

The total average annual change in risk for extended CTs is compared to the guidance of RG 1.174, Figures 4 and 5 for CDF and LERF changes, respectively. If the actual annual risk increase is acceptable (i.e., not in Region I of the figures), then RICT Program implementation is acceptable for the assessment period. Otherwise, further assessment of the cause of exceeding the RG 1.174 guidance and implementation of any necessary corrective actions to ensure future plant operation is within the guidance is conducted under the site Corrective Action Program.

The assessment will identify areas for consideration during the evaluation, including, as examples:

- Those SSCs where the application of a RICT dominated the risk increase
- Contributions from planned vs. emergent RICT applications
- Risk management actions (RMAs) implemented but not credited in the risk calculations
- Offset risk due to RICT application by avoiding multiple shorter outages
- Reductions in risk levels through improvements in SSC availability and reliability due to different maintenance strategies and the operational flexibility made possible through the RICT Program

Based on the evaluation, any necessary corrective actions determined to be appropriate are developed and approved by the Plant General Manager or Unit Operations Manager. These may include:

- Administrative restrictions on the use of RICTs for specific high-risk configurations based on instantaneous risk levels
- Additional RMAs for specific high-risk configurations
- Rescheduling planned maintenance activities
- Deferring planned maintenance to shutdown conditions
- Use of temporary equipment to replace out-of-service systems, structures or components (SSCs)
- Plant modifications to reduce risk impact of expected future maintenance configurations

In addition to the cumulative impact of RICT Program implementation, the unavailability of SSCs is also potentially impacted. The existing Maintenance Rule (MR) monitoring programs under 10 CFR 50.65(a)(1) and (a)(2) provide for evaluation and disposition of unavailability impacts that may be incurred by implementation of the RICT Program. The use of the MR Program is acceptable since the SSCs in the scope of the RICT Program are also in the scope of the MR. Using the existing MR monitoring for this program is explicitly discussed in RG 1.177, *An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications*, (Reference 4 of this Attachment), Section 3.2, "Maintenance Rule Control."

The monitoring program for the MR, along with the specific assessment of cumulative risk impact described above, serves as the "Implementation and Monitoring Program," defined as Element 3 of RG 1.174 for the RICT Program.

<u>References</u>

1. NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (TAC No. MD4995), ML071200238, dated May 17, 2007

2. Regulatory Guide 1.174, *An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,* Revision 1, November 2002

3. Regulatory Guide 1.174, *An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,* Revision 2, May 2011

4. Regulatory Guide 1.177, *An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications,* Revision 1, May 2011

ATTACHMENT 16

Risk Management Action Examples

Risk Management Action Examples

Introduction

Section 4.0, Item 13 of the NRC Final Safety Evaluation (Reference 1 of this Attachment) for NEI 06-09-A requires that the license amendment request (LAR) provide a description of the process to identify and provide compensatory measures and risk management actions (RMAs) during extended Completion Times (CTs), including specific examples.

This attachment describes the process for identification of RMAs applicable during extended CTs and provides examples of RMAs. RMAs will be governed by plant procedures for planning and scheduling maintenance activities. This procedure will provide guidance for the determination and implementation of RMAs when entering the Risk-Informed Completion Time (RICT) Program and is consistent with the guidance provided in NEI 06-09-A.

Responsibilities

Work Planning / Work Management is responsible for identifying the need for RMAs for planned work and Operations is responsible for identifying the need for RMAs for emergent work. Operations, PRA and Fire Protection are responsible for developing the RMAs. Operations is responsible for implementation of RMAs.

Procedural Guidance

For planned maintenance activities, implementation of RMAs will be required if it is anticipated that the risk management action time (RMAT) will be exceeded. The RMAs are implemented at the earliest possible time, without waiting for the actual RMAT to be exceeded as appropriate for the situation. For emergent activities, RMAs must be implemented if the RMAT is reached. Also, if an emergent event occurs, requiring recalculation of a RMAT already in place, the procedure requires a re-evaluation of the existing RMAs for the new plant configuration to see if new RMAs are appropriate. These requirements of the RICT Program are consistent with the guidance of NEI 06-09-A.

RMAs are put in place no later than the point at which the incremental core damage probability (ICDP) of 1E-6 is reached, or no later than the point at which an incremental large early release probability (ILERP) of 1E-7 is reached. If as the result of an emergent event, the instantaneous core damage frequency (CDF) or the instantaneous large early release frequency (LERF) exceeds 1E-3 or 1E-4 per year, respectively, RMAs are also required to be implemented. These requirements are consistent with the guidelines of NEI 06-09-A.

By determining which structures, systems, or components (SSCs) are most important from a CDF and/or LERF perspective for a specific plant configuration, RMAs may be created to protect these SSCs. Similarly, knowledge of the initiating event or sequence contribution to the configuration-specific CDF and/or LERF allows development of RMAs that enhance the plant's capability to mitigate such events. System-specific Configuration Risk Management System Guidelines (CRMSGs) will be developed that will define the risk role of plant systems within the scope of the RICT Program, identify SSCs explicitly modeled in the system, and identify the key

SSC failure modes for equipment explicitly modeled. Approved system-specific RMAs will be contained in the CRMSGs and be available in each unit Control Room.

It is possible to credit RMAs in the RICT calculations, but such quantification of RMAs is not required by NEI 06-09-A. Crediting RMAs in the RICT calculations is only done consistent with the guidance of NEI 06-09-A.

NEI 06-09-A classifies RMAs into three categories, as described below:

1) Actions to increase awareness and control
- Shift brief
- Pre-job brief
- Training (formal or informal)
- Presence of system engineer or other expertise related to maintenance activity
- Special purpose procedure to identify risk sources and contingency plans

2) Actions to reduce the duration of maintenance activities
- Pre-staging materials
- Conducting training on mock-ups
- Performing the activity around the clock
- Performing walk-downs on the actual system(s) to be worked on prior to beginning work

3) Actions to minimize the magnitude of the risk increase
- Suspend/minimize activities on redundant systems
- Suspend/minimize activities on other systems that adversely affect the CDF and/or LERF
- Suspend/minimize activities on systems that may cause a trip or transient to minimize the likelihood of an initiating event that the out-of-service component is meant to mitigate
- Use temporary equipment for backup power
- Use temporary equipment for backup ventilation
- Reschedule other maintenance activities

Examples of RMAs that may be considered during a RICT Program entry for a diesel generator (DG) or a battery to reduce the risk impact and ensure adequate defense-in-depth are:

A. Diesel Generator
1) The condition of the offsite power supply, switchyard, and the grid is evaluated prior to entering a RICT, and RMAs as identified below are implemented, particularly during times of high grid stress conditions, such as during high demand conditions.
2) Deferral of switchyard maintenance, such as deferral of discretionary maintenance on the main, auxiliary, or startup transformers associated with the unit.
3) Deferral of maintenance that affects the reliability of the trains associated with the operable DGs.
4) Deferral of planned maintenance activities on station blackout mitigating systems, and

treating those systems as protected equipment.

5) Contacting the dispatcher on a periodic basis to provide information on the DG status and the power needs of the facility.

B. Battery

1) Limit the immediate discharge of the affected battery, if possible.
2) Recharge the affected battery to float voltage conditions using a spare battery charger, if possible.
3) Evaluate the remaining battery capacity and protect its ability to perform its safety function.
4) Periodically verify battery float voltage is equal to or greater than the minimum required float voltage for remaining batteries.

References

1 NRC letter, Jennifer M. Golder to Biff Bradley (NEI), *Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines* (TAC No. MD4995), ML071200238, dated May 17, 2007