

**Responses to NRC Request for Additional
Information dated June 3, 2005**

General RAIs

1. General RAI #1 suggested limiting applicability of TS 3.0.9 such that at least one train of the impacted system was fully OPERABLE with no degraded barriers. In response, the specific portions of the guidance which implement the intent of this restriction were referenced, and no further changes were identified. The only identified exception permits multiple trains to be impacted, but for separate initiating events. The staff notes that the TS 3.0.9 wording itself specifically requires operability of the redundant train. However, on page 11, item 2, an exception to this requirement based on the ICDP with one of the trains assumed unavailable being within the NUMARC 93-01 guidelines is provided. This could be interpreted to allow multiple barriers out of service on both trains of a two train system for the same initiator, or to allow unavailable barriers on one train, with the other train inoperable for maintenance. A clarification of this item is requested.

RESPONSE:

The following words have been added to the last sentence in Section 6.2 general guidance Item 2:

“However, this does not infer that the use of LCO 3.0.9 permits different barriers, protecting redundant trains against the same initiating event, to be removed from service simultaneously.”

2. General RAI #2 requested additional guidance regarding emergent conditions when TS 3.0.9 is in use. In response, it was stated that the guidance for 10CFR50.65 (a)(4), endorsed by Regulatory Guide 1.182, was adequate for assessing the risk impacts of emergent conditions, and that TS 3.0.9 was adequately addressed by this guidance. However, the methodology for assessing risk of barriers does not consider the integrated configuration risk, and does not address emergent failures of the operable train. Therefore, the methodology itself does not address plant risk quantitatively in an integrated fashion. With regards to the (a)(4) program, since the barriers within the scope of this proposed change need not be in the plant PRA model, the quantitative risk assessment would not necessarily identify the impact of emergent conditions, and would rely solely upon a qualitative understanding of the interaction of barrier status with overall plant status. The staff suggests the methodology be changed such that the quantitative assessment considers the actual plant configuration (see RAI #3), and include provisions to reassess the quantitative risk when emergent conditions occur.

RESPONSE:

The (a)(4) assessment considers the actual plant configuration in an EOOS (or the equivalent) model. The following words have been added as the last paragraph in Section 6.1.

“To ensure that the plant risk is quantitatively addressed in an integrated fashion, the actual plant configuration should be used when invoking LCO 3.0.9. When an emergent condition occurs, the original risk assessment will be re-evaluated in accordance with (a)(4).”

The phrase “configuration-specific” was added to Step 7 and Step 7b to clarify that configuration-specific RAW values should be used.

3. General RAI #3 questioned addressing barrier risk separately from total plant configuration risk in the quantitative assessment. In response, it was stated that NUMARC 93-01 addresses total configuration risk, and that implementation of this initiative would require a commitment to this guidance. However, the RAI was identifying that the barrier risk is treated separately from configuration risk and the thresholds from NUMARC 93-01 were applied separately. NUMARC 93-01, section 11.3.7, specifically identifies that the risk significance of components changes with the configuration, but the methodology does not address these changes. The process has no provision to quantitatively evaluate the status of barriers along with the overall plant configuration. The staff suggests the methodology be changed such that the quantitative assessment considers the actual plant configuration for example, by assessing the applicable risk achievement worth for impacted components using the actual plant configuration during barrier removal.

RESPONSE:

See Response to General RAI #2. Note that the example in Appendix A uses configuration-specific RAW values.

4. General RAI #4 requested guidance for treating external events. In response, it was identified that no guidance was needed. The staff has additional comments on this item. If the particular initiating event for which the barrier(s) provides protection is not in the model (i.e., an external event), then the internal events RAW may not reflect the true risk importance of the component. The staff suggests that the methodology should allow only one barrier to be unavailable if the PRA model does not include an initiator for which that one barrier provides a protective function.

RESPONSE:

Step 7d of Section 6.2 discusses the quantitative and qualitative risk impacts of external events. When a particular initiating event is not quantitatively modeled, Step 7d ensures that insights from IPEEE and similar analyses are considered. In

addition, the following words have been added in the penultimate paragraph in Section 6.2/Step 7d.

“Another way external events risk importance can be accounted for is by modifying the RAW value using the insights from the IPEEE and similar analyses. Risk management actions should take this into account, even if the external events risk importance cannot be directly quantified.”

In Step 7b the guidance recommends that LCO 3.0.9 should not be invoked when the configuration-specific RAW value exceeds 100. This would apply to a RAW value qualitatively modified to account for external event risk.

5. General RAI #7 requested identification of the safety benefits of this initiative. In response it was stated (in part) that implementation of this initiative would not increase the number or length of barrier outages. The staff suggests that implementation of this initiative could better focus plant maintenance and configuration control on safety-significant items, rather than the LCO time restrained removal and restoration of low risk significant barriers, for example.

RESPONSE:

The following words have been added as the last paragraph in Section 2.0.

“This initiative will result in some safety benefits for the industry. Implementation of this initiative will better focus plant maintenance and configuration control on safety significant items, rather than application of Technical Specification system LCOs that are deterministically based. Additionally, implementation of this initiative will shift the licensee’s focus to a consistent risk assessment and management approach for barrier removal.”

Specific RAIs

1. Specific RAI #1 requested clarification as to how the proposed guidelines regarding PRA model sophistication and resulting plant-specific limitations on the use of TS 3.0.9 would be implemented. In response, it was stated that the specific wording was identical to another RITS document, and that the intent was not to limit applicability, and that existing risk assessment tools are adequate. The guideline specifically states that the level of sophistication of the plant PRA model and tools directly affects the utility of TS 3.0.9. It further states that "the process provided in this implementation guidance document allows a plant to use its existing risk assessment tools to determine if the LCO 3.0.9 allowance is acceptable for use." However, in no part of the guideline is there anything which implements these statements. The staff suggests that if the PRA does not model an initiating event, then TS 3.0.9 should not be used for multiple barrier removal when the unmodeled initiator is impacted, for example.

RESPONSE:

See Response to General RAI #4. Any PRA model that is sufficient for (a)(4) should be technically adequate for the implementation of Initiative 7a, which is a more "limited" risk-informed application.

2. Specific RAI #3 took exception to the conclusion that high pressure injection (HPCI , RCIC and HPCS) was functionally redundant to ADS and low pressure injection for BWRs. Since BWR standard TS relate operability of HPCI and RCIC, application of TS 3.0.9 should retain that relationship. Further, the separate, diverse methods should be consistent with the design and licensing bases, rather than additional methods used in the PRA (i.e., containment venting may be a PRA alternative to suppression pool cooling, but should not be used to justify barrier removal). Please revise the guidelines.

RESPONSE:

The last paragraph of Section 5.1 was modified to be consistent with the LCO 3.0.9 wording in TSTF-427. This paragraph now reads as follows.

"Thus, for the purposes of LCO 3.0.9, the HPCI/HPCS, the RCIC system, and the ADS are considered independent subsystems of a single system. Therefore, these systems would be treated in the same manner as two redundant trains (of the same system) in a PWR. This allowance is stated in LCO 3.0.9 in the BWR ISTS (NUREG-1433 and NUREG-1434) and described in the BWR LCO 3.0.9 Bases."

3. Specific RAI #11 requested clarification on the guidance regarding when RAW values can be added. In response, additional clarifications were provided. It is stated that RAW values can be added when "no dependencies exist between the systems." RAW values can only be correctly added when the two items considered do not and cannot occur in the same cutset. The degree of dependency which exists is not relevant. For example, the turbine-driven AFW pump and main feedwater pumps are independent means of achieving secondary side heat removal, there are no dependencies. However, failures of these components can occur in the same cutset, and it is not possible to add the RAW values. Further, a diesel generator may have a dependency on the service water pump; however, it is not possible for the same cutset to have both items, since failure of one component results in failure of the other due to a dependency. In this case, it would be appropriate to add the RAW values.

The staff suggests that the guidelines could require combinations of components impacted by barriers to be requantified in order to directly calculate the risk achievement worth for the configuration (see General RAI #3), avoiding the need for the operator to determine if adding risk achievement worth values is applicable.

RESPONSE:

The industry agrees with the staff's RAW analysis, that is, when there are two independent components in the same cut set, that the RAW values can not be added. Accordingly, Step 7b has been revised to include guidance on the calculation of a configuration-specific RAW value.

4. Specific RAI #13 requested documentation requirements for use of TS 3.0.9. In response no documentation requirements were proposed. The staff suggests that documentation is appropriate to assess performance for this risk-informed, performance based application both for self-assessment by the licensee, and for regulatory oversight. This is especially important, for example, when complex configurations are required to facilitate maintenance, when emergent conditions occur, when risk management actions are used to justify the barrier outage time, or when multiple safety trains are impacted by one or more barriers. The following information would allow proper oversight: what barriers are removed, what the assumed impacts are, the applicable calculations, the applicable risk management actions, the calculated allowed time, and the times of barrier removal and restoration to show that the 30 day limit was met. Additional consideration is therefore requested.

RESPONSE:

Additional documentation guidance has been added to Section 8 of the Guidance Document.

5. NEW SPECIFIC RAI #18 - In Section 3.0 of TSTF-427, in the Executive Summary of the guidelines, and in the proposed STS bases, reference is made that the supported system remains operable with its barrier removed/degraded under TS 3.0.9. However, since the definition of operability is not changed, it is not clear how to interpret operability once TS 3.0.9 is in effect. It would seem that the component(s) are inoperable, but TS 3.0.9 allows up to a 30-day period to not implement the required TS actions. The staff suggests that the guidelines be reviewed and clarified, as well as the TS and bases, if appropriate.

RESPONSE:

LCO 3.0.9 is revised to state that when LCO 3.0.9 is invoked, any supported LCOs are not required to be declared not met. This avoids any perceived conflict with the definition of OPERABILITY. This approach is consistent with LCO 3.0.8 (smubbers). Revision 0 of TSTF-427 explicitly revised the definition of OPERABILITY to acknowledge the exceptions provided by LCO 3.0.8 and LCO 3.0.9. However, the NRC stated that they did not agree with this change and, upon further consideration, the industry agreed and stated that the change to the definition of OPERABILITY will be removed from the next revision of TSTF-427. LCO 3.0.9 does not affect the definition of OPERABILITY but modifies the LCO use and application.

6. NEW SPECIFIC RAI #19 - In Section 4.0 of TSTF-427, and in the proposed STS bases, the definition of "barrier" is circular, in that it refers to "installed barriers" and "other barriers." Please correct to eliminate this concern. In addition, "insulation" is identified as a barrier. The staff suggests that insulation is most likely in place for personnel hazard concerns, or to assure the system heat loss/gain is within assumed design limits, rather than for protection against particular initiating events, and so TS 3.0.9 would not apply.

RESPONSE:

The first paragraph in Section 5.1 has been revised to delete the words "installed barriers," replace the words "other barriers" with "other devices," and deleted "insulation" from the definition of barriers.

7. NEW SPECIFIC RAI #20 - In Section 4.0, the inclusion of LOCAs but exclusion of HELBs inside containment seems inconsistent and should be discussed or corrected. Further, the external event "high winds" is included in the draft guidelines but not in TSTF-427, and no generic initiator frequency is provided to justify inclusion. Please clarify and correct as necessary.

RESPONSE:

The words "outside containment" as it refers to HELBs, have been deleted from TSTF-427 and the Guidance Document, thus referring to all HELBs. In Insert 2 of TSTF-427, high winds is included in the initiators with tornadoes and is now consistent with the Guidance Document.

8. NEW SPECIFIC RAI #21 - Several items in TSTF-427 page 7 need to be clarified:
 - a. It is stated that because maintenance unavailabilities of barriers are controlled under 10 CFR 50.65(a)(4), then the failure probability of remaining train(s) would

be approximately 1 E-2. The staff notes that unavailability of redundant components may exceed 1 E-2.

RESPONSE:

This sentence has been deleted from the TSTF-427.

- b. It is stated that because maintenance unavailability for redundant train(s) is controlled the RAW values are conservative. It is noted that if redundant train maintenance is set to zero (controlled), then the relative importance of the remaining basic events increase, and so the RAW values would increase above the values of the baseline PRA model which is used. Therefore, it is not clear that the RAW values are in fact conservative because of this control.

RESPONSE:

Sentences related to RAW being calculated from a baseline time-averaged PRA have been deleted from the TSTF. The use of the RAW value in the TSTF was to demonstrate ranges of incremental core damage probability (ICDP) and Incremental large early release probability (ILERP). When using the RAW to estimate the risk-informed Completion Time, the Guidance Document clearly says a configuration-specific RAW value should be used.

- c. It is stated that recovery of equipment damaged by the initiating event would continue to be applicable. The staff does not agree with assessing equipment repair and recovery when using the PRA model to assess the risk importance of having that equipment out of service or degraded.

RESPONSE:

The paragraph dealing with recovery has been deleted from TSTF-427. However, use of recovery actions is an acceptable practice in a PRA model. Accordingly, recovery actions will be implicitly used when a PRA model is used to estimate a risk-informed Completion Time.

- d. It is stated that “all plants-have a conditional early containment failure probability of less than 0.1. No basis is provided for this statement.

RESPONSE:

This sentence is deleted from TSTF-427. The conditional containment failure probability was only used to show acceptable ranges of ICDP and ILERP.

9. NEW SPECIFIC RAI #22 - The proposed revised STS bases identify that fire protection barriers are controlled by 10 CFR 50 Appendix R; not all plants are subject to this requirement, so it is not generically applicable.

RESPONSE:

TSTF-427 and Section 6.2 Step 2 of the Guidance Document have been revised to remove the reference to Appendix R and replaced with "other regulatory requirements and associated plant programs."

10. NEW SPECIFIC RAI #23 - In Section 6.2 of the guidelines, second paragraph requires clarification:

- a. What "following general aspects" are referred to? A bulleted or numbered list of items would be expected.

RESPONSE:

The text in the Guidance Document has been modified with specific numbered bullets.

- b. Is the flowchart used in all cases, or is the explanatory paragraph for item 1 intended to replace the flowchart assessment?

RESPONSE:

Yes, any confusion from item 1 has been removed by deleting that item.

- c. The paragraph explaining item 1 seems to identify a quantified calculation to determine an allowed outage time for barrier removal which is "conservative." However, nothing in the LCO itself implies that the 30 day period is potentially less than 30 days, and it is not clear why a separate risk assessment which does not consider the actual plant configuration would always be conservative.

RESPONSE:

See the response to Specific RAI #10.b. The LCO has been revised to reflect that the risk-informed Completion Time can be up to 30 days.

- d. The paragraph explaining item 2 identifies various aspects of the barriers dependency to be "considered", but except for the last item where there are identified dependencies between systems, no specific action is identified. What is the intent of this part of the guideline?

RESPONSE:

The referenced paragraph does identify “cases” in which dependencies should be considered. The purpose is to create an “awareness” of the potential impact of dependencies, and caution to the users to “consider” these impacts, without being explicit about how the dependencies are “handled.”

- e. The second numbered list of this section identifies general guidance for planned barrier removal. Item 1 is conservative, since if the risk of having a train completely out of service is acceptable, then it is irrelevant how many barriers are removed. However, it is not clear why item 2 is reasonable guidance to maintain low risk. If one train could be removed from service and be within risk guidelines of NUMARC 93-01 why is it assumed that degrading the second train with multiple removed barriers would not result in a higher risk configuration?

RESPONSE:

For items 1 and 2, the exception “clause” has been deleted, simplifying this guidance.

- 11. NEW SPECIFIC RAI #24 - In the implementing steps for the flowchart of the guideline there is reference to the risk assessment "not support removal of the barrier from service without declaring the supported system inoperable" (step 8), and to the risk assessment and risk management actions "not support the maximum 30-day allowed time period" (also step 8). However, the barrier risk calculation is completed in step 7c, and since barriers would not be in the PRA model and the supported components would not be considered non-functional, it is not clear how the (a)(4) assessment of step 8 could calculate a quantitative allowed outage time. The staff believes that this guidance, and that of step 9 which provides the ICDP and ILERP limits, should be applied in step 7c.

Further, the guideline does not state what ICDP/ILERP limit applies to calculating the acceptability of the 30-day allowance. The staff suggests that pre-planned barrier removal should be quantitatively assessed against the lower limit, with the upper limit applying to emergent conditions. The (a)(4) assessment of steps 8 and 9 would not be affected.

RESPONSE:

The risk assessment does not require a risk-informed completion time to determine necessary risk management actions. Section 6.2 Step 11 was added to the Guidance Document to explicitly calculate the risk-informed completion time. See the example in Appendix A that reflects the time sequence of these steps.

- 12. NEW SPECIFIC RAI #25 - In step 7c, the last three sentences require clarification as to what is intended: While the licensee is not limited by the example in the technical

justification, it is prudent to use the plant baseline CDF and LERF in conjunction with the RAW value and initiating event frequency previously evaluated to gain any insights from the combination of actual plant data on the resultant ICDP and ILERP values. The results should be factored into the risk management actions as necessary.

This review should be performed whether or not the PRA considers internal events only, or internal and external events.

What actual plant data is being referenced? What combination is being referred to? What results are being referred to? How are they to be factored into risk management actions? What determines if this is necessary? What review is being referred to? Why is the scope of the PRA with regards to external events mentioned?

RESPONSE:

Section 6.2 Step 7c has been revised to address these concerns.