

REQUEST FOR ADDITIONAL INFORMATION NEEDED TO COMPLETE
THE TECHNICAL REVIEW OF TSTF-424, REVISION 0,
“RISK-INFORMED HPSI AOT/CT EXTENSION”

1. The staff requested clarification of the proposed implementation approach with respect to guidance provided in maintenance rule (a)(4) and RGs 1.174 and 1.177 (Question 2 of “acceptance review” comments). The industry’s response did not fully clarify all of the staff’s questions. Please answer the following questions, including examples when judged to be helpful.
 - (a) Briefly describe the process, including criteria, that will be used to determine the extended (or “flexible”) AOT/CT (i.e., the amount by which the front stop AOT/CT will be extended) for a given plant configuration. Example(s) could be used to illustrate the process and distinguish among potential cases (e.g., planned maintenance vs. emergent condition during the extended AOT/CT).
 - (b) In the industry’s response it is stated that flexible AOTs should in aggregate conform to the general guidance of RG 1.174. Although the staff agrees with this statement, there may be a difference in the understanding of this statement between the staff and the industry:
 - The industry states that an increase in CDF of up to $1E-5/yr$ is small and, therefore, acceptable. However, the guidance provided in RG 1.174 states that this is acceptable only when the plant’s baseline risk from all sources (i.e., both internal and external events at power as well as during shutdown) has been reasonably assessed (i.e., uncertainties were also addressed) and is lower than $1E-4/yr$. Please discuss.
 - If the flexible AOTs should in aggregate conform to the general guidance of RG 1.174 for allowed risk increases, then why it is proposed to be able to accumulate all the allowed risk increase in a single AOT/CT extension? Please discuss.
 - Please clarify how the aggregate increase in risk associated with the proposed flexible HPSI AOT/CT extensions will be calculated (e.g., the time the risk accumulation begins, credit for compensatory measures, risk increases measured from the “zero maintenance” baseline or the “average maintenance” baseline).
 - If contingency actions and compensatory measures are credited in assessing risk increases, risk-informed regulation requires procedures and administrative controls as well as appropriate PRA modeling for such actions and measures. Please discuss how this requirement will be implemented.

Enclosure 2

- Please explain how the risk increases to be used in RG 1.174 criteria will be calculated (e.g., from the zero maintenance baseline or the average maintenance baseline). Include a brief discussion of the proposed approach (e.g., risk increases are in accordance with RG 1.174 guidelines or they are calculated conservatively).
- (c) Describe the process, including criteria, for initiating a plant shutdown. How will this process address the proposed removal of current constraints to plant operation at power imposed by the fixed AOTs/CTs? The staff believes that the guidance provided in maintenance rule (a)(4) regarding the initiation of plant shutdown needs improvement to compensate for the proposed removal of current constraints to plant operation at power imposed by the TS fixed AOTs/CTs.
- (d) Please clarify the risk metrics used for (1) the configuration from the beginning of the outage to completion and return to service and (2) the configuration beyond the front-stop (i.e., associated with the AOT/CT extension), respectively. Use of different designators for risks associated with these two cases would help eliminate confusion throughout the report.
2. The staff needs further clarification of the following statements included in the industry's response to Question 4 of "acceptance review" comments (regarding the criterion for limiting the allowed instantaneous increase of risk):
- It is stated: *"...entries into configurations with incremental risks (ICDPs) greater than 1E-5 should not be voluntary."* Does this statement imply that during an AOT/CT extension, which is voluntary, no ICDPs greater than 1E-5 will be allowed? If this is correct, shouldn't an ICDP greater than 1E-5 require the initiation of plant shutdown? Furthermore, the industry's RMTS guide states that preventive maintenance involving an AOT/CT extension will be planned so that it is completed before the ICDP reaches the value of 1E-6. Please discuss.
 - It is stated: *"...instantaneous risks greater than 1E-3/yr ...should be performed only when supported by a plant assessment to determine the efficacy of a plant shutdown assessment."* Please clarify this statement. Also, explain how is this statement in agreement with maintenance rule (a)(4) Section 11 which states that a configuration with instantaneous CDF risk greater than 1E-3/yr should not be entered voluntarily? Please discuss.
3. The staff needs clarification of statements included in the industry's response to Question 5 of "acceptance review" comments regarding the need for more detailed discussion of the plant specific risk assessments discussed in the report. It is stated: *"... the intent of this effort is to establish a process for risk evaluation that is consistent with the MR. Therefore, detailed a priori information assessments for each action need not be required on an individual basis. The information provided in the base report and associated RAIs include examples of potential configurations for the purpose of illustrating the use of the process."* These statements do not seem consistent with the proposed TS changes in TSTF-424. The industry has requested generic staff approval for the proposed HPSI AOT/CT extensions for all CEOG plants. If this is correct, then

the risk assessment information provided to the staff should be detailed enough to demonstrate that all CEONG plants have the capability to use the proposed process to extend HPSI-related AOTs/CTs safely. Such capability cannot be demonstrated by just illustrating the use of a process. Additional information regarding important assumptions made in the PRA (e.g., in modeling the various HPSI inoperabilities and degradations) is needed. Please discuss.

4. The industry's response to Question 6 of "acceptance review" comments lists four elements that should be included in the RMTS guidelines. The staff agrees that these elements should be an important part of the RMTS guidelines and should be in place before the proposed HPSI AOT/CT extensions are approved. Also, the staff requests the following information related to the proposed guidelines:
 - The first element is the *"identification of high risk configurations in a timely manner."* It is stated that *"[The] timely consideration of high risk configurations imply either availability of pre-assessed "high risk" configurations, or a process and ability to perform and respond to contemporaneous online assessments of high risk...."* How do the various CEONG plants intend to incorporate this element for the proposed HPSI AOT/CT extensions? Is this an issue that would be addressed generically (i.e., at the topical report SE stage) or on a plant-specific basis at a later stage? The identification of high risk configurations issue needs to be discussed in the revised topical report.
 - The second element is the *"prompt consideration and resolution of common cause issues (if any)."* Will there be generic and/or plant-specific guidance on how to look for potential common-cause issues and on strategies and actions to resolve any such issues? The common-cause issue needs to be discussed in the revised topical report.
 - The third element is *"a process for considering unmodeled external challenges (e.g., challenges beyond the scope of PSA evaluation."* The industry lists options for addressing external events, especially when only qualitative and semi-qualitative risk assessments are available. However, the industry needs to develop generic and plant-specific guidance for treating external challenges. For the proposed HPSI AOT/CT extensions, this guidance can be based on insights such as those discussed in Section 6.3.2.6 of the topical report. This issue needs to be further discussed in the revised topical report.
 - The fourth element is *"a risk informed shutdown process."* However, no such a process is discussed in the industry's report. In the industry's response it is also stated that *"Prior to implementation of the "flexible AOT" plant specific implementation guidelines will be prepared."* The staff believes that a risk-informed shutdown process based on generic principles and criteria, and not on plant-specific implementation guidelines as the industry's response implies, is needed. Please discuss.
5. Question 8 of "acceptance review" comments discusses the need to address the issue of PRA quality for the proposed risk-informed application (i.e., HPSI flexible AOT/CT extension at all CEONG plants). The ASME PSA Standard (endorsed by RG 1.200)

requires that the parts of the plant-specific PRA, which are impacted by the proposed change, be identified and evaluated to determine whether the PRA scope and level of detail are sufficient for the application in order to provide confidence that the results can be used in the decision-making process. To meet this requirement, the staff requested the following information:

- Documentation that the parts of the PRA required to produce the results used in the decision are performed consistently with the standard or peer review process as endorsed by the staff, or a discussion showing that the impact on the results of not meeting the standard or the criteria of the peer review process is not significant.
- A characterization of the assumptions and approximations that have a significant impact on the results used in the decision-making process of the specific application, including a discussion of the resolution of the peer review comments.

The industry responded by stating that *“Prior to implementation of the flexible AOT utilities will review the PSA high level [peer review] findings and other known modeling deficiencies that may significantly impact configuration risk assessment of the target component (HPSI) and remove the limitation, or provide appropriate guidance for addressing the limitation in risk assessments.”* These statement does not seem consistent with the proposed TS change in TSTF-424. The industry has requested staff approval for the proposed HPSI AOT/CT extensions for all CEQG plants (i.e., a license amendment). If this is correct, then it should be demonstrated that all CEQG plants have PRA quality which provide confidence that the results can be used in the decision-making process to extend HPSI-related AOTs/CTs without compromising safety. The staff understands that there may be considerable overlapping between the information requested in this RAI and RAI #3 (above). In the industry’s response to Question 8 of the staff’s acceptance review comments, it is also stated that *“The submittal will be modified to reflect that the PSA internal events review will be consistent with the intent of RG 1.200.....”* The staff needs clarification of this statement regarding the timing and content of the proposed modification of the TSTF-424 submittal.

6. The industry’s responses to Question 9 of “acceptance review” comments provides an outline of some general ideas of how to use qualitative and blended evaluations in the risk-informed decisionmaking process for flexible HPSI AOT/CT extensions. The staff views this information only as the first step in the development of a structured process that will be capable to allow, reliably and safely, AOT/CT extensions based on actual plant configurations. The staff expects this process to become an element of the generic RMTS guidance currently being developed. However, for the HPSI-specific application it could be possible to proceed without the benefit of the final generic structured process for incorporating qualitative and blended evaluations. This will be the case if it can be shown that all CEQG plants have PRA models (for internal events) which are of “adequate quality” for the application (as discussed in RAIs # 3 and 5 above) and at the same time perform bounding type analyses, such as those reported in Section 6.3.2.6 of the TSTF-424 submittal, to “capture” the impact of external events for which no detailed PRA models are available. Please discuss how the industry proposes to address the issue of using qualitative and blended evaluations in the risk-informed decisionmaking process for flexible HPSI AOT/CT extensions.

7. In Question 10 of “acceptance review” comments the staff states that the acceptability of incremental plant risks in Region II (per RG 1.174 guidelines) depends on several factors, such as the plant baseline risk from all sources (internal and external events at power and shutdown operation). This, according to the staff means that an annual increase in risk that falls in Region II is not acceptable for plants with high baseline risk (CDF of about 1E-4/yr or higher or LERF of about 1E-5/yr or higher). The industry did not address this issue in its response to Question 10 of the staff “acceptance review” comments. Please discuss.

Also, with reference to statements made in the industry’s response, please clarify the following:

1. Please discuss in more detail the statement provided in response to Question 10A: *“Acceptability of the flexible AOT will be tracked via recording entries (number, duration, configuration, estimated risk (or bounding color), reason for entry) into the extended AOT.”* How each of these factors will be taken into consideration and what are the acceptance criteria? How these factors and acceptance criteria provide adequate assurance that the plant risk will not creep up as a result of the proposed flexible AOTs/CTs? How will the concept of “bounding color” be integrated in the quantitative assessments? Also, please clarify the information provided in the long (third) insert in the response to Question 10A.
 2. Please explain the statement provided in response to Question 10B: “Where qualitative risks are large contributors to the risk, a bounding assessment will be required. Typically this can be considered by the expert panel by increasing the risk color” How would the risk color concept work? An example may be needed to clarify this concept.
 3. Please clarify the statement provided in response to Question 10C: *“The tracking of ICDPs (above zero maintenance) when the risk is less than 1E-6 for the entry configuration is not recommended. This is consistent with the maintenance rule designation for a normal configuration and special treatment is not needed. If the extended AOT has a total ICDP in excess of the maintenance rule normal condition, tracking should be performed. Process tracking of the number of entries and durations spent beyond the frontstop will be tracked for all entries and reviewed to ensure appropriate use of the flexible AOT.”* Why are the ICDPs above zero maintenance more conservative than ICDPs above average maintenance? Please explain how the ICDPs are calculated (list the assumptions about component unavailability due to maintenance at the beginning and the end of the outage). How is the term “ICDP for the entry configuration” defined? How is the term “total ICDP of the extended AOT” defined? What are the criteria for reviewing the number of entries and durations spent beyond the frontstop?
8. In Question 13 of “acceptance review” comments the staff requested clarification of the process and criteria that will be used to determine whether the completion time

extension is acceptable given the plant configuration following an emergent condition. The staff needs clarification of the following statements made in the industry's response:

1. The statement "*Note that the CEOG submittal involves a single train outage with no loss of function*" implies that no high risk configurations are likely. The staff notes that high risk configurations are possible when trains of systems other than HPSI (e.g. AFW and EDG) are also unavailable.
2. The statement "*operators are well trained to quickly identify high risk significant plant conditions*" appear to weaken the statement made elsewhere in the response that "*... potential high risk configurations will be determined a priori.*" Please confirm that the identification of potential high risk configurations will be a licensee commitment for the proposed flexible AOT/CT extension. As mentioned also in RAI #4, the identification of high risk configurations issue needs to be discussed in the revised topical report (e.g., will it be addressed generically at the topical report SE stage or on a plant-specific basis at a later stage?). Please discuss.
3. The statement "*...the flexible AOT is expected to work in conjunction with the exigent AOT extensions (CENPSD-1208)*" needs clarification. The staff notes that "exigent AOTs" have been based on average maintenance unavailability and not on actual plant configurations. Please discuss.
9. In Question 14 of "acceptance review" comments the staff requested clarification regarding contingency actions and compensatory measures that may be credited in risk assessments. Specifically, the staff requested clarification of the process for identifying "contingency actions and compensatory measures" and determining their acceptability for both planned and emergent conditions. The staff needs clarification of the following two statements included in the response: "*...the impact may be assessed using reasonable approximations and reviewed via a panel of experts*" and "*In finalizing the process, the process will include considerations for both planned and emergent work.*" Will there be any guidance to be used by the "panel of experts" in assessing the risk impact of contingency actions and compensatory measures credited in risk assessments? Will there be procedures and administrative controls for contingency actions and compensatory measures credited in risk assessments? Please discuss how the industry proposes to address this issue in the risk-informed decisionmaking process for flexible HPSI AOT/CT extensions.
10. Statements made in the cover letter and on page 1 of TSTF-424 Rev. 0 appear to conflict each other. In the cover letter from NEI it is stated: "*This report is intended to demonstrate typical risk results in order to facilitate discussion leading to risk assessment and management guidance. The purpose is to provide an example*" However, on page 1 of TSTF-424 Rev. 0 it is stated: "*This traveler is a request to amend NUREG 1432, Revision 2, Revised Standard Technical Specifications for Combustion Engineering Plants. The proposed change provides a risk-informed alternative to the existing restoration period for the High Pressure Safety Injection (HPSI) System, allowing this period to be extended from 72 hours up to 30 days.*" Please clarify these two statements. Is the industry requesting generic staff approval for the proposed HPSI AOT/CT extensions for all CEOG plants?

11. On page 3-1, second paragraph, it is stated that *“Initiative 4B, focuses on the change to selected TSs”* This statement is confusing because Initiative 4B proposes AOT/CT extensions for all systems? Please discuss.
12. On page 3-1, bottom of third paragraph, it is stated: *“Non-risk significant degradations athave lead to a forced shutdown (Reference 7) at one CE designed PWR and potential shutdowns at others.”* What are potential shutdowns? If only one forced shutdown has occurred which is associated with non-risk significant degradations of HPSI, one would argue that the proposed TS change may not be of much benefit. Please discuss.
13. On page 3-1, fourth paragraph, it is stated: *“The intend of the Backstop TS change is”* This terminology is confusing and non-consistent with terminology used throughout the report. Please clarify.
14. On page 3-1, fifth paragraph, it is stated: *“all CE plants are participating in this CEOG activity.”* However, no plant-specific risk assessments are reported for some plants (e.g., Calvert Cliffs). Please discuss and clarify.
15. The first two paragraphs on page 5-5 need clarification. In the first paragraph it is stated that the use of the installed spare as a replacement for one of the other two HPSI pumps allows extended pump maintenance to be performed without entering an LCO Action Statement. However, in the second paragraph it is stated that *“the spare HPSI pump cannot be used to replace the inoperable HPSI pump.”* Please clarify. Also, in the footnote on page 5-5 it is stated: *“Plants that must voluntarily enter the LCO Action Statement...”* How can an action be voluntary and required at the same time? Please explain.
16. On page 5-7, under Operability vs. Functionality, it is stated: *“For the HPSI system partial system inoperabilities include (but are not limited to) the following”* What other inoperabilities are there? Have they been analyzed, understood and modeled in the PRA? To ensure that HPSI inoperabilities are adequately modeled in the PRA, it is necessary to identify the complete set of inoperabilities for which flexible AOTs/CTs will be allowed. Please discuss.
17. On page 6-4 it is stated: *“For smaller LOCAs, PSA analyses using the realistic evaluation model (Reference 22) indicate that during the injection-mode core damage conditions may be avoided with HPSI flow rates less than minimum design basis requirements.”* What are the important results of reference 22? Have the staff reviewed the “realistic evaluation model” of reference 22? How the statement “core damage conditions may be avoided...” is modeled in the PRA?
18. On page 6-7 (last paragraph) it is stated: *“In order to go beyond the frontstop AOT, the allowable incremental risks will be associated with maintenance of the component beyond the frontstop AOT. Incremental CDPs beyond the frontstop AOT will be “targeted” in the range of 1.0E-06 and will be accompanied by compensatory actions, as appropriate.”* Please clarify the definition of “allowable incremental risks” and “incremental CDPs” appearing in the two sentences of the statement. Also, please

discuss how RG 1.174 guidance will be met when CDPs beyond the frontstop AOT are “targeted” in the range of 1.0E-06 and whether compensatory actions will be credited to meet guidance criteria.

19. Key PRA modeling assumptions of mini-flow operability requirements for the HPSI system at the various CEOG plants are listed in the third column of Table 6.3-1 (page 6-10). A brief discussion of these assumptions would help characterize their robustness and clarify their basis. For example, a brief discussion would help clarify the following assumptions:
 1. For Fort Calhoun it is stated: “*Failure of mini-flow will impact a break less than 5% of small LOCA spectrum.*” Which part of the spectrum? What does it mean in terms of accident sequence modeling? What is the basis for this statement?
 2. For ANO Unit-2 it is stated: “*Not modeled, impact neglected (Reference 16e).*” Is this assumption justified?
 3. For WSES Unit 3 it is stated: “*Unavailability of mini-flow assumes HPSI fails for LOCAs and SGTRs.*” Does this assumption include transient-induced LOCAs? What is the basis for this statement?
20. Table 6.3-2 (page 6-11) lists the assumed LOCA initiating event frequencies at the various CEOG plants. It appears that there is a large variability in the assumed LOCA frequencies among plants (over two orders of magnitude in some cases). This variability can drive the risk assessment results. It is important to understand the uncertainty associated with initiating event frequencies, and other parameters, that impact the results of the risk assessments. Please address the issue of uncertainties in assumptions that drive the risk assessment results.
21. Please provide a discussion, as necessary, explaining in more detail the HPSI LOCA success criteria at the various CEOG plants listed in Table 6.3-3 (page 6-12). For example, it is noted that HPSI hot leg injection is required for St Lucie Unit 2 but no exact criteria are mentioned. Are the HPSI LOCA success criteria assumed to be the same for all break sizes and locations? Please discuss the robustness of the assumed success criteria and the degree of conservatism of some assumptions (e.g., hot leg injection alignment time).
22. Terminology used in the discussion on incremental risk (page 6-13) appears confusing. For example terms, such as “incremental risk,” “incremental CDP value,” “incremental CDP beyond the frontstop,” and “ICDP associated with the maintenance,” are used almost interchangeably. When do each of these incremental risks begin to accumulate? What guidance applies to each of these incremental risks? Please clarify and revise accordingly to include consistent and precise terminology.
23. On page 6-13 it is stated: “*...the model utilizes a risk increment of 1.0E-06. This value is selected for illustration. Risks of this level are very small....*” Please explain why is this value selected for illustration purposes, only. What criteria will be used to determine how much is acceptable to go beyond the frontstop? When does this incremental risk begin to accumulate? If this incremental risk represents the incremental CDP beyond

the frontstop (i.e., counting from entry into the extended AOT/CT), as it appears from statements elsewhere in the text, then a risk increment of 1.0E-6 is not necessarily “very small.” Furthermore, this quantity should not be confused with the “configuration” or “maintenance” incremental risk which is used in the Maintenance Rule guidance. Please discuss and clarify accordingly.

24. On page 6-15 it is stated: *“This conditional CDF was assessed for PM only.For emergent repairsit is expected that the common cause failure probability would increase for a CM condition.”* Since CCFs are major contributors to risk, it would be very insightful to investigate how the time to reach the ICDP value of 1.0E-06 changes when an emergent condition is assumed in some of the example risk assessments provided in Section 6.3 of the topical report. This investigation would (1) demonstrate the plant’s capability to implement the Initiative 4b approach to conditions involving CM and (2) would provide insights that could be used in the development of guidance (i.e., would provide input to the RMTS guide). Please discuss.
25. On page 6-17 it is stated: *“For plants with rigidly aligned HPSI asymmetries (e.g., Four Calhoun), the single HPSI pump train was assumed failed, as the likelihood of two inoperable HPSI pumps on the other train was considered remote.”* Please explain what is meant by “rigidly aligned HPSI asymmetries” and the point this statement is making.
26. On page 6-17 it is stated: *“In general, the results confirm the conservative nature of the 3 day front stop AOT.”* Also, in the footnote it is stated: *“Note that a typical front stop AOT is generally related to a 5.0E-07 CDP, however the current HPSI AOTs are actually based on system reliability assessments (See Reference 24).”* Based on what criteria the results are conservative? Please explain how the statement in the footnote support the statement regarding the conservative nature of the results.
27. The discussion on HPSI train inoperability due to unavailability of HPSI auto start (page 6-18) does not clearly state how this failure is modeled in the PRA. More detailed explanation of what was done is needed. For example, it is stated that the “failure to start” basic event was set to “true” without stating how recovery was modeled for the various LOCA sizes. Also, the staff notes that this case is a clear example where PRA modeling assumptions (e.g., break frequencies and manual recovery probabilities) can drive the results. The staff believes that the understanding of important assumptions made in the pilot risk assessments, and their risk impact, is needed to ensure that appropriate guidance will be developed for implementing RMTS Initiative 4b. Please discuss.
28. The inoperability of one HPSI train, due to inability to operate in the emergency sump recirculation mode, is discussed on page 6-19. It is stated: *“This failure increases the likelihood of core damage events initiated by large and medium LOCAs.”* Please explain the basis for not considering the more frequent small LOCAs and transient-induced LOCAs (as is the case in the ongoing resolution of GSI-191 for PWRs).
29. The discussion on HPSI train inoperability, due to the unavailability of a mini-flow line (page 6-19), does not clearly state how this failure is modeled in the PRA for each of the CEOG plants. More detailed explanation of what was done is needed. It is stated that the risk analysis assumed that the mini-flow capability was disabled (e.g. closed mini-

flow valve). However, not enough information is presented on how the capability of the HPSI pump to perform its function was modeled. Several “generic” statements are made without providing adequate explanation about their applicability or basis. For example, it is stated: *“This time is sufficiently long so as to significantly limit the range of small LOCAs for which HPSI failure would occur.”* The staff finds that such statements do not provide adequate information to determine whether the unavailability of a HPSI mini-flow line was properly modeled in the risk assessments discussed in the CEOG topical report. The staff believes that the understanding of important modeling assumptions made in the pilot risk assessments is needed to develop appropriate guidance for implementing RMTS Initiative 4b. Please discuss.

30. The HPSI inoperability, due to degraded pump performance, is discussed on pages 6-19 and 6-20. It is stated that the assessments of degraded pump performance were performed using a Realistic LOCA Evaluation Model and that *“... analyses indicate that reductions in HPSI pump injection flows on the order of 80 percent full capacity will still avoid a core damage condition.”* How much confidence do we have in this “realistic” model? Please discuss.
31. The HPSI inoperability, due to failure of HPSI pump room cooling, is discussed on page 6-20. It is stated: *“... the loss **may** cause a failure of the associated HPSI pump(s) while operating in the recirculation mode”* and *“None of the plants requires HPSI pump cooling for successful HPSI performance while in the injection mode.”* What are the bases for these assumptions? How was this failure modeled in the PRA? Please discuss.
32. On page 6-25, third paragraph, it is stated that the results of the impact of simultaneous equipment inoperabilities in the presence of a low risk HPSI condition are presented in Figures 6.3-8 through 6.3-14. Please provide more detailed description of the assumed outages. For example, what is the concurrent maintenance for PVNGS (Figure 6.3-15) which shows maintenance conditions with train A and train B outage? Please clarify.
33. On page 6-25 (bottom) it is stated: *“In this particular example, while the change in risk is notable, the practical risk increment for the flexible AOT is negligible (See Figure 6.3-16). Similar conclusions may be drawn from the Fort Calhoun comparison (See Figure 6.3-8).”* It appears that there are inconsistencies between these two figures (which are related to Fort Calhoun). For example, Figure 6.3-8 shows that the time to reach ICDP of $1.0E-6$ when an SI line valve is inoperable, concurrently with the opposite EDG, is about one day. However, Figure 6.3-16 shows that this same time is almost 200 days! Also, Figure 6.3-16 shows that it takes more than 2,000 days of operation with one SI header valve and one motor-driven AFW pump out of service to reach an ICDP value of $1.0E-6$. Please explain these two Figures and revise accordingly.
34. The information provided in Table 6.3-5 (page 6-26) indicates that not all CEOG plants performed all risk assessments (actually Calvert Cliffs and Millstone 2 have not performed any). The missing risk assessments are needed if the industry is requesting staff approval for the proposed HPSI AOT/CT extensions for all CEOG plants. Please explain.

35. The contribution from fire risk is discussed on page 6-31. Table 6.3-6 reports results which show that the time to reach 1.0E-6 ICDP can be significantly shorter when fire risk is considered in some cases (e.g., SI injection and AFW pump). This does not seem to agree with the industry's conclusion that HPSI train OOS risk is not expected to impact fire-induced core damage results. Furthermore, the results of Table 6.3-6 are specific to Palo Verde Nuclear Generating Station (PVNGS), a plant that cannot use HPSI for feed and bleed (i.e., no PORVs). The fire risk impact for plants that take credit for HPSI to perform feed and bleed may be considerably higher. Also, it is stated: *".....availability of safe shutdown paths will.....obviate the need for HPSI mitigation during and following a fire."* This statement needs to be followed by licensee commitment to ensure the availability of safe shutdowns systems, such as EDGs and AFW, when a HPSI train is declared inoperable for maintenance. Please discuss.
36. Seismic risks are discussed on page 6-32. It is stated: *"For other initiators, provided safe shutdown paths are protected for any PWR, the presence or absence of the HPSI will not have a significant impact on plant risk."* This statement needs to be followed by licensee commitment to ensure the availability of safe shutdowns systems, such as EDGs and AFW, when a HPSI train is declared inoperable for maintenance. Please discuss.
37. Typical administrative actions that can be taken when a HPSI train is declared inoperable and the repair time is longer than the frontstop AOT/CT are discussed on page 6-36. The language used in describing these administrative actions does not imply a strong commitment that plants will develop and implement such controls. The staff believes that a commitment should be made to develop guidance for each of the four administrative control categories discussed on page 6-36 as part of the justification of the proposed flexible HPSI AOT/CT extensions. Please discuss.
38. On page 6-37, a brief comment on defense-in-depth is made. It is stated: *"Additional guidance to critically evaluate simultaneous outages of the AFW and HPSI trains further enhances defense-in-depth by ensuring the potential challenges to core cooling are adequately controlled."* This statement implies that guidance will be available to critically evaluate simultaneous outages of AFW and HPSI trains. However, no commitment has been made to require the development of such guidance. Please discuss.
39. On page 7-3 it is stated: *"As discussed previously, HPSI subsystem inoperabilities are expected to have a negligible impact on LERF. Therefore, LERF need only be assessed during periods of equipment inoperabilities that are important to LERF that may be OOS during the HPSI extended AOT/CT period."* The staff believes that guidance is required to ensure that the increase in LERF (when equipment important to LERF is out of service) is assessed and considered in the decisionmaking process when a HPSI AOT/CT extension is considered. Also, please comment on the adequacy of the PRA models the various CEQG plants will be using to calculate LERF increases. Will they be detailed assessments and/or bounding-type calculations?
40. On page 7-4 it is stated: *"Explicit risk management actions (e.g., Mode Change, including shutdown and compensatory measures).....may be developed and documented in advance for anticipated combinations of equipment with more significant risk impacts."* The staff expects that an explicit plant shutdown strategy based on clear

decision criteria should be developed as part of the RMTS Guide. Also, the RMTS Guide should require that each plant adopting flexible AOTs/CTs (Initiative 4b) identify anticipated combinations of equipment outages with significant risk impacts and develop appropriate risk management guidance. Please discuss.

41. On page 7-5 it is stated: *“Furthermore, flexibility to utilize longer AOTs/CTs can potentially avoid higher risk system outages which result from situations that drive the plant to complete more comprehensive maintenance activities to minimize system outage times and meet performance goals.”* Please clarify and provide example(s).
42. On page B-5 it is stated: *“Furthermore unlike the TS, the Maintenance Rule is silent on identification of plant conditions requiring plant shutdown.....This alternative establishes flexible AOTs controlled by the Maintenance Rule, and shutdown/mode change actions established from a risk assessment process.”* It is not clear in the report how the proposed process for shutting the plant down differs from the Maintenance Rule process. For example, on page B-7 it is stated: *“The risk assessment process will focus on the entire maintenance evolution and will utilize the quantitative action thresholds of Section 11.3.7.2 of Reference B8.”* These “action thresholds” do not provide a strategy and clear criteria for initiating a plant shutdown. Please explain how the proposed process is any different than the Maintenance Rule in identifying plant conditions that require plant shutdown.
43. On the bottom of page B-5 it is stated: *“However, it is envisioned that, once fully implemented, the maintenance related actions for non-TS SSCs will also follow the same risk assessment process.”* Please provide a more detailed discussion to clarify this statement regarding non-TS SSCs.
44. On page B-6 it is stated: *“....A quantitative/qualitative risk assessment will provide the basis for continued plant operation....”* Please explain how will a qualitative risk assessment be used to determine the AOT/CT extension intervals. Guidance, and/or requirements for guidance, is needed for the qualitative risk assessments. Also, statements, such as *“The timing of the plant shutdown will reflect plant cumulative risks, the likelihood of repair, and transition and shutdown considerations,”* are vague and does not provide a clear strategy and criteria for shutting the plant down. Please discuss.
45. On page B-8 it is stated that *“Planned maintenance beyond the frontstop AOT/CT should be infrequent.....”* Please explain what effective controls are proposed so that this statement will come true. For example, a requirement to base the flexible AOT/CT extension for planned maintenance on an ICDP value of 1.0E-6. Please discuss.
46. On page B-11, two *“initiative 4b enhancements”* are mentioned. The first is the *“identification of, and timely response to, emergent High Risk conditions.”* The second is the *“Implementation of a formal Risk Informed Decision Process for plant shutdown/mode change.”* The staff believes that these two “enhancements” need to be further developed, analyzed, characterized and explained and then used to identify criteria and requirements and to develop guidance (both generic and plant-specific) to implement initiative 4b. The same is true for the various ideas, considerations,

attributes, comments and suggestions discussed in Appendix B of the topical report. Please discuss.

47. The level of documentation required for an Initiative 4b risk assessment must be described; the documentation must be adequate for inspectors to verify the assumptions and results of the CE Pilot CRMP process.
48. CE-TSTF-424 (Table 6.3-3): Table 6.3-3 of WCAP-15773 lists the HPSI system LOCA success criteria in terms of number of the available HPSI systems and intact SI lines. Discuss the bases used to determine the success criteria and justify that they provide a sufficient HPSI capacity assumed in the LOCA analysis.
49. CE-TSTF-424: On page 1, Section 2, of the proposed change, it is stated that "...[c]ontingency action or compensatory actions or compensatory measures may be required to support the acceptable result of risk assessment." CE Owner Group should consider to add a matrix that lists the specific contingency measures and compensatory actions for extending AOT beyond the front stop for each system (such as HPSI) or components in appropriate documents with acceptable justification, and to provide them for the staff to review.