MODEL SAFETY EVALUATION FOR PLANT-SPECIFIC ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER TSTF-422, REVISION 2, "CHANGE IN TECHNICAL SPECIFICATIONS END STATES, (CE NPSD-1186)," FOR COMBUSTION ENGINEERING PRESSURIZED WATER REACTOR PLANTS USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

{NOTE: TSTF-422, Revision 1 (Agencywide Document Access and Management Systems (ADAMS) Accession Number ML021840500), used the approved Combustion Engineering (CE) Owners' Group (CEOG)Topical Report NPSD-1186, Revision 0, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs [Pressurized Water Reactors]" (ADAMS Accession Number ML003712022), to justify changing PWR Standard Technical Specifications (STS) (NUREG-1432). The ADAMS Accession Number for the NRC staff safety evaluation (SE) approving NPSD-1186 is ML011980047.}

{NOTE: Revision 2 of TSTF-422 (ADAMS Accession Number ML093570241) supersedes Revision 1 of TSTF-422 in its entirety. Revision 2 to the TSTF traveler modifies the TS Required Actions with a Note prohibiting the use of limiting condition for operation (LCO) 3.0.4.a when entering the preferred end state (Mode 3) on startup.}

{NOTE: The model license amendment request with model No Significant Hazards Consideration (NSHC) Determination and model SE for TSTF 422, Revision 2, in this Notice of Availability (NOA) supersede in their entirety the models for TSTF-422, Revision 1. The models for TSTF-422, Revision 1, were published in the *Federal Register* NOA on July 5, 2005 (70 FR 38729-38731, ADAMS Package Accession Number ML051650144).}

1.0 <u>INTRODUCTION</u>

By letter dated [DATE], [LICENSEE] (the licensee) proposed changes to the Technical Specifications (TS) for [PLANT]. The requested changes are the adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-422, Revision 2, "Change in Technical Specifications End States, (CE NPSD-1186)," to the pressurized water reactor (PWR) Standard Technical Specifications (STS) (NUREG-1432) dated December 22, 2009 (Reference 1). TSTF-422, Revision 2, incorporates the Combustion Engineering (CE) Owners' Group (CEOG) approved Topical Report (TR) NPSD-1186, Revision 0, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs," (Reference 2), into the PWR STS (the changes in TSTF-422 are made with respect to Revision 3 of the CE PWR STS NUREG).

TSTF-422 is one of the industry's initiatives developed under the Risk Management Technical Specifications (RMTS) program. These initiatives are intended to maintain or improve safety through the incorporation of risk assessment and management techniques in TS, while reducing unnecessary burden and making TS requirements consistent with the Commission's other risk-informed regulatory requirements, in particular the maintenance rule.

The regulation at Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, "Technical Specifications," states: "When a limiting condition for operation [LCO] of a nuclear reactor is not met, the licensee shall shut down the reactor or follow the remedial action permitted by the technical specification until the condition can be met." The STS and most plant TS provide a completion time (CT) for the plant to meet the LCO. If the LCO or the remedial action cannot be met, then the reactor is required to be shut down. When the STS and individual plant TSs were written, the shutdown condition or end state specified was usually cold shutdown.

TR CE NPSD-1186 provides the technical basis to change certain required end states when the TS CTs for remaining in power operation are exceeded. Most of the requested TS changes are to permit an end state of hot shutdown (Mode 4) rather than an end state of cold shutdown (Mode 5) contained in the current TS. The request was limited to: (1) those end states where entry into the shutdown mode is for a short interval, (2) entry is initiated by inoperability of a single train of equipment or a restriction on a plant operational parameter, unless otherwise stated in the applicable TS, and (3) the primary purpose is to correct the initiating condition and return to power operation as soon as is practical.

The TS for CE plants define six operational modes. In general, they are:

- Mode 1 - Power Operation
- Mode 2 - Reactor Startup
- Mode 3 - Hot Standby: Reactor coolant system (RCS) temperature above ~300° F (TS-specific) and RCS pressure that can range up to power operation pressure. Shutdown cooling (SDC) systems can sometimes be operated in the lower range of Mode 3 temperature and pressure.
- Mode 4 - Hot Shutdown: RCS temperature can range from the lower value of Mode 3 to the upper value of Mode 5. Pressure is generally (but not always) low enough for SDC system operation.
- Mode 5 - Cold Shutdown: RCS temperature is below 200° F and RCS pressure is consistent with operation of the SDC system.
- Mode 6 - Refueling: Operation is in Mode 6 if one or more reactor vessel head bolts have been de-tensioned. RCS temperature is below 200° F and RCS pressure is generally equal to containment pressure.

Criticality is not allowed in Modes 3 through 6, inclusive.

TSTF-422 generally allows a Mode 4 end state rather than a Mode 5 end state for selected initiating conditions in order to perform short-duration repairs which necessitate exiting the original Mode of operation. Short duration repairs are on the order of 2-to-3 days, but not more than a week.

2.0 REGULATORY EVALUATION

In 10 CFR 50.36, the Commission established its regulatory requirements related to the content of TS. Pursuant to 10 CFR 50.36(c), TS are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls. The rule does not specify the particular requirements to be included in a plant’s TS. As stated in 10 CFR 50.36(c)(2)(i), the “Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications.”

CE NPSD-1186 (Reference 2) states: "preventing plant challenges during shutdown conditions has been, and continues to be, an important aspect of ensuring safe operation of the plant. Past events demonstrate that risk of core damage associated with entry into, and operation in, shutdown cooling is not negligible and should be considered when a plant is required to shutdown. Therefore, the TS should encourage plant operation in the steam generator heat removal mode whenever practical, and require SDC entry only when it is a risk beneficial alternative to other actions."

Most of today's TS and the design basis analyses were developed under the perception that putting a plant in cold shutdown would result in the safest condition and the design basis analyses would bound credible shutdown accidents. In the late 1980s and early 1990s, the NRC and licensees recognized that this perception was incorrect and took corrective actions to improve shutdown operation. At the same time, STS were developed and many licensees improved their TS. Since enactment of a shutdown rule was expected, almost all TS changes involving power operation, including a revised end state requirement, were postponed (see, for example the Final Policy Statement on TS Improvements). However, in the mid-1990s, the Commission decided a shutdown rule was not necessary in light of industry improvements.

Controlling shutdown risk encompasses control of conditions that can cause potential initiating events and responses to those initiating events that do occur. Initiating events are a function of equipment malfunctions and human error. Responses to events are a function of plant sensitivity, ongoing activities, human error, defense-in-depth, and additional equipment malfunctions.

In practice, the risk during shutdown operations is often addressed via voluntary actions and application of 10 CFR 50.65, the maintenance rule. The regulation at 10 CFR 50.65(a)(4) states: "Before performing maintenance activities ... the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. The scope of the assessment may be limited to structures, systems, and components that a risk-informed evaluation process has shown to be significant to public health and safety." Regulatory Guide (RG) 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants" (Reference 3), provides guidance on implementing the provisions of 10 CFR 50.65(a)(4) by endorsing the revised Section 11 (published separately) to NUMARC 93-01, Revision 2. The revised Section 11 of NUMARC 93-01, Revision 2, was subsequently incorporated into Revision 3 of NUMARC 93-01 (Reference 4). However, Revision 3 has not yet been formally endorsed by the NRC. The changes in TSTF-422 are consistent with the rules, regulations, and associated regulatory guidance, as noted above.

3.0 TECHNICAL EVALUATION

The changes proposed in TSTF-422 are consistent with the changes proposed and justified in CE NPSD-1186 (Reference 2), and approved by the associated NRC safety evaluation (SE) (Reference 5). The evaluation included in Reference 5, as appropriate and applicable to the changes of TSTF-422 (Reference 1), is reiterated here and differences from the SE are justified. In its application, the licensee commits to WCAP-16364-NP, Revision 2, "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)" (Reference 6), which addresses a variety of issues such as considerations and compensatory actions for risk significant plant configurations. An overview of the generic evaluation and associated risk assessment is provided below, along with a summary of the associated TS changes justified by Reference 2.

3.1 Risk Assessment

The objective of the risk assessment in CE NPSD-1186 was to show that the risk changes due to changes in TS end states are either negative (i.e., a net decrease in risk) or neutral (i.e., no risk change).

CE NPSD-1186 documents a risk-informed analysis of the proposed TS changes. Probabilistic risk analysis (PRA) results and insights are used, in combination with results of deterministic assessments, to identify and propose changes in end states for all CE plants. This is consistent with guidance provided in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (Reference 7), and RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" (Reference 8). The three-tiered approach documented in RG 1.177 was followed. The first tier includes the assessment of the risk impact of the proposed change for comparison to acceptance guidelines consistent with the Commission's Safety Goal Policy Statement (RG 1.174). In addition, the first tier aims at ensuring that there are no time intervals associated with the implementation of the proposed TS end state changes during which there is an increase in the probability of core damage or large early release with respect to the current end states. The second tier addresses the need to preclude potentially high-risk configurations which could result if equipment is taken out of service during implementation of the proposed TS change. The third tier addresses the application of 10 CFR 50.65(a)(4) for identifying risk-significant configurations resulting from maintenance or other operational activities and taking appropriate compensatory measures to avoid such configurations. The scope of CE NPSD-1186 and the associated NRC staff SE were limited to identifying changes in end state conditions that excluded continued power operation as an acceptable end state, regardless of the risk. CEOG's risk assessment approach was found comprehensive and acceptable. In addition, the analyses show that the criteria of the three-tiered approach for allowing TS changes are met as explained below:

- Risk Impact of the Proposed Change (Tier 1): The risk changes associated with the proposed TS changes, in terms of mean yearly increases in core damage frequency (CDF) and large early release frequency (LERF), are risk neutral or risk beneficial. In addition, there are no time intervals associated with the implementation of the proposed TS end state changes during which there is an increase in the probability of core damage or large early release with respect to the current end states.
- Avoidance of Risk-Significant Configurations (Tier 2): The need for some restrictions and enhanced guidance was determined by the specific TS assessments, documented in WCAP-16364-NP, Revision 2 (Reference 6). These restrictions and guidance are intended to (1) preclude preventive maintenance and operational activities on risk-significant equipment combinations, and (2) identify actions to exit expeditiously a risk-significant configuration should it occur. The licensees are expected to commit to following the implementation guidance in Reference 6. The NRC staff finds that the

proposed restrictions and guidance are adequate for preventing risk-significant plant configurations.

- Configuration Risk Management (Tier 3): These are programs in place to comply with 10 CFR 50.65(a)(4) to assess and manage the risk from proposed maintenance activities. These programs can support licensee decisionmaking regarding the appropriate actions to control risk whenever a risk-informed TS is entered.

3.2 Assessment of TS Changes

The changes proposed in TSTF-422 are consistent with the changes proposed in TR CE NPSD-1186 and approved by the NRC SE (Reference 5). Only those changes proposed in TSTF-422 are addressed in this SE. The SE information and justifications are not duplicated in this document. The SE and associated topical report address the entire fleet of CE plants, and the plants adopting TSTF-422 must confirm the applicability of the changes to their plant. TSTF-422, Revision 2, modifies each Required Action by a Note stating, “LCO 3.0.4.a is not applicable when entering MODE 4.” This specific note applies to the proposed changes. Adding this Note into plant-specific TS requirements provides assurance that an inappropriate entry into Mode 4 utilizing the provisions of LCO 3.0.4.a during startup is not made. Following are the proposed changes, including a synopsis of the STS LCO, the change, and a brief conclusion of acceptability.

3.2.1 TS 3.5.4 - Refueling Water Storage Tank (RWST)

The RWST is a source of borated water for the emergency core cooling system (ECCS).

LCO: The RWST shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: When the RWST is inoperable in Modes 1, 2, 3, and 4 due to boron concentration not being within limits and not corrected within 8 hours.

Proposed Modification for End State Required Actions: Modify action statement to allow for Mode 3 or Mode 4 end state when boron concentration is outside of the operating band for a period greater than 8 hours and create a new action (e.g., 3.5.4 D.2) to maintain the current end state for other inoperabilities than boron concentration out of limits.

Assessment: The requested change is unlikely to have a significant impact on safety because deviations are likely to be small. Most of the need for a large volume of water from the RWST in Mode 3 is due to low probability events such as loss-of-coolant-accident (LOCA), and avoiding equipment transitions associated with some mode changes, and thereby avoiding risk associated with those changes.

3.2.2 TS 3.3.6 - Engineered Safety Feature (ESF) Actuation System (ESFAS) Logic and Manual Trip - (Digital)

The ESFAS provides an automatic actuation of the ESFs which are required for accident mitigation. A set of two manual trip circuits is also provided, which uses the actuation logic and initiation logic circuits to perform the trip function.

LCO: Six channels of ESFAS matrix logic, four channels of ESFAS initiation logic, two channels of actuation logic and two channels of manual trip shall be operable for the safety injection (SI) actuation signal (SIAS), containment isolation actuation signal (CIAS), containment cooling actuation signal (CCAS), recirculation actuation signal (RAS), containment spray actuation signal (CSAS), main steam isolation signal, and emergency feedwater actuation system EFAS-1 and EFAS-2. The LCO is applicable in Modes 1, 2, and 3 for all functions for all components and in Mode 4 for initiation logic, actuation logic, and manual trip for SIAS, CIAS, CCAS, and RAS. (The specific applicability of CCAS or equivalent systems (e.g., CSAS) may vary among utilities.)

Condition Requiring Entry into End State: Condition F of the TS is entered when:

1. One manual trip circuit, initiating logic circuit, or actuation logic circuit is inoperable for RAS, SIAS, CIAS, or CCAS, for more than 48 hours (Conditions A, B & D), or,
2. Two initiating logic circuits in the same trip leg for RAS, SIAS, CIAS, or CCAS are inoperable for more than 48 hours (Condition C).

Proposed Modification for End State Required Actions: Modify the Mode 5 end state required action to allow component repair in Mode 4 of all functions of the CCAS and RAS initiation/logic function of the SIAS and CIAS. Entry into Mode 4 is proposed at 12 hours. No change was requested for TS 3.5.3, ECCS-shutdown.

Assessment: The primary objective of the ESFAS logic and manual trip in Mode 4 is to provide a SIAS to the operable high pressure SI (HPSI) train and CIAS to ensure containment isolation. For TS 3.5.3, ECCS-Shutdown, to be met, the manual trip and actuation logic associated with that train of HPSI must be available in Mode 4. No other Mode 4 restrictions are required. By including the actuation logic in Mode 4, the effort in establishing HPSI following a LOCA or other inventory loss event is minimized. Similarly, by requiring one CIAS manual trip and actuation relay group to be operable, the plant operating staff does not have to operate every containment penetration manually following an event that may lead to radiation releases to the containment.

In general, the CCAS is used to automatically actuate the containment heat removal systems (containment recirculation fan coolers) to prevent containment overpressurization during a range of accidents which release inventory to the containment, including large break LOCAs, small break LOCAs, or main steam line breaks or feedwater line breaks inside containment. This signal is typically actuated by high containment pressure. Based on the lower stored energy in the RCS and lesser core heat generation, short term containment pressure following a LOCA or main steam line break would be less than the current design containment strength. Ample instrumentation is available to the operator to diagnose the onset of the event and to take appropriate mitigating actions (actuation of the containment fan coolers and/or sprays) prior to a potential containment threat.

Following a LOCA, the RAS is used to automatically perform the switchover from the SI mode of heat removal to the sump recirculation mode of heat removal. RAS times in Mode 4 are expected to be longer than those associated with Mode 1 and available instrumentation is sufficient to alert the operator to the need for switchover.

Since the SIAS and CIAS signals perform numerous actions, manual trip and actuation for these signals should be retained in Mode 4. In particular, the operability of a single train of HPSI is required in Mode 4. Therefore, the associated actuation circuit and manual trip circuit for SIAS should be maintained available so that automatic lineup of HPSI can be established following a LOCA. Both isolation valves in the appropriate containment penetrations are required to be operable during Mode 4. However, the large number of actions required to isolate these penetrations, given an event, indicates that an extended unavailability of CIAS is not desired. We conclude from a comparison of plant conditions, event response, and risk characteristics, including the discussions of Sections 3 and 4 of Reference 6, that there is no net benefit from requiring a Mode 5 end state as opposed to a Mode 4 end state.

3.2.3 TS 3.3.8 - (Digital) Containment Purge Isolation Signal (CPIS)

The CPIS provides automatic or manual isolation of any open containment purge valves upon indication of high containment airborne radiation.

LCO: One CPIS channel shall be operable in Modes 1, 2, 3, and 4, during core alterations, and during movement of irradiated fuel assemblies within containment.

Condition Requiring Entry into End State: CPIS (manual trip actuation logic), or one or more required channels of radiation monitors is inoperable and the required actions associated with the TS allowed outage time (AOT) or CT have not been met.

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action to allow component repair in Mode 4. Entry time into Mode 4 is proposed at 12 hours.

Assessment: TS for Modes 1 through 4 allow plant operation with the containment mini-purge valves open. Following an accident, unavailability of the CPIS in Mode 4 would prevent automatic containment purge isolation. Without automatic isolation, the operator must manually isolate the containment purge. Since Mode 4 core damage events will evolve more slowly than similar events at Mode 1, the operator has adequate time and plant indications to identify and respond to an emergent core damage event and secure the containment purge.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 6, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on steam generator (SG) heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

The CEOG recommended and provided implementation guidance stating that, when the CPIS is disabled, the operating staff should be alerted and operation of the containment mini-purge should be restricted. It further recommended consideration should be given to maintaining availability of CIAS during the CPIS Mode 4 repair. The NRC staff endorses these recommendations. In addition, the licensee has committed to the implementation guidance contained in Reference 6.

3.2.4 TS 3.3.8 (Analog) and TS 3.3.9 - (Digital), Control Room Isolation Signal (CRIS)

The CRIS initiates actuation of the emergency radiation protection system and terminates the normal supply of outside air to the control room to minimize operator radiation exposure.

LCO: One channel of CRIS shall be operable. The channel consists of manual trip, actuation logic, and radiation monitors for iodine/particulates and gases.

Condition Requiring Entry into End State: Both channels of CRIS are inoperable (and one control room emergency air cleanup system train is not realigned to the emergency mode within one hour). A channel consists of actuation logic, manual trip, and particulate/iodine and gaseous radiation monitors.

Proposed Modification for End State Required Actions: It is proposed that the existing TS be modified to change the Mode 5 end state required action to allow component repair in Mode 4. Entry time into Mode 4 is 12 hours.

Assessment: The CRIS includes two independent, redundant subsystems, including actuation trains. Control room isolation also occurs on a SIAS. The CRIS functions must be operable in Modes 1, 2, 3, and 4 [5, 6], [during core alterations], and during movement of irradiated fuel assemblies to ensure a habitable environment for the control room operators.

This system responds to radiation releases from fuel. Adequate in-plant radiation sensors (for example, containment high area radiation monitors (CHARMs)) are available to identify the need for control room isolation or shield building filtration (if appropriate). In Mode 4, the transient will unfold more slowly than at power. Therefore sufficient time exists for the operator to take manual action to realign the control room emergency air cleanup system (CREACUS).

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

The CEOG recommended and provided implementation guidance stating that it would be prudent to minimize unavailability of SIAS and alternate shutdown panel and/or remote shutdown capabilities during Mode 4 operation with CRIS unavailable. The NRC staff agrees. In addition, the licensee has committed to the implementation guidance contained in Reference 6.

3.2.5 TS 3.3.9 - (Analog) Chemical Volume Control Isolation Signal

The chemical volume control system (CVCS) isolation signal provides protection from radioactive contamination, as well as personnel and equipment protection in the event of a letdown line rupture outside containment.

LCO: Four channels of west penetration room/letdown heat exchanger room pressure sensing and two actuation logic channels shall be operable.

Condition Requiring Entry into End State: The Mode 5 end state entry (Condition D) is required when:

1. One actuation logic channel is inoperable, or
2. One CVCS isolation instrument channel is inoperable for a time period in excess of the plant AOT/CT (48 hours).

Proposed Modification for End State Required Actions: Modify Condition D of TS to accommodate a Mode 4 end state when the required actions are not completed in the specified time.

Assessment: Transition to lower temperature states requires the CVCS. Thus, by the time the plant is placed in Mode 4, the system should have successfully operated to borate the RCS. The CEOG stated that, consequently, there is adequate time to identify the need for CVCS isolation and for the operator to terminate letdown and secure charging.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.6 TS 3.3.10 (Analog) - Shield Building Filtration Actuation Signal (SBFAS)

The SBFAS is required to ensure filtration of the air space between the containment and shield building during a LOCA.

LCO: Two channels of SBFAS automatic and two channels of manual trip shall be operable.

Condition Requiring Entry into End State: Shutdown Condition B of TS 3.3.10 requires transition to Mode 5. This required action is to be taken when one Manual Trip or Actuation Logic channel is inoperable for a time period exceeding the TS AOT/CT (48 hours).

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action to allow component repair in Mode 4.

Assessment: With one SBFAS channel inoperable, the system may still provide its function via its redundant channel. These systems provide post-accident radiation protection to on-site staff and/or the public. Since these systems respond to radiation releases from fuel, adequate in-plant radiation sensors (such as CHARMs) are available to identify the need for control room isolation or shield building filtration (if appropriate).

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.7 TS 3.4.6 - RCS Loops – Mode 4

An RCS loop consists of a hot leg, SG, crossover pipe between the SG and reactor coolant pump (RCP), the RCP, and a cold leg. The operational meaning with respect to this TS is that water flows from the reactor vessel into a hot leg, either into a SG or a SDC system where it is cooled, and is returned to the reactor vessel via one or more cold legs. The flow rate must be sufficient to both cool the core and to ensure good boron mixing.

LCO: Two loops or trains consisting of any combination of RCS loops and SDC trains shall be operable and at least one loop or train shall be in operation while in Mode 4.

Condition Requiring Entry into End State: Condition B of the STS Revision 1 requires that with one required SDC train inoperable and two required RCS loops inoperable for 24 hours, the plant be maneuvered into Mode 5. Required Action A.2 of STS Revisions 2 and 3 require proceeding to Mode 5 within 24 hours with a required loop inoperable and a SDC loop operable (the STS Revision 1, 2 and 3 situations and results are similar, yet worded differently). The short CT and the low-temperature end state reflect the importance of maintaining these paths for heat removal.

Proposed Modification for End State Required Actions: When RCS loops are unavailable with the inoperability of one train of SDC, but at least one SG heat removal path can be established, modify the TS to change the end state from Mode 5 to Mode 4 with RCS heat removal accomplished via the SGs.

Assessment: This TS requires that two loops or trains consisting of any combination of RCS cooling loops or SDC trains shall be operable and at least one loop or train shall be in operation to provide forced flow in the RCS for decay heat removal and to mix boron. LCO action 3.4.6 addresses the condition when the two SDC trains are inoperable. In that condition, the STS recognizes that Mode 5 SDC operation is not possible and continued Mode 4 operation is allowed until the condition may be exited. Condition B of STS Revision 2 and Required Action A.2 of STS Revision 3 are concerned with the unavailability of forced circulation in two RCS loops and the inoperability of one train of SDC. Upon failure to satisfy the LCO, the current STS drives the plant to Mode 5.

The requested change reflects the risk of Mode 5 operation with one SDC system train inoperable and two RCS loops not in operation. The change will allow heat removal to be achieved in Mode 4 using either SDC or, if available, the SGs with RCS/core heat removal driven by natural convection flows. Reactivity concerns are addressed by requiring natural circulation prior to RCP restart. Furthermore, as already noted in the STS Bases, if unavailability of RCS loops is due to single SDC train unavailability, staying in a state with minimal reliance on SDC is preferred (Mode 4) due to the diversity in RCS heat removal modes during Mode 4 operation.

3.2.8 TS 3.6.2 - Containment Air Locks

Containment air locks provide a controlled personnel passage between outside and inside the containment building with two doors/door-seals in series with a small compartment between the doors. When operable, only one door can be opened at a time, thus providing a continuous containment building pressure boundary. The two doors provide redundant closures.

LCO: [Two] containment air lock[s] shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: Entry into a Mode 5 end state is required when:

1. One or more containment air locks with one containment air lock door inoperable or,
2. One or more containment air locks with containment air lock interlock mechanism inoperable, or
3. One or more containment air locks inoperable for other reasons, and
4. The required action not completed within the specified AOT/CT.

Proposed Modification for End State Required Actions: Modify TS to accommodate Mode 4 end state within the Condition D required Action to shutdown. Mode 4 entry is proposed within 12 hours of expiration of the specified AOT/CT for the conditions that require entry into Mode 4.

Assessment: The TS requirements apply to Modes 1, 2, 3, and 4. Containment air locks are not required in Mode 5. The requirements for the containment air locks during Mode 6 are addressed in LCO 3.9.3, "Containment Penetrations."

Operability of the containment air locks is defined to ensure that leakage rates (defined in TS 3.6.1) will not exceed permissible values. These TS are entered when containment leakage is within limits, but some portion of the containment isolation function is impaired. The issue of concern is the appropriate action/end state for extended repair of an inoperable air lock where air lock doors are not functional. Changes to the TS are only requested for conditions when containment leakage is not expected to exceed that allowed in TS 3.6.1. For example, this means that the containment air locks must still be functional under expected conditions during Mode 4 operation.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.9 TS 3.6.3 - Containment Isolation Valves (CIVs)

For systems that communicate with the containment atmosphere, two redundant isolation valves are provided for each line that penetrates containment. For systems that do not communicate with the containment atmosphere, at least one isolation valve is provided for each line.

LCO: Each CIV shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: A required action to maneuver the plant into Mode 5 (Condition F) will occur when one or more penetration flow paths exist with one or more CIVs inoperable [except for purge valve leakage and shield building bypass leakage not within limit] and the affected penetration flow path cannot be isolated within the prescribed AOT/CT.

Proposed Modification for End State Required Actions: Modify TS to accommodate a Mode 4 end state (within 12 hours) for any penetration having one CIV inoperable.

Assessment: Operability of the CIVs ensures that leakage rates will not exceed permissible values. This LCO is entered when containment leakage is within limits but some portion of the containment isolation function is impaired (e.g., one valve in a two valve path inoperable or containment purge valves have leakage in excess of TS limits). The issue of concern in this TS is the appropriate action/end state for extended repair of an inoperable CIV when one CIV in a single line is inoperable.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.10 TS 3.6.4 - Containment Pressure

LCO: Containment pressure shall be controlled within limits during Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: A Mode 5 end state transition is required to be initiated (Condition B) when the containment pressure is not within limits and the condition is not corrected within one hour.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state when the required actions are not completed in the specified time. Mode 4 entry is proposed at 12 hours.

Assessment: The upper limit on containment pressure in this LCO results from a containment designed to respond to Mode 1 design-basis accidents while remaining well within the structural material elastic response capabilities. This effectively maintains the containment design pressure about a factor of two or more below the minimum containment failure pressure. Consequently, small containment pressure challenges at the design-basis pressure have a negligible potential of threatening containment integrity.

The vacuum lower limit on containment pressure is typically set by the plant design basis and ensures the ability of the containment to withstand an inadvertent actuation of the containment spray (CS) system. The lower limit is of particular concern to plants with steel shell containment designs – plants with steel containment control the impact of CS actuation via use of vacuum breakers. Therefore, for plants with steel shell containments, if the lower limit pressure specification is violated, the operators are to confirm operability of the vacuum breakers. For all plants, when entering this action statement for violation of low containment pressure limit for a period projected to exceed one day, one CS pump is to be secured. The licensee commits to an implementation guide in which these actions will be prescribed.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.11 TS 3.6.5 - Containment Air Temperature

LCO: Containment average air temperature shall be ≤ 120° F in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: Condition B of this TS requires a Mode 5 shutdown when containment temperature is not within limits and is not corrected within the specified AOT/CT.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state with a 12-hour entry time.

Assessment: The upper limit on containment temperature is based on Mode 1 design-basis analyses for containment structures and equipment qualification. The Mode 4 energy release is less than the maximum that could occur in Mode 1 and, consequently, initial Mode 4 post-accident containment temperature will be below the containment temperature limit employed in the plant design basis. Thus, temporary operation outside the bounds of the LCO would not be expected to challenge containment integrity.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.12 TS 3.6.6 - Containment Cooling Systems

The containment building is typically provided with CS and containment cooling trains to control containment conditions following accidents that cause containment pressure or temperature upsets.

LCO: Two CS trains and two containment cooling trains shall be operable in Modes 1, 2, [and] [3 and 4]. The time required for Mode 5 entry varies from 30 to 36 hours for one component of the containment cooling system out of service. {NOTE: For SONGS Units 2 and 3, unavailability of one or more CS train(s) will require the plant to transition to Mode 4 in 84 hours.}

Condition Requiring Entry into End State: Condition B requires Mode 5 entry when the affected train is not returned to service within the TS AOT/CT. {NOTE: For SONGS 2 and 3 only, Conditions 3.6.6.1 B and 3.6.6.1 F require Mode 4 entry within 84 hours.}

<u>Proposed Modification for End State Required Actions</u>: Modify Condition B and F of TS to accommodate a Mode 4 end state. Entry time requirements are as follows:

Inoperability	Required Actions
CS one train	Mode 4 – 84 hrs
Containment Coolers two trains	Mode 4 – 36 hrs

<u>Assessment</u>: Containment cooling is required to ensure long term containment integrity. Containment cooling TSs include LCO 3.6.6 - CS and cooling systems, LCO 3.6.6A - credit taken for iodine removal by CS, and LCO 3.6.6B - credit not taken for iodine removal by containment spray.

The design basis of the CS and cooling systems varies among the CEOG units. Most CEOG plants credit the CS and cooling systems for containment pressure and temperature control and one of the two systems for radioiodine removal. In these plants, typically, one train of CS is sufficient to effect radioiodine control and one train of CS and one train of fan coolers is sufficient to effect containment pressure and temperature control. {NOTE: The Palo Verde units are designed with only the CS system (containing full capacity redundant CS pumps) which it credits for both functions.}

Design and operational limits (and consequently the TSs) are established based on Mode 1 analyses. Traditionally, these analyses and limits are applied to Modes 2, 3, and 4. Mode 1 analyses bound the other modes and confirm the adequacy of the containment cooling system to control containment pressure and temperature following limiting containment pipe breaks occurring at any mode. However, the resulting TS requirements generally become increasingly conservative as the lower temperature shutdown modes are traversed. {NOTE: Plants that do not require containment cooling in Mode 4 include St. Lucie Units 1 and 2 and Palo Verde Units 1, 2, and 3. SONGS Units 2 and 3, ANO 2, in addition to St. Lucie Units 1 and 2 do not require sprays to be operable in Mode 4.}

Inability to complete the repair of a single train of cooling equipment in the allotted AOT/CT presently requires transition to Mode 5. This end state transition was based on the expectation of low Mode 5 risks when compared to alternate operating states. As discussed in Sections 3 and 4 of Reference 5, Mode 4 is a robust operating mode when compared to Mode 5.

Furthermore, when considering potential Mode 4 containment challenge, the low stored energy and decay heat of the RCS (after 36 or 84 hours) support the proposed use of the containment cooling and radionuclide removal capability. Based on representative plant analyses performed in support of PRA containment success criteria, containment protection may be established via use of a single fan cooler. Qualitatively, a similar conclusion could be drawn for one train of CS. Consequently, in Mode 4, one train of containment coolers or one train of CS should provide adequate heat removal capability. Furthermore, for plants that credit CS for iodine removal, accidents initiated in Mode 4 should be adequately mitigated via one operable spray pump. Therefore, 84 hours requested to transition to Mode 4 with one CS train inoperable allows additional time to restore the inoperable CS train and is reasonable when considering the relatively low driving force for a release of radioactive material from the RCS. Further, the CEOG states that the requested 36 hours to transition to Mode 4 with both trains of containment cooling inoperable is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. It also recognizes that at least one train of CS is available as a backup system.

3.2.13 TS 3.6.11 - Shield Building

The shield building is a concrete structure that surrounds the primary containment in some PWRs. Between the primary containment and the shield building inner wall is an annular space that collects containment leakage that may occur following an accident. Following a LOCA, the shield building exhaust air cleanup system establishes a negative pressure in the annulus between the shield building and the steel containment vessel. Filters in the system then control the release of radioactive contaminants to the environment.

LCO: In Modes 1, 2, 3, and 4, Condition A provides 24 hours to restore shield building operability. If the shield building cannot be restored to operable status within the required completion time, the plant must be brought to Mode 5 within 36 hours.

Condition Requiring Entry into End State: A Mode 5 end state, in Condition B, is required to be initiated when the shield building is inoperable for more than 24 hours.

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action to allow component repair in Mode 4 with a 12 hour Mode 4 entry requirement.

Assessment: The LCO considers the limited leakage design of the containment and the probability of an accident occurring during the transition from Mode 1 to Mode 5. The purpose of maintaining shield building operability is to ensure that the release of radioactive material from the primary containment atmosphere is restricted to those leakage paths and associated leakage rates assumed in the accident analysis.

Shield building “leakage” at or near containment design basis levels is not explicitly modeled in the PRA. The PRA implicitly assumes that containment gross integrity must be available. In the Level 2 model, containment leakage is not considered to contribute to large early release even without a shield building. Were accidents to occur in Mode 4, resulting initial containment pressures would be less than the design basis analysis conditions and the shield building would be available to further limit releases. When Condition A of this TS can no longer be met, the plant must be shut down and transitioned to Mode 5.

Inoperability of the shield building during Mode 4 implies leakage rates in excess of permissible values. Containment conditions following a LOCA in Mode 4 may result in containment pressures somewhat higher than in Mode 5, but since containment leakage is controlled via TS 3.6.1, and no major leak paths should be unisolable, there should be no contribution to an increased LERF.

The requirements stated in the LCO define the performance of the shield building as a fission product barrier. In addition, this TS places restrictions on containment air locks and containment isolation valves. The integrated effect of these TS is intended to ensure that containment leakage is controlled to meet 10 CFR Part 100 limits following a maximum hypothetical event initiated from full power.

Accidents initiated from Mode 4 are initially less challenging to the containment than those initiating from Mode 1. Furthermore, by having the plant in a shutdown condition in advance, fission product releases should be reduced. Thus, while leakage restrictions should be maintained in Mode 4, a condition in excess of that allowed in Mode 1, is anticipated to meet overall release requirements and therefore, Mode 4 should be allowed to effect repair of the leak and then return the plant to power operation.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.14 TS 3.7.7 – Component Cooling Water (CCW) System

{NOTE: Terminology for cooling water systems varies between the CEOG plants. This discussion is based on the SONGS 2 and 3 designation of the service water cooling (SWC) system.}

The CCW system provides cooling to critical components in the RCS and also provides heat removal capability for various plant safety systems, both at power and on SDC.

LCO: Two CCW trains shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: One CCW train inoperable and not returned in Condition A to service in TS AOT/CT, 72 hours.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state with a 12 hour entry requirement, rather than a Mode 5 end state.

Assessment: The appropriate actions to be taken in the event of inoperabilities of the CCW system depend on the particular system function being compromised and the existence of backup water supplies.

In the event of a design basis accident, one train of CCW is required to provide the minimum heat removal capability assumed in the safety analysis for systems to which it supplies cooling water. The CCW system provides heat removal capability to the containment fan coolers, CS, and SDC. In addition, CCW provides cooling to the reactor coolant pumps. Other safety components may be cooled via CCW component flow paths. From an end state perspective, upon loss of part of the CCW, the plant should normally transition to a state where reliance on the CCW system is least significant. {NOTE: For San Onofre Units 2 and 3, loss of one CCW train will degrade the plant's capability to remove heat via the affected SDC heat exchanger. Thus, once on SDC, an unrecovered failure of the second CCW train means no SDC system will remove decay heat and alternate methods, such as returning to SG cooling, must be used to prevent core damage. Provided component cooling is available to the RCPs, a Mode 4 end state with the RCS on SG heat removal is usually preferred to the Mode 5 end state on SDC heat removal, in part for this reason. The risk of plant operation in Mode 4 on SG cooling may be less than for Mode 5 because the transient risks associated with valve misalignments and malfunctions may be averted by avoiding SDC entry.}

For conditions where CCW flow is lost to the RCP seals, reactor shutdown is required and the RCS loops operating TS is entered. Limited duration natural circulation operation is acceptable, but extended plant operation in the higher Mode 4 temperatures may degrade RCP seal elastomers. Mode 5 operation ensures adequately low RCS temperatures so that RCP seal challenges would be avoided. Therefore, use of the modified Mode 4 end state may not always be appropriate. Prior to entry into Mode 5 due to loss of CCW to RCP seals, the redundant CCW train should be confirmed to be operable and backup cooling water systems should be confirmed for emergency use. SG inventory should be retained to assure a diverse and redundant heat removal source if CCW should fail. The licensee commits to an implementation guide in which compensatory actions will be contained.

3.2.15 <u>TS 3.7.8 - Service Water System/Salt Water Cooling System/Essential Spray Pond System/Auxiliary Component Cooling Water</u>

{NOTE: Terminology for cooling water systems varies between the CEOG plants. This discussion is based on the SONGS 2 and 3 designation of the SWC system.}

This TS covers systems that provide a heat sink for the removal of process heat and operating heat from the safety-related components during a transient or design basis accident.

<u>LCO</u>: Two SWC trains shall be operable in Modes 1, 2, 3, and 4.

<u>Condition Requiring Entry into End State</u>: One SWC train inoperable and not restored to operability in Condition A within TS AOT/CT, 72 hours.

<u>Proposed Modification for End State Required Actions</u>: Modify Condition B of TS to accommodate a Mode 4 end state with a 12 hour entry requirement on SG heat removal.

<u>Assessment</u>: The primary function of the SWC system is to remove heat from the CCW system. In this manner the SWC system also supports the SDC system. {NOTE: include these statements if applicable to plant design:} [The SWC system or its equivalent provides emergency makeup to the CCW system and may also provide backup supply to the AFWS.] [Loss of one SWC system train will degrade the plant's capability to remove heat via the affected SDC heat exchanger. In this case, a Mode 4 end state with the RCS on SG heat removal is preferred to Mode 5 with the RCS on SDC heat removal.]

At least one SWC train must be operable to remove decay heat loads following a design basis accident. SWC is also used to provide heat removal during normal operating and shutdown conditions. Two 100 percent trains of SWC are provided, which provides adequate SWC flow assuming the worst single failure.

SWC is required to support SDC when the plant is in Mode 4 on SDC or in Mode 5. Therefore, in conditions in which the other SWC train is inoperable, the one operable SWC train must continue to function. The NRC staff notes much of the CCW discussion in Paragraph 3.2.14 above, is also applicable here since long-term loss of SWC is, in effect, loss of CCW.

Operation in Mode 4 with the SGs available provides a decay heat removal path that is not directly dependent on SWC, although there are some long-term concerns such as RCP seal cooling. Overall, the proposed Mode 4 TS end state generally results in plant conditions where reliance on the SWC system is least significant. The licensee commits to an implementation guide in which compensatory actions will be contained.

3.2.16 TS 3.7.9 - Ultimate Heat Sink (UHS)

{NOTE: Calvert Cliffs designates the system as the salt water system; SWC performs the function of the UHS at SONGS Units 2 and 3.}

The UHS system provides a heat sink for the removal of process and operating heat from the safety-related components during a transient or design basis accident. {NOTE: Use these statements if applicable to plant design:} [The UHS system provides emergency makeup to the CCW system and also provides backup supply to the AFW system. Loss of one UHS system train such as would occur with the loss of a cooling fan tower, as in this TS, will degrade the plant's capability to remove heat via the affected SDC heat exchanger.]

LCO: The UHS shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: One cooling tower inoperable and not restored to operability in Condition A within TS AOT/CT, 7 days.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state with a 12 hour entry requirement.

Assessment: In Modes 1, 2, 3, and 4, the UHS system is a normally operating system which is required to support the OPERABILITY of the equipment serviced by the SWS and required to be operable in these modes. In Mode 5, the OPERABILITY requirements of the UHS are determined by the systems it supports.

When the plant is in Mode 5, UHS is required to support shutdown cooling and the one operable cooling tower (in conditions in which the other train is inoperable) must continue to function. Operation in Mode 4 with the SGs available provides a decay heat removal path that is not dependent on UHS.

The proposed Mode 4 TS end state results in plant conditions where the direct reliance on the UHS system is the least significant. The rationale applicable to Paragraph 3.2.15 above, applies to this section as well. Further, NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition.

3.2.17 TS 3.7.10 - Emergency Chilled Water (ECW) System

The ECW system provides a heat sink for the removal of process and operating heat from selected safety-related air-handling systems during a transient or accident.

LCO: Two ECW trains shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: Mode 5 entry is required when one ECW train is inoperable and not returned to service in Condition A within the TS AOT/CT, 7 days.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state with a 12 hour entry requirement.

Assessment: The ECW system is actuated on SIAS and provides water to the heating, ventilation, and air conditioning (HVAC) units of the ESF equipment areas (e.g., main control room, electrical equipment room, safety injection pump area). For most plant equipment, ECW is a backup to normal HVAC. For a subset of equipment, only ECW is available, but cooling is provided by both ECW trains.

In Modes 1, 2, 3, and 4, the ECW system is required to be operable when a LOCA or other accident would require ESF operation. Two trains have not been required in Mode 5 because potential heat loads are smaller and the probability of accidents requiring the ECW system has been perceived as low.

Because normal HVAC would be available in all non-loss of 1E bus situations, cooling to most plant equipment would remain available. Should an event occur during Mode 4, the post-accident heat loads would be reduced, potentially allowing more time for manual recovery actions, including alternate ventilation measures. Such measures could include opening doors/vents and/or provision for temporary alternate cooling equipment. Repair of the ECW in Mode 4 poses a low risk of core damage due to the diversity of plant RCS heat removal resources in Mode 4 and the added risks associated with the transition to Mode 5, as discussed in Sections 3 and 4 of Reference 5.

3.2.18 TS 3.7.11 - Control Room Emergency Air Cleanup System (CREACUS)

{NOTE: Alternate designations include CREACS, CREVAS, CREVS, and CREAFS. SONGS Units 2 and 3 do not include a demister as part of CREACUS.}

The CREACUS consists of two independent, redundant trains that recirculate and filter the control room air. Each train consists of a prefilter and demisters, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodine), and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system, as do demisters that remove water droplets from the air stream. A second bank of HEPA filters follows the adsorber section to collect carbon fines and to backup the main HEPA filter bank if it fails.

LCO: Two CREACUS trains shall be operable in Modes 1, 2, 3, [or] 4 [5 and 6] and [during movement of irradiated fuel assemblies].

Condition Requiring Entry into End State: Mode 5 operation is required when one CREACUS train is inoperable in Modes 1, 2, 3, or 4 and not returned to service in Condition A within the TS AOT/CT, 7 days.

Proposed Modification for End State Required Actions: Modify Condition B of TS to accommodate a Mode 4 end state with entry into Mode 4 in 12 hours.

Assessment: The CREACUS provides a protected environment from which operators can control the plant following an uncontrolled release of radioactivity, chemicals, or toxic gas. The current TS requires operability of CREACUS from Mode 1 through 4 to support operator response to a design basis accident. Operability in Mode 5 and 6 may also be required at some plants for chemical and toxic gas concerns and may be required during movement of fuel assemblies. The CREACUS is needed to protect the control room in a wide variety of circumstances. Plant operation in the presence of degraded CREACUS should be based on placing the plant in a state which poses the lowest plant risk.

Outage planning should ensure that the plant staff is aware of the system inoperability, that respiratory units and control room pressurization systems are available, that operational and leakage pathways are properly controlled, and that alternate shutdown panels and local shutdown stations are available. The licensee commits to an implementation guide in which compensatory actions will be contained.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.19 TS 3.7.12 - Control Room Emergency Air Temperature Control System

The control room emergency air temperature control system (CREATCS) provides temperature control following control room isolation. Portions of the CREATCS may also operate during normal operation. The CREATCS consists of two independent, redundant trains that provide cooling and heating of recirculated control room air. Each train consists of heating coils, cooling coils, instrumentation, and controls. A single train of CREATCS will provide the required temperature control to maintain habitable control room temperatures following a design basis accident.

LCO: Two CREATCS trains shall be operable in Modes 1, 2, 3, and 4, and during movement of irradiated fuel assemblies.

Condition Requiring Entry into End State: One CREATCS train inoperable and the Condition A required action and the associated completion time of 30 days not met in Mode 1, 2, 3, or 4.

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action to allow component repair in Mode 4, and Mode 4 must be entered in 12 hours.

Assessment: CREATCS is required to ensure continued control room habitability and ensure that control room temperature will not exceed equipment operability requirements following isolation of the control room. We addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 above, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDCS. In this case, there is little impact on risk associated with unavailable CREATCS and the impact is reduced further if the alternate shutdown panel or local plant shutdown and control capability are available. Consequently, for longer outages, licensees should ensure availability of the alternate shutdown panel or local plant shutdown and control capability. The licensee commits to an implementation guide in which compensatory actions will be contained.

3.2.20 TS 3.7.13 - ECCS Pump Room Exhaust Air Cleanup System (PREACS) and ESF Pump Room Exhaust and Cleanup System

The ECCS PREACS and the ESF PREACS filters air from the area of active ESF components during the recirculation phase of a LOCA. This protects the public from radiological exposure resulting from auxiliary building leaks in the ECCS system. The ECCS PREACS consists of two independent, redundant equipment trains. A single train will maintain room temperature within acceptable limits.

LCO: Two ECCS PREACS trains shall be operable in Modes 1, 2, 3, and 4.

Condition Requiring Entry into End State: One or two ECCS PREACS trains inoperable and Conditions A and B required actions and associated completion times of 7 days and 24 hours, receptively, not met in Modes 1, 2, 3, or 4.

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action in Condition C to allow component repair in Mode 4. The time for initial entry into Mode 4 is 12 hours.

Assessment: The CEOG bounded the short term need for the PREACS by assuming: (1) the frequency of Mode 4 LOCAs requiring recirculation is bounded by 0.0001 per year, (2) the probability of a significant leak into the ECCS pump room is about 0.1, and (3) the probability that the backup system is unavailable is 0.1. Then, the probability that the system will be needed over a given repair interval (assumed at 7 days or 0.0192 years) becomes
$0.0001 \times 0.10 \times 0.10 \times 0.0192 = 1.92 \times 10^{-8}$.

The CEOG failed to address potential operator errors, as discussed in Section 3 of Reference 5, in arriving at this estimate. However, the bounding nature of the CEOG estimate and the sensitivity study discussed in Section 4 of Reference 5, appear to be sufficient that this failure will not significantly influence the conclusion. For the licensee to have the condition which allows 24 hours to restore the ECCS pump room boundary when two ECCS PREACS trains are inoperable, they would have already had to commit to compensatory and preplanned measures to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Consequently, the NRC staff concludes that this is a reasonable assessment.

The PREACS is a post-accident mitigation system that is expected to have little or no impact on CDF. The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.2.21 TS 3.7.15 - Penetration Room Emergency Air Cleanup System

The penetration room emergency air cleanup system filters air from the penetration area between the containment and the auxiliary building. It consists of two independent, redundant trains. Each train consists of a heater, demister or prefilter, HEPA filter, activated charcoal absorber, and a fan. The penetration room emergency air cleanup system's purpose is to protect the public from radiological exposure resulting from containment leakage through penetrations.

LCO: Two penetration room emergency air cleanup system trains shall be operable in Modes 1, 2, 3, and 4. Inability to return one or two trains of the penetration room emergency air cleanup system to service in the allotted AOT/CT requires plant shutdown to Mode 5 in 36 hours, in Condition C.

Condition Requiring Entry into End State: One or two penetration room emergency air cleanup system trains inoperable and required Action and associated completion time of Conditions A or B, 7 days or 24 hours respectively, not met in Modes 1, 2, 3, or 4.

Proposed Modification for End State Required Actions: Modify Mode 5 end state required action to allow component repair in Mode 4. Mode 4 entry is proposed to be in 12 hours.

Assessment: The need for the penetration room emergency air cleanup system is of particular importance following a severe accident with high levels of airborne radionuclides. These events are of low probability. (For example, for Mode 1, the plant core damage frequency is on the order of 2×10^{-5} to 1×10^{-4} per year). The CEOG estimated the short term need for the penetration room emergency air cleanup system by assuming: (1) the frequency of Mode 4 core damage events is on the order of 5×10^{-5} per year, and (2) the probability that the backup system is unavailable is 1×10^{-2}. Then, the probability that the system will be needed over a given repair interval (assumed at 7 days or 1.92×10^{-2} years) becomes $5 \times 10^{-5} \times 0.01 \times 0.0192 \sim 1 \times 10^{-8}$.

The penetration room emergency cleanup system is an accident mitigation system and it has little to no impact on the likelihood of core damage. The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including this condition. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system. For the licensee to have the condition which allows 24 hours to restore the penetration room boundary when two penetration room emergency air cleanup system trains are inoperable, they would have already had to commit to compensatory and preplanned measures to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Consequently, the NRC staff concludes that this is a reasonable assessment.

3.2.22 TS 3.8.1 - AC Sources - Operating

The unit Class 1E electrical power distribution system AC sources consist of the offsite power sources (preferred power sources, normal and alternate(s)), and the onsite standby power sources (Train A and Train B emergency diesel generators). {NOTE: In addition, many sites, including SONGS Units 2 and 3 and St. Lucie Units 1 and 2, provide a cross-tie capability between units. Palo Verde provides alternate AC power capability via an onsite combustion turbine-generator.}

As required by General Design Criterion (GDC) 17 of 10 CFR Part 50, Appendix A, the design of the AC electrical power system provides independence and redundancy. The onsite Class 1E AC distribution system is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to two preferred offsite power sources and a single diesel generator. Offsite power is supplied to the unit switchyard(s) from the transmission network by two transmission lines. (An offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network to the onsite Class 1E ESF bus or buses.) From the switchyard(s), two electrically and physically separated circuits provide AC power, through step down station auxiliary transformers, to the 4.16 kV ESF buses.

Certain loads required for accident mitigation are started in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Class 1E distribution system. Within 1 minute after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are started via the load sequencer.

In the event of a loss of power, the ESF electrical loads are automatically connected to the emergency diesel generators (EDGs) in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a design basis accident (DBA) such as a LOCA.

<u>LCO</u>: The following AC electrical sources shall be operable in Modes 1, 2, 3, and 4:

1. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC electrical power distribution system; [and]
2. Two EDGs each capable of supplying one train of the onsite Class 1E AC electrical power distribution system.

<u>Condition Requiring Entry into End State</u>: Plant operators must bring the plant to Mode 5 within 36 hours following the sustained inoperability of either or both required offsite circuits, either or both required EDGs, or one required offsite circuit and one required EDG.

<u>Proposed Modification for End State Required Actions</u>: Modify Condition G [Condition F for SONGS] of STS to specify a Mode 4 end state on SG heat removal with a 12-hour entry time.

<u>Assessment</u>: Entry into any of the conditions for the AC power sources implies that the AC power sources have been degraded and the single failure protection for ESF equipment may be ineffective. Consequently, as specified by TS 3.8.1, at present the plant operators must bring the plant to Mode 5 when the required action is not completed by the specified time for the associated condition.

During Mode 4 with the steam generators available, plant risk is dominated by a LOOP initiating event. If a LOOP were to occur during degraded AC power system conditions, the number of redundant and diverse means available for removing heat from the RCS may vary, depending upon the cause of the degradation. If the LCO entry resulted from inoperability of both onsite AC sources (i.e., EDGs) followed by LOOP, a station blackout event will occur. For this event, the

SG inventory may be sufficient for several hours of RCS cooling without feedwater, and the turbine-driven auxiliary feedwater (TDAFW) pump, which does not rely on the AC power sources to operate, should be available if needed. Further, there should be time to start any available alternate AC power supplies, such as blackout diesels. For all other LCO entries which do not lead to station blackout following LOOP during Mode 4, feed and bleed (for non 3410 megawatt thermal CE-designed PWRs) capability may also be available for RCS heat removal if the auxiliary feedwater system should fail. If the RCS conditions are such that the steam generators are not available for RCS heat removal during Mode 4, then only the SDC system is available for RCS heat removal for non-station blackout events.

Switchyard activities, other than those necessary to restore power, should be prohibited when AC power sources are degraded. Note that to properly utilize TDAFW pumps the SG pressure should be maintained above the minimum recommended pressure required to operate the TDAFW. The licensee commits to an implementation guide in which compensatory actions will be contained.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system. In the case of a degraded AC power capability, the likelihood of losing SDC is increased, and the NRC staff concluded the plant should be placed in a condition that maximizes the likelihood of avoiding a further plant upset of loss of RCS cooling. This will generally be Mode 4 with SG cooling.

3.2.23 TS 3.8.4 - DC Sources – Operating

The direct current (DC) electrical power system:

1. Provides normal and emergency DC electrical power for the AC emergency power system, emergency auxiliaries, and control and switching during all modes of operation,
2. Provides motive and control power to selected safety related equipment, and
3. Provides power to preferred AC vital buses (via inverters).

For CEOG PWRs, the Class 1E, 125-VDC electrical power system consists of two independent and redundant safety-related subsystems. {NOTE: The Class 1E, 125-VDC electrical power system at SONGS, Palo Verde, and Calvert Cliffs consists of four independent and redundant Class 1E, safety subsystems. At Waterford, there are three Class 1E, 125-VDC independent and redundant safety-related subsystems. Each subsystem consists of one battery, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cables.}

{NOTE: The 125-VDC loads vary among the CE-designed PWRs. At SONGS for example, Train A and Train B 125-VDC electrical power subsystems provide control power for the 4.16 KV switchgear and 480-V load center AC load groups A and B, diesel generator A and B control systems, and Train A and B control systems, respectively. Train A and Train B DC subsystems also provide DC power to the Train A and Train B inverters, as well as to Train A and Train B DC valve actuators, respectively. The inverters in turn supply power to the 120-VAC vital buses.}

Train C and Train D 125-VDC electrical power subsystems provide power for nuclear steam supply system control power and DC power to Train C and Train D inverters, respectively. The Train C DC subsystem also provides DC power to the TDAFW pump inlet valve HV-4716 and the TDAFW pump electric governor.

During normal operation, the 125-VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger (which is powered from the safety related 480-VAC source), the DC load is automatically powered from the station batteries.

<u>LCO</u>: All of the DC electrical power subsystems are required to be operable during Modes 1, 2, 3, and 4. {NOTE: At SONGS for example, the Train A, Train B, Train C, and Train D DC electrical power subsystems shall be operable in Modes 1, 2, 3, and 4.}

<u>Condition Requiring Entry into End State</u>: The plant operators must bring the plant to Mode 5 within 36 hours following the sustained inoperability of one DC electrical power subsystem for a period of 2 hours.

<u>Proposed Modification for End State Required Actions</u>: Modify Condition B to Mode 4, on SG heat removal, end state with a 12 hour entry requirement.

<u>Assessment</u>: DC power sources have sufficient capacity for the steady state operation of the connected loads during Modes 1, 2, 3, and 4, while at the same time maintaining the battery banks fully charged. Each battery charger has sufficient capacity to restore the battery to its fully charged state within a specified time period while supplying power to connected loads. The DC sources are required to be operable during Modes 1, 2, 3, and 4 and connected to the associated DC buses. Mode 5 is the current end state for not restoring an inoperable DC electrical subsystem to operable status within 2 hours.

If a DC electrical power subsystem is inoperable during Mode 4, plant risk is dominated by loss of offsite power (LOOP) events. Such an event with concurrent failure of the unaffected emergency diesel generator (EDG) can progress to a station blackout (SBO). These events challenge the capability of the ESF systems to remove heat from the RCS. Entry into Mode 4 as the end state when an inoperable DC electrical power subsystem cannot be restored to operability within 2 hours provides the plant staff with several resources. For SBO cases with one DC power source continuing to operate, the TDAFW pump is available for RCS heat removal when steam pressure is adequate. If this pump becomes unavailable, such as if the other DC sources were lost and the TDAFW pump could not be satisfactorily operated locally, the lack of RCS heat removal initiates a boil-down of the steam generator inventory. Boil-off of steam generator inventory and a certain amount of RCS inventory must both occur in order to uncover the core. Under this condition, the plant operators have significant time to accomplish repair and/or recovery of offsite or onsite power. For non-station blackout cases, the remaining train(s) (motor and/or turbine-driven) of auxiliary feedwater are available for RCS heat removal if steam pressure is adequate as long as the remaining DC power source continues to operate. {NOTE: use this statement if applicable to plant design:} [Should the remaining train(s) fail, feed, and bleed capability is available to provide RCS heat removal as long as the remaining DC power source continues to operate.] Whether or not DC power remains, Mode 4 operation with an inoperable DC power source provides the plant operators with diverse means of RCS heat removal and significant time to perform repairs and recovery before core uncovery occurs.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions, including those applicable here. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system. The licensee commits to an implementation guide in which compensatory actions will be contained.

3.2.24 TS 3.8.7 - Inverters – Operating

In Modes 1, 2, 3, and 4, the inverters provide the preferred source of power for the 120-VAC vital buses which power the reactor protection system (RPS) and the ESFAS. The inverters are designed to ensure the availability of AC power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The Class 1E, 125-VDC station batteries via the respective Class 1E, 125-VDC buses provide an uninterruptible source of power for the inverters.

LCO: All of the safety related inverters are required to be operable during Modes 1, 2, 3, and 4. {NOTE: Use this statement for SONGS:} [The required Train A, Train B, Train C, and Train D inverters shall be operable in Modes 1, 2, 3, and 4.]

Condition Requiring Entry into End State: The plant operators must bring the plant to Mode 5 within 36 hours following the sustained inoperability of one required inverter for a period of 24 hours.

Proposed Modification for End State Required Actions: Modify Condition B of STS to Mode 4 on SG heat removal within a 12-hour entry requirement.

Assessment: The inverters are included as four independent and redundant trains. Each inverter provides a dedicated source of uninterruptible power to its associated vital bus. An operable inverter requires the associated vital bus to be powered by the inverter and have output voltage and frequency within the acceptable range. In order to be operable, the inverter must also be powered from the associated station battery. Maintaining the inverters operable ensures that the redundancy incorporated in the design of the RPS and ESFAS is maintained. The inverters provide an uninterruptible source of power, provided the station batteries are operable, to the vital buses even if the 4.16 kV ESF buses are not energized. Entry into the LCO required action implies that the redundancy of the inverters has been degraded.

The inoperability of a single inverter during Mode 4 operation will have little or no impact on plant risk. The inoperable inverter causes a loss of power to the associated bistable channel of the RPS. Since reactor trip will have been accomplished as part of the shutdown prior to reaching Mode 4, loss of one inverter will not impact reactor trip. An inoperable inverter also causes a loss of power to one of the four ESFAS trip paths. This single condition should not impact the ability of the ESFAS to perform its function.

The NRC staff addressed Mode 4 versus Mode 5 operation in Sections 3 and 4 of Reference 5, and concluded there is essentially no benefit in moving to Mode 5 under many conditions. Further, there is a potential benefit to remaining in Mode 4 on SG heat removal because additional risk benefits are realized by averting the risks associated with the alignment of the SDC system.

3.3 Summary and Conclusions

The above requested changes are found acceptable by the NRC staff. The NRC staff approval applies only to operation as described and acceptably justified in References 2 and 5. The requested end state changes do not preclude licensees from entering cold shutdown should they desire to do so for operational needs or maintenance requirements. In such cases, the specific requirements associated with the requested end state changes do not apply.

To be consistent with TSTF-422, Revision 2, as approved in this SE, the licensee has committed to operate in accordance with WCAP-16364-NP, Revision 2 (Reference 6), and to adhere to the guidance of the revised Section 11 of NUMARC-93-01, Revision 3.

4.0 STATE CONSULTATION

{NOTE: Per LIC-101, the PM is responsible for contacting the state official and verifying that this statement is correct.}

In accordance with the Commission's regulations, the [Name of State] State official was notified of the proposed issuance of the amendment. The State official had [no] comments. [If comments were provided, they should be addressed here].

5.0 ENVIRONMENTAL CONSIDERATION

{NOTE: Caution per LIC-101: The environmental consideration discussed below is written for a categorical exclusion based on 10 CFR 51.22(c)(9). The PM is responsible to ensure that this is accurate for the specific amendment being issued.}

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding ([ ] FR [ ]). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. TSTF-422, Revision 2, “Change in Technical Specification States: CE-NSPD-1186, Risk Informed Technical Specification Task Force,” December 22, 2009. (ADAMS Accession Number ML093570241)

2. CE NPSD-1186-A, Rev. 00, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG PWRs," October 2001. (ADAMS Accession Number ML110410539)

3. Regulatory Guide 1.182, “Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants,” USNRC, May 2000.

4. NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Nuclear Management and Resource Council, Revision 3, July 2000.

5. NRC staff Safety Evaluation of CE NPSD-1186, Rev. 00, “Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs,” dated July 17, 2001. (ADAMS Accession Number ML011980047)

6. WCAP-16364-NP, Revision 2, “Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422),” dated May 2010. (ADAMS Accession Number ML102500295)

7. Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decision Making on Plant Specific Changes to the Licensing Basis,” USNRC, August 1998.

8. Regulatory Guide 1.177, “An Approach for Pant Specific Risk-Informed Decision Making: Technical Specifications,” USNRC, August 1998.

Principal Contributor(s):

MODEL APPLICATION FOR PLANT-SPECIFIC ADOPTION OF TSTF-422, REVISION 2, "CHANGE IN TECHNICAL SPECIFICATIONS END STATES (CE NPSD-1186)," FOR COMBUSTION ENGINEERING PLANTS USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

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

SUBJECT: [PLANT]
DOCKET NO. 50-[XXX]
LICENSE AMENDMENT REQUEST FOR ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-422, REVISION 2, "CHANGE IN TECHNICAL SPECIFICATIONS END STATES, (CE NPSD-1186)," USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.90, [LICENSEE] is submitting a request for an amendment to [PLANT] Technical Specifications (TS) to incorporate the NRC-approved TSTF-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)."

The proposed amendment would modify TS to risk-inform requirements regarding selected Required Action End States. In conjunction with the proposed change, TS requirements are included for a Bases Control Program consistent with TS Bases Control Program described in Section 5.5 of the Combustion Engineering PWR Standard TSs if not already in the facility TSs.

- Attachment 1 provides a description and assessment of the proposed change, the requested confirmation of applicability, and plant-specific verifications.
- Attachment 2 summarizes the regulatory commitments made in this submittal.
- Attachment 3 provides markup pages of existing TS and TS Bases to show the proposed change.
- Attachment 4 provides revised (clean) TS pages.

[LICENSEE] requests approval of the proposed license amendment by [DATE], with the amendment being implemented [BY DATE OR WITHIN X DAYS].

In accordance with 10 CFR 50.91(a)(1), "Notice for public comment," the analysis about the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is being provided to the Commission in accordance with the distribution requirements in 10 CFR 50.4.

In accordance with 10 CFR 50.91(b)(1), "State consultation," a copy of this application and the reasoned analysis about NSHC is being provided to the designated [STATE] Official.

I declare [or certify, verify, state] under penalty of perjury that the foregoing is correct and true.

Executed on [DATE] [SIGNATURE]

If you should have any questions about this submittal, please contact [NAME, TELEPHONE NUMBER].

Sincerely,

[NAME, TITLE]

Attachments: [AS STATED OR PROVIDE LIST]

cc w/ attachments: [NRR PROJECT MANAGER]
[REGIONAL OFFICE]
[RESIDENT INSPECTOR]
[STATE CONTACT]

ATTACHMENT 1
DESCRIPTION AND ASSESSMENT

1.0 DESCRIPTION

The proposed amendment would modify Technical Specifications (TS) to risk-inform requirements regarding selected Required Action End States. The changes are consistent with Nuclear Regulatory Commission (NRC)-approved Technical Specification Task Force (TSTF) traveler TSTF-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)," dated December 22, 2009 (ADAMS Accession Number ML093570241) (Reference 1). The *Federal Register* notice published on [DATE] ([ ] FR [ ]) (Reference 2) announced the availability of this TS improvement as part of the consolidated line item improvement process (CLIIP).

2.0 ASSESSMENT

2.1 Applicability of Topical Report, TSTF-422, and Model Safety Evaluation

[LICENSEE] has reviewed Combustion Engineering (CE) Topical Report (TR) NPSD-1186 (Reference 3), TSTF-422, Revision 2, and the NRC staff's model safety evaluation (SE) (Reference 4) as part of the CLIIP. [LICENSEE] has concluded that the information in TR NPSD-1186, TSTF-422, Revision 2, and the NRC staff's model SE are applicable to [PLANT] and justify this license amendment request (LAR) for the incorporation of the changes to the [PLANT] TS.

{NOTE: Only those changes proposed in TSTF-422 are addressed in the model SE. The model SE and associated TR address the CE pressurized water reactor (PWR) plants, and the plants adopting TSTF-422 must confirm the applicability of the changes to their plant.}

2.2 Optional Changes and Variations

[LICENSEE] is [not] proposing variations or deviations from TR NPSD-1186, the TS changes described in the TSTF-422, Revision 2, or the NRC staff's model SE referenced in the *Federal Register* on [DATE] ([ ] FR [ ]) as part of the CLIIP Notice of Availability. [Discuss any differences with TR NPSD-1186 or TSTF-422, Revision 2, and the effect of any changes on the NRC staff model SE.]

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Determination

[LICENSEE] has evaluated the proposed changes to the TS using the criteria in 10 CFR 50.92 and has determined that the proposed changes do not involve a significant hazards consideration.

{NOTE: This model application contains a model NSHC analysis as an example for the licensee to consider in preparing the NSHC for plant-specific adoption of TSTF-422.}

Description of Amendment Request: A change is proposed to the TS of [PLANT], consistent with TSTF-422, Revision 2, to allow, for some systems, entry into hot shutdown rather than cold shutdown to repair equipment, if risk is assessed and managed consistent with the program in place for complying with the requirements of 10 CFR 50.65(a)(4). Changes proposed in TSTF-422 will be made to the [PLANT] TS for selected Required Action end states providing this allowance.

Basis for no significant hazards consideration determination: As required by 10 CFR 50.91(a), [LICENSEE] 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 allows a change to certain required end states when the Technical Specification (TS) Completion Times (CTs) for remaining in power operation are exceeded. Most of the requested TS changes are to permit an end state of hot shutdown (Mode 4) rather than an end state of cold shutdown (Mode 5) contained in the current TS. The request was limited to: (1) those end states where entry into the shutdown mode is for a short interval, (2) entry is initiated by inoperability of a single train of equipment or a restriction on a plant operational parameter, unless otherwise stated in the applicable TS, and (3) the primary purpose is to correct the initiating condition and return to power operation as soon as is practical. Risk insights from both the qualitative and quantitative risk assessments were used in specific TS assessments. Such assessments are documented in Section 5.5 of CE NPSD-1186, Rev 00, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs." They provide an integrated discussion of deterministic and probabilistic issues, focusing on specific TSs, which are used to support the proposed TS end state and associated restrictions. Therefore, the probability of an accident previously evaluated is not significantly increased, if at all. The consequences of an accident after adopting proposed TSTF-422 are no different than the consequences of an accident prior to adopting TSTF-422. Therefore, the consequences of an accident previously evaluated are not significantly affected by this change. The addition of a requirement to assess and manage the risk introduced by this change will further minimize possible concerns.

   Therefore, this 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 of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed). Allowing a change to certain required end states when the TS CTs for remaining in power operation are exceeded, i.e., entry into hot shutdown rather than cold shutdown to repair equipment, if risk is assessed and managed, will not introduce new failure modes or effects and will not, in the absence of other unrelated failures, lead to an accident whose consequences exceed the consequences of accidents previously evaluated. The addition of a requirement to assess and manage the risk introduced by this change and the commitment by the licensee to adhere to the guidance in WCAP-16364-NP, Revision [2], "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)," will further minimize possible concerns.

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

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

Response: No

The proposed change allows, for some systems, entry into hot shutdown rather than cold shutdown to repair equipment, if risk is assessed and managed. The CEOG's risk assessment approach is comprehensive and follows NRC staff guidance as documented in Regulatory Guides (RGs) 1.174 and 1.177. In addition, the analyses show that the criteria of the three-tiered approach for allowing TS changes are met. The risk impact of the proposed TS changes was assessed following the three-tiered approach recommended in RG 1.177. A risk assessment was performed to justify the proposed TS changes. The net change to the margin of safety is insignificant.

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

Based upon the reasoning presented above, [LICENSEE] concludes that the requested change involves no significant hazards consideration, as set forth in 10 CFR 50.92(c), "Issuance of Amendment."

3.2 Verifications, Commitments, and Additional Information Needed

[LICENSEE] commits to the regulatory commitments in Attachment 2. In addition, [LICENSEE] has proposed TS Bases consistent with TSTF-422, Revision 2, which provides guidance and details on how to implement the new requirements. Implementation of TSTF-422 requires that risk be managed and assessed, and the configuration risk management program is adequate to satisfy this requirement. The risk assessment need not be quantified, but may be a qualitative assessment of the vulnerability of systems and components when one or more systems are not able to perform their associated function. Finally, [LICENSEE] has a Bases Control Program consistent with Section 5.5 of the Standard TSs (STS).

4.0 ENVIRONMENTAL CONSIDERATION

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 Part 20, and 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(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

5.0 REFERENCES

1. TSTF-422, Revision 2, "Change in Technical Specifications End States (CE NPSD-1186)," dated December 22, 2009 (ADAMS Accession No. ML093570241).

1. *Federal Register*, [Vol. XX, No. XX, p.XXXXX], "Notice of Availability of the Models for Plant-Specific Adoption of Technical Specifications Task Force (TSTF) Travleer TSTF-422, Revision 2, 'Change in Technical Specifications End States (CE NPSD-1186)' for Combustion Engineering Plants Using the Consolidated Line Item Improvement Process," [DATE]. (ADAMS Accession No. ML103270159).

2. CE NPSD-1186, Rev 00, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs," April 2000 (ADAMS Package Accession No. ML010540231).

3. NRC Model Safety Evaluation of TSTF-422, Revision 2 (ADAMS Accession No. ML103270197).

ATTACHMENT 2
LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by [LICENSEE] in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments. Please direct questions regarding these commitments to [CONTACT NAME].

REGULATORY COMMITMENTS	DUE DATE/EVENT
[LICENSEE] will modify the Technical Specification Bases for the revised specifications as adopted with the applicable license amendment.	[Complete, implemented with amendment OR within X days of implementation of amendment]
[LICENSEE] will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision 3, July 2000.	[Ongoing, or implement with amendment]
[LICENSEE] will follow the guidance established in WCAP-16364-NP, Revision 2, "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)," dated May 2010.	[Implement with amendment, when TS Required Action End State remains within the APPLICABILITY of TS]