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AUG 0 6 2018

Docket Nos.: 50-321
50-366

NL-18-0601

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

Edwin I. Hatch Nuclear Plant – Units 1 & 2
Revision to Technical Specification End State for Residual Heat Removal Drywell Spray

Ladies and Gentlemen:

Pursuant to the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations, Southern Nuclear Operating Company (SNC) hereby requests an amendment to the Technical Specifications (TS) for Edwin I. Hatch Nuclear Plant (HNP) Unit 1 Renewed Facility Operating License DPR-57 and Unit 2 Renewed Facility Operating License NPF-5, and includes the results of the no significant hazards determination. The proposed license amendments modify the HNP TS end state for the required actions of the drywell spray function of the Residual Heat Removal System. Specifically, if the required action statements are not met, then instead of requiring the plant to achieve Cold Shutdown (i.e., Mode 4), the new required end state of Hot Shutdown (i.e., Mode 3) is requested.

SNC requests approval of the proposed license amendments by July 15, 2019. The proposed changes would be implemented within 90 days of issuance of the amendments.

This letter contains no NRC commitments. If you have any questions, please contact Jamie Coleman at 205.992.6611.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 6th day of August 2018.

Respectfully submitted,

C. A. Gayheart
Director, Regulatory Affairs
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CAG/RMJ

Enclosure: 1. Basis for Proposed Changes

Attachments: 1. HNP Unit 1 and Unit 2 Technical Specifications Marked-Up Pages
2. HNP Unit 1 and Unit 2 Technical Specifications Clean-Typed Pages
3. HNP Unit 1 and Unit 2 Technical Specifications Bases Marked-Up Pages (Information Only)

cc: Regional Administrator, Region II
NRR Project Manager – Hatch
Senior Resident Inspector – Hatch
Director, Environmental Protection Division – State of Georgia
RType: CHA02.004

Edwin I. Hatch Nuclear Plant – Units 1 & 2
Revision to Technical Specification End State for Residual Heat Removal Drywell Spray

Enclosure

Basis for Proposed Change

1.0 SUMMARY DESCRIPTION

Southern Nuclear Operating Company (SNC) requests amendments to Facility Operating Licenses DPR-57 and NPF-5 for Edwin I. Hatch Nuclear Plant Units 1 and 2 (HNP), respectively. The proposed license amendments modify the HNP Technical Specification (TS) end state for the required actions of the drywell spray function of the Residual Heat Removal (RHR) system. Specifically, if the required action statements are not met, then instead of requiring the plant to achieve Cold Shutdown (i.e., Mode 4), the new required end state of Hot Shutdown (i.e., Mode 3) is requested.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

Drywell spray is a mode of the RHR system which may be initiated under post-accident conditions to reduce the temperature and pressure of the primary containment atmosphere. Each of the two RHR subsystems consists of two pumps, one heat exchanger, containment spray valves, and a spray header in the drywell. RHR drywell spray is a manually initiated function which can only be placed in service if adequate core cooling is assured. A physical interlock prevents opening the spray valves unless reactor water level is above two thirds core height.

The HNP Unit 1 and Unit 2 primary containment is a steel lined, reinforced concrete vessel, which surrounds the reactor primary system and provides an essentially leak tight barrier against an uncontrolled release of radioactive material to the environment. The upper portion of the primary containment, known as the drywell, surrounds the reactor pressure vessel and piping. The bottom portion, known as the suppression chamber, is a toroidal shaped, steel pressure vessel containing a volume of water known as the suppression pool. The suppression pool is designed to absorb the energy associated with a reactor blowdown from safety/relief valve discharges or from a design basis accident (DBA).

Water is pumped from the suppression pool and through the RHR heat exchangers, after which it is diverted to the spray headers in the drywell. The spray reduces primary containment temperature and pressure through the combined effects of evaporative and convective cooling, depending on the drywell atmospheric conditions. If the atmosphere is superheated, a rapid evaporative cooling process will ensue. If the environment in the drywell is saturated, temperature and pressure will be reduced via a convective cooling process.

The RHR drywell spray is also operated to wash, or "scrub", inorganic radioactive iodine and particulates from the drywell atmosphere into the suppression pool.

At HNP, the drywell spray mode of RHR is credited in the loss of coolant accident (LOCA) analysis for both the "scrubbing" effect and the temperature and pressure reduction effects. The drywell spray mode is not credited in determining the post-LOCA peak primary containment internal pressure in the containment pressure analysis; however, the radiological dose analysis does

credit the drywell spray temperature and pressure reduction over time in reducing the post-LOCA primary containment leakage and main steam isolation valve leakage.

2.2 Current Technical Specifications Requirements

The current TS Limiting Condition for Operation (LCO) 3.6.2.5 requires two RHR drywell spray subsystems to be Operable. This LCO is applicable in Modes 1, 2 and 3.

In the condition when one RHR drywell spray subsystem is inoperable (Condition A of TS 3.6.2.5), the required action is to restore the RHR drywell spray subsystem to operable status within 7 days. In the condition when two RHR drywell spray subsystems are inoperable (Condition B of TS 3.6.2.5), the required action is to restore one RHR drywell spray subsystem to operable status within 8 hours.

If the required action and the associated completion times are not met (Condition C of TS 3.6.2.5), the plant must be placed in Mode 3 in 12 hours and be in Mode 4 within 36 hours.

2.3 Reason for the Proposed Change

On December 22, 2016, the NRC approved a license amendment to the HNP TS to implement Technical Specification Task Force (TSTF) traveler TSTF-423, "Technical Specifications End States, NEDC-32988-A" (Refs. 1 and 2). TSTF-423 provided the technical justification for changing the required end states for various TS action statements. The TS end states for the TSs related to the RHR system, including TS 3.5.1, "ECCS – Operating," TS 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and TS 3.6.2.5, "Residual Heat Removal (RHR) Suppression Pool Spray," were among TS end states that were changed.

TSTF-423 and the HNP amendment did not include a change to the end state of HNP TS 3.6.2.5, "Residual Heat Removal (RHR) Drywell Spray," because that specification does not appear in the Standard Technical Specifications (STS) for boiling water reactor BWR/4 plants (Ref. 3), and was not evaluated in NEDC-32988-A (Ref. 4). The HNP TS are based on the STS, but TS 3.6.2.5 was added to the HNP TS in 2008 as part of an amendment to adopt the alternate source term (AST) methodology for analyzing DBA radiological consequences (Ref. 5). Therefore, TS 3.6.2.5 still requires the plant to be placed in Mode 4 (Cold Shutdown) if the required actions and associated completion times are not met.

The change in the RHR system TS end state implemented by TSTF-423 are essentially negated by having a TS in place related to the RHR system that requires a more restrictive mode (i.e., cold shutdown vs. hot shutdown). This impacts plant operational flexibility and regulatory efficiency.

2.4 Description of the Proposed Change

Condition C of TS 3.6.2.5 is revised to remove Required Action C.2, which requires being in Mode 4 within 36 hours. As a result, failure to restore the inoperable RHR drywell spray subsystem(s) within the required completion time will require being in Mode 3 within 12 hours, but the plant may remain in MODE 3, if desired, to restore one or more RHR drywell spray subsystem(s) to Operable status.

Required Action C.1, which requires being in Mode 3 within 12 hours, is modified by a Note that states, "LCO 3.0.4.a is not applicable when entering MODE 3."

3.0 TECHNICAL EVALUATION

The methodology used and approved to evaluate a Mode 3 end state for the RHR system in TSTF-423 and the HNP TSTF-423 license amendment is applicable to the drywell spray mode of the RHR system and justifies a Mode 3 end state for TS 3.6.2.5.

3.1 Summary of TSTF-423 and Topical Report NEDC-32988

General Electric (GE) Topical Report NEDC-32988-A, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants," (Ref. 4), which was approved by the NRC in September 2002 (Ref. 6), provides a systematic, generic review of the risks associated with required actions in Technical Specifications ending in placing the unit in cold shutdown (Mode 4). Cold shutdown is normally required when an inoperable system or train cannot be restored to an Operable status within the allowed time. However, placing the unit in cold shutdown results in the loss of steam-driven core cooling systems, challenges the shutdown heat removal systems, and requires restarting the plant over a greater range of plant conditions. A more preferred operational Mode is one that maintains adequate risk levels while repairs are completed without causing unnecessary challenges to plant equipment during shutdown and startup transitions. The analysis summarized in the GE topical report considered hot shutdown (Mode 3) as a preferred alternative to cold shutdown.

The plant risk associated with the two Modes of operation were evaluated and compared using the Probabilistic Safety Analysis (PSA) for a typical BWR/4 plant, but the results are applicable for all the BWR models (BWR/2 through 6). The PSA model was modified to evaluate the core damage frequency (CDF) and large early release frequency (LERF) during Mode 3 and Mode 4 operations. This allowed a comparison of the risks between the two shutdown Modes for various inoperable conditions specified in the TS. In addition to the quantitative analysis, the two Modes of operation were evaluated based on defense-in-depth considerations.

The topical report demonstrates that, for the modified conditions, remaining in Mode 3 is appropriate for the primary purpose of performing the short-duration repairs needed to correct the failure which necessitated exiting the original operating Mode. In response to the NRC staffs' questions, the Boiling Water

Reactor Owners' Group (BWROG) stated that "The BWRs are most likely to stay in hot shutdown for no more than 2 to 3 days and definitely not more than a week." In the NRC safety evaluation (SE) of the topical report (Ref. 6), the NRC staff stated that they expect that the licensees will follow this guidance.

For HNP, the change in the RHR system end state implemented by TSTF-423 are essentially negated by having a TS in place related to RHR that requires a more restrictive mode (i.e., cold shutdown vs. hot shutdown). With regard to the ECCS systems, the NRC SE for the HNP adoption of TSTF-423 (Ref. 1) states:

> *The BWROG performed a comparative PRA evaluation in NEDC-32988-A of the core damage risks of operation in the current Mode 4 end state and the proposed Mode 3 end state. The NRC staff's conclusion described in the safety evaluation (Reference 18) for NEDC-32988, Revision 2, on the BWROG PRA evaluation indicates that the core damage risks are lower in Mode 3 than in Mode 4. For HNP, going to Mode 4 for one ECCS subsystem would cause loss of the high pressure core cooling HPCI/RCIC systems and loss of the power conversion system (condenser/feedwater) and would require activating the RHR system. In addition, plant EOPs direct the operator to take control of the de-pressurization function if low pressure injection/spray systems are needed for RPV water makeup and cooling.*

3.2 Applicability of Topical Report NEDC-32988 to HNP Technical Specification 3.6.2.5

NEDC-32988 did not specifically address the RHR drywell spray function for a GE BWR/4 design, but the report did address similar functions.

- The suppression chamber spray function was addressed by NEDC-32988 and supports a Mode 3 end state when one or both RHR suppression pool spray subsystems are inoperable and the allowed times to restore are exceeded. Following a DBA, the RHR suppression pool spray subsystem removes heat from the suppression chamber airspace. This function is comparable to the function of the drywell spray function in that both are heat removal systems. NEDC-32988 noted that changing the end state of the RHR suppression pool spray function is not risk significant based on the low probability of an event requiring the safety function (i.e., LOCA), availability of alternate methods to remove heat from the primary containment, and the number of systems available in Mode 3.

- NEDC-32988 addressed the containment spray function for the GE BWR/6 design. This system is similar in function to the HNP RHR drywell spray system. For the GE BWR/6 design, NEDC-32988 supported a containment spray Mode 3 end state based on the low probability of an event requiring the safety function, alternate methods to remove heat from primary containment, and the additional systems available in Mode 3. As a result, the RHR containment spray system STS for the GE BWR/6 design in NUREG-1434 (Ref. 10) was modified to allow an end state of Mode 3 when one or both

RHR containment spray subsystems are inoperable and the allowed times to restore are exceeded.

- NEDC-32988 addressed the fission product removal capability for the GE BWR/4 and BWR/6 design and includes an assessment of the standby gas treatment (SGT) system and main control room emergency filtration systems. The function of the SGT system is to ensure that radioactive materials that leak from the primary containment into the secondary containment following a DBA are filtered and adsorbed prior to exhausting to the environment. The BWR/4 main control room environmental control (MCREC) and BWR/6 control room fresh air (CRFA) systems provide a radiologically controlled environment from which the unit can be safely operated following a DBA. The function of these systems is similar in scope to the radioactive material "scrubbing" effect of the RHR system drywell spray mode. With regard to these fission product cleanup systems, NEDC-32988 noted that the unavailability of one or both subsystems has no impact on CDF or LERF, independent of the mode of operation at the time of the accident and it was determined that allowing an end state of Mode 3 when one or both subsystems are inoperable is acceptable.

NRC Assessment of BWR/4 Suppression Pool Spray Function

As stated in Section 6 of the NRC SE associated with GE topical report NEDC-32988 (Ref. 6) regarding the RHR suppression pool spray TS (i.e., TS 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray"), steam blown down from the break under the conditions assumed in the DBA could bypass the suppression pool and end up in the suppression chamber air space and the RHR suppression spray system could be needed to condense such steam so that the pressure and temperature inside primary containment remain within analyzed design basis limits. However, the frequency of a DBA is very small and the containment has considerable margin to failure above the design limits. For this reason, the unavailability of one or both RHR suppression spray subsystems has no significant impact on CDF or LERF, even for accidents initiated during operation at power. Therefore, it is very unlikely that the RHR suppression spray system will be challenged to mitigate an accident occurring during power operation. This probability becomes extremely unlikely for accidents that would occur during a small fraction of the year (less than three days) during which the plant would be in Mode 3 (associated with lower initial energy level and reduced decay heat load as compared to power operation) to repair the failed RHR suppression spray system.

Section 5.1 of NEDC-32988 summarizes the staff's risk assessment for approval of the end state change to TS 3.6.2.4. The justification for staying in Mode 3 instead of going to Mode 4 to repair the RHR suppression pool spray system (one or both trains) is also supported by defense-in-depth considerations. NEDC-32988, Section 5.2 makes a comparison between cold shutdown (Mode 4) and hot shutdown (Mode 3) end states, with respect to the means available to perform critical functions (i.e., functions contributing to the defense-in-depth

philosophy) whose success is needed to prevent core damage and containment failure and mitigate radiation releases.

In addition, the probability of a DBA (large break) is much smaller during shutdown as compared to power operation. A DBA in Mode 3 would be considerably less severe than a DBA occurring during power operation since Mode 3 is associated with lower initial energy level and reduced decay heat load. Under these extremely unlikely conditions, an alternate method that can be used to remove heat from the primary containment, in order to keep the pressure and temperature within the analyzed design basis limits, is containment venting. For more realistic accidents that could occur in Mode 3, several alternate means are available to remove heat from the primary containment, such as the RHR system in the suppression pool cooling mode and the containment spray mode.

The risk and defense-in-depth reasoning, used according to the "integrated decision-making" process of NRC Regulatory Guides (RGs) 1.174 and 1.177 (Refs. 8 and 9), supports the conclusion that Mode 3 is as safe as Mode 4 (if not safer) for repairing an inoperable RHR suppression spray system. The NRC staff's finding concludes the proposed change to the BWR/4 RHR suppression pool spray TS is acceptable in light of defense-in-depth considerations and because the time spent in Mode 3 to perform the repair is infrequent and limited.

NRC Assessment of BWR/6 Containment Spray Function

The assessment regarding the BWR/6 RHR containment spray system TS (i.e., TS 3.6.1.7, "Residual Heat Removal (RHR) Containment Spray System"), as summarized in Section 6 of the NRC SE associated with GE topical report NEDC-32988 (Ref. 6), is comparable to the assessment associated with the BWR/4 RHR suppression pool spray function. The NRC staff's finding concludes the proposed change to the BWR/6 RHR containment spray system TS is acceptable in light of defense-in-depth considerations and because the time spent in Mode 3 to perform the repair is infrequent and limited.

NRC Assessment of BWR/4 and BWR/6 Fission Product Cleanup Function

GE topical report NEDC-32988 (Ref. 4) evaluated the following fission product cleanup systems: SGT system (i.e., TS 3.6.4.3 "Standby Gas Treatment (SGT) System"), BWR/4 MCREC system (TS 3.7.4, "Main Control Room Environmental Control (MCREC) System"), and BWR/6 CRFA system (TS 3.7.3, "Control Room Fresh Air (CRFA) System"). As stated in Section 6 of the NRC SE associated with GE topical report NEDC-32988 regarding these fission product cleanup systems, the unavailability of one or both subsystems has no impact on CDF or LERF, independent of the mode of operation at the time of the accident. Furthermore, the challenge frequency of these systems (i.e., the frequency with which the system is expected to be challenged to mitigate offsite or main control room radiological dose resulting from materials that leak from the primary containment above TS limits) is less than 1.0E-6/yr. Consequently, the conditional probability that these systems will be challenged during the repair time interval while the plant is at either the current or the proposed end state (i e., Mode 4 or Mode 3, respectively) is less than 1.0E-8. This probability is

considerably smaller than the probabilities considered "negligible" in RG 1.177 (Ref. 9) for much higher consequence risks, such as large early release.

Section 5.1 of NEDC-32988 summarizes the staff's risk assessment for approval of the end state change to TS 3.6.4.3, BWR/4 TS 3.7.4, and BWR/6 TS 3.7.3. The justification for staying in Mode 3 instead of going to Mode 4 to repair the system (one or both subsystems) is also supported by defense-in-depth considerations. NEDC-32988, Section 5.2 makes a comparison between the current (Mode 4) and the proposed (Mode 3) end state, with respect to the means available to perform critical functions (i.e., functions contributing to the defense-in-depth philosophy) whose success is needed to prevent core damage and containment failure and mitigate radiation releases. The risk and defense-in-depth reasoning, used according to the "integrated decision-making" process of RGs 1.174 and 1.177 (Refs. 8 and 9), supports the conclusion that Mode 3 is as safe as Mode 4 (if not safer) for repairing an inoperable system. The NRC staff's finding concludes the proposed change to the BWR/4 and BWR/6 fission product cleanup TSs is acceptable in light of defense-in-depth considerations and because the time spent in Mode 3 to perform the repair is infrequent and limited.

Comparison of RHR Drywell Spray Function to Similar Containment Heat Removal and Fission Product Cleanup Functions

There are no unique aspects of the HNP RHR drywell spray function that is different than the BWR/4 RHR suppression pool spray function and the BWR/6 RHR containment spray function. Therefore, SNC has determined that the NEDC-32988 conclusion that a Mode 3 end state is acceptable for TSs associated with comparable containment heat removal systems is also acceptable for the RHR drywell spray TS. The drywell spray mode of the HNP RHR system and the BWR/4 and BWR/6 fission product cleanup systems are functionally similar in that, the drywell spray scrubbing function limits the radioactive release from the primary containment and the fission product cleanup systems evaluated in the GE topical report provide a radioactive filtration function that limits the radioactive release from the secondary containment to the environment and limits the radiation dose to the operators in the control room. Therefore, SNC has determined that the NEDC-32988 conclusion that a Mode 3 end state is acceptable for the fission product cleanup systems' TSs is also acceptable for the RHR drywell spray TS.

The proposed change does not alter the design of the drywell spray mode of the RHR system, the associated LCO, or its applicability. The RHR drywell system subsystems will still be required to be Operable when the reactor is in Modes 1, 2, and 3. The proposed change only alters the end state with one or more RHR drywell spray subsystems inoperable, and requires the reactor to be subcritical (Mode 3). Finally, the requested change has no impact on the assumptions, calculations or commitment made in the AST license amendment (Ref. 5).

3.3 Note Addition to Required Action C.1

TS 3.6.2.5, Required Action C.1 is also modified by the addition of a Note prohibiting entry into the end state Mode within the Applicability during startup using the provisions of LCO 3.0.4.a. The purpose of this Note is to provide

assurance that entry into the end state Mode during startup is not made without the appropriate risk assessment. Entry into Mode 3 with an inoperable RHR drywell spray subsystem would be permitted after evaluation under LCO 3.0.4.b. This is acceptable because LCO 3.0.4.b allows entry only after performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the Mode or other specified condition in the Applicability, and establishment of risk management actions, if appropriate. Details of the risk assessment are provided in the Bases for LCO 3.0.4.b.

3.4 NRC Stipulations on the Use of NEDC-32988

The NRC's approval of NEDC-32988 included five stipulations on its use as identified in Section 7.0 of the NRC SE associated with NEDC-32988 (Ref. 6). Implementation of these stipulations were addressed in Table 2 of TSTF-423, Revision 1 (Ref. 10).

SNC committed to these stipulations as identified in the NRC SE approving the HNP license amendments to adopt TSTF-423 (Ref. 1). SNC follows 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 4A, April 2011 and the guidance established in TSTF-IG-05-02, Revision 2, "Implementation Guidance for TSTF-423, Revision 1, 'Technical Specifications End States, NEDC-32988-A'," with the exception that SNC utilizes the guidance provided in RG 1.160 in lieu of RG 1.182 and Revision 4A of NUMARC 93-01 in lieu of Revision 3. Since these stipulations currently apply to the HNP use of Mode 3 as the RHR system end state for the ECCS low pressure injection and suppression pool cooling modes implemented by TSTF-423, they will be in effect for the drywell spray mode of the RHR system also.

3.5 Summary of Technical Evaluation

Topical report NEDC-32988 provides a technical evaluation for changing the end state of several TSs and was approved by the NRC (Refs. 4 and 6). The topical report formed the technical basis of TSTF-423, which has been adopted by HNP. After approval of the HNP amendment adopting TSTF-423, SNC identified that the required action end states of TS 3.6.2.5, "Residual Heat Removal (RHR) Drywell Spray," was not addressed by the amendment. Changing the required end state of TS 3.6.2.5 from Mode 4 to Mode 3 to be consistent with other TSs related to the RHR system can improve operational efficiency and reduce plant costs.

NEDC-32988 provides a comprehensive, detailed analysis that can be directly applied to changing the TS 3.6.2.5 end state from Mode 4 to Mode 3. The design functions of containment heat removal, pressure control, and fission product cleanup are not affected by the proposed change. Therefore, the proposed change is acceptable.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements / Criteria

The drywell spray mode of the RHR system satisfies 10 CFR 50.36, "Technical specifications," paragraph (c)(2)(ii), Criterion 3. The temperature and pressure reduction effect of RHR drywell spray function, including the "scrubbing" effect of inorganic radioactive iodine and particulates from the drywell atmosphere into the suppression pool, is considered a primary success path in radioactive dose analyses.

The proposed amendment does not delete requirements associated with the RHR drywell spray function and LCO 3.6.2.5 continues to maintain requirements associated with structures, systems, and components that are part of the primary success path and actuate to mitigate the related design basis accidents and transients. The proposed amendment does not adversely alter the remedial actions or shutdown requirements required by 10 CFR 50.36(c)(2)(i); rather, the proposed amendment changes the end state requirement from cold shutdown (Mode 4) to hot shutdown (Mode 3). The risk and defense-in-depth reasoning provided in GE topical report NEDC-32988 (Ref. 4) supports the conclusion that Mode 3 is as safe as Mode 4 (if not safer) for repairing an inoperable system.

HNP Unit 1 RHR drywell spray was designed to the following applicable Atomic Energy Commission preliminary general design criteria (GDC) identified in Federal Register 32 FR 10213, published July 11, 1967 (ADAMS Accession No. ML043310029):

1967 GDC 52, 58, 59, and 60: Containment heat removal, inspection and testing of containment pressure-reducing and containment spray systems and components. The proposed amendment does not alter the design of the RHR system including the drywell spray mode of operation. The proposed amendment changes the end state requirement from cold shutdown (Mode 4) to hot shutdown (Mode 3). The HNP cooling systems will continue to be capable of removing heat from the reactor core, the drywell, and from the water in the suppression chamber during accident conditions and, thus, providing cooling of the primary containment and removal of energy from the containment. Provisions to facilitate periodic inspections of active components and other important equipment of the containment pressure-reducing and containment spray systems is not altered by the proposed amendment and the RHR system continues to provide sufficient test connections and isolation valves to permit periodic pressure and functional testing.

The HNP Unit 2 RHR drywell spray was designed to the following 10 CFR Part 50, Appendix A General Design Criteria for Nuclear Power Plants:

GDC 38, 39, and 40: Containment heat removal, inspection, and testing. The proposed amendment does not alter the design of the RHR system including the drywell spray mode of operation. The proposed amendment changes the end state requirement from cold shutdown (Mode 4) to hot shutdown (Mode 3). The HNP cooling systems will continue to be capable of removing heat from the

reactor core, the drywell, and from the water in the suppression chamber during accident conditions and, thus, providing cooling of the primary containment and removal of energy from the containment. Provisions to facilitate periodic inspections of active components and other important equipment of the containment pressure-reducing systems is not altered by the proposed amendment and the RHR system continues to provide sufficient test connections and isolation valves to permit periodic pressure and functional testing.

GDC 41, 42, and 43: Containment atmosphere cleanup, inspection, and testing. The proposed amendment does not alter the design of the RHR system drywell spray mode. The proposed amendment changes the end state requirement from cold shutdown (Mode 4) to hot shutdown (Mode 3). The drywell spray mode of the RHR system will continue to be capable of "scrubbing" inorganic radioactive iodine and particulates from the drywell atmosphere and reducing the pressure and temperature in the drywell following a LOCA to reduce the radioactive leakage that bypasses the secondary containment and associated cleanup systems. Provisions to facilitate periodic inspections of active components and other important equipment of the containment pressure-reducing systems is not altered by the proposed amendment and the RHR system continues to provide sufficient test connections and isolation valves to permit periodic pressure and functional testing.

4.2 No Significant Hazards Consideration Determination Analysis

The proposed change revises the end state when the time allowed by Technical Specifications (TS) to continue operation is exceeded for the drywell spray mode of the Residual Heat Removal (RHR) system. The proposed allows entry into hot shutdown (Mode 3) rather than cold shutdown (Mode 4) 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). The current TS action to be in Mode 3 is also modified by a Note that prohibits entering the TS applicability with the limiting condition for operation (LCO) not met using LCO 3.0.4.a. Risk insights from both qualitative and quantitative risk assessments in General Electric (GE) topical report NEDC-32988-A, Revision 2, "Technical Justification to Support Risk Informed Modification to Selected Required Action End States for BWR Plants," support the proposed change.

SNC has evaluated whether a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

(1) Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The RHR drywell spray function is not an initiator of any accident previously evaluated but is assumed to mitigate some accidents previously evaluated. However, the proposed change does not alter the design or safety function of the RHR system, including the drywell spray mode. The proposed change

revises the end state when the time allowed by TS to continue operation is exceeded for the drywell spray mode of the RHR system. This request is limited to an end state where entry into the shutdown mode is for a short interval and the primary purpose is to correct the initiating condition and return to power operation as soon as practical. Risk insights from both the qualitative and quantitative risk assessment were used to support a change in end state for similar boiling water reactor (BWR) systems as summarized in GE topical report NEDC-32988. These assessments provide an integrated discussion of deterministic and probabilistic issues focusing on specific TSs used to support similar TS end states and associated restrictions. SNC finds that the risk insights also support the conclusion of the proposed change to the RHR drywell spray TS. Therefore, the probability of an accident previously evaluated is not significantly increased, if at all.

The consequences of accidents previously evaluated that assume the drywell spray function in accident mitigation are based on the plant operating with the reactor critical and at power. A DBA in hot shutdown would be considerably less severe than a DBA occurring during power operation since hot shutdown is associated with lower initial energy level and reduced decay heat load. The risk and defense-in-depth reasoning, provided in GE topical report NEDC-32988, supports the conclusion that hot shutdown is as safe as cold shutdown (if not safer) for repairing an inoperable RHR subsystem. SNC concludes the proposed change is acceptable in light of defense-in-depth considerations and because the time spent in hot shutdown to perform the repair is infrequent and limited. Therefore, the consequences of any accident that assumes the drywell spray function are not significantly affected by this change.

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

(2) Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed change does not change the design function or operation of the RHR drywell spray function. No plant modifications or changes to the plant configuration or method of operation are involved. If risk is assessed and managed, allowing a change to the end state for the RHR drywell spray TS when the allowed time for remaining in power operation with one or more RHR drywell spray subsystem inoperable is exceeded, i.e., entry into hot shutdown rather than cold shutdown to repair equipment, will not introduce new failure modes or effects and will not, in the absences 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 to adhere to the industry guidance related to TS end states further minimizes possible concerns.

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

(3) Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The proposed change does not affect any of the controlling values of parameters used to avoid exceeding regulatory or licensing limits. The proposed change does not exceed or alter the design basis or safety limits, or any limiting safety system settings. The requirement for the drywell spray mode of the RHR system to perform its designated safety function is unaffected. The risk assessment approach used in the GE topical report NEDC-32988 is comprehensive and follows NRC staff guidance. The risk assessment, summarized in GE topical report NEDC-32988, included evaluations of systems with similar functions as the drywell spray function of the RHR system. In addition, the NEDC-32988 risk analyses show that the criteria of the three-tiered approach for allowing TS changes, in accordance with NRC staff guidance, are met. The risk assessments used to justify TS changes associated with containment heat removal systems are also applicable the RHR drywell spray TS because these systems perform an equivalent function as the drywell spray mode of the RHR system and there are no unique aspects of the RHR drywell spray containment heat removal function that would change the conclusion that a hot shutdown end state is acceptable. The risk assessment used to justify the TS change associated with fission product cleanup systems is also applicable to the RHR drywell spray TS because the systems are functionally similar and there are no aspects of the HNP RHR drywell spray fission product cleanup function that would change the conclusion that a hot shutdown end state is acceptable. Therefore, SNC has determined that the acceptability of hot shutdown end state for systems previously evaluated with similar functions is also acceptable for the HNP RHR drywell spray TS. As such, the net change to the margin of safety as a result of the proposed change is insignificant.

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

Based on the above, SNC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.3 Conclusion

In conclusion, based on the considerations discussed above, (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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATIONS

SNC has evaluated the proposed amendment for environmental considerations. The review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a 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 amendment 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 amendment.

6.0 REFERENCES

1. Letter from Michael D. Orenak (NRC) to Charles R. Pierce (SNC), "Edwin I. Hatch Nuclear Plant, Unit Nos. 1 And 2 - Issuance of Amendments to Adopt TSTF-423, Revision 1, "Technical Specifications End States, NEDC-32988-A," December 19, 2016 (ADAMS Accession No. ML16257A724).
2. Notice of Availability of the Proposed Models for Plant-Specific Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF–423, Revision 1, "Technical Specifications End States, NEDC–32988–A," for Boiling Water Reactor Plants Using the Consolidated Line Item Improvement Process, 76FR9614, February 18, 2011.
3. NRC NUREG-1433, Volume 1 - Specifications, "Standard Technical Specifications General Electric BWR/4 Plants," Revision 4, April 2012 (ADAMS Accession No. ML12104A192).
4. GE Nuclear Energy Topical Report, NEDC-32988-A, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants," Revision 2, December 2002 (ADAMS Accession No. ML030170060).
5. Letter from Robert E. Martin (NRC) to Dennis R. Madison (SNC), "Edwin I. Hatch Nuclear Plant, Unit Nos. 1 and 2, Issuance of Amendments Regarding Alternate Source Term (TAC Nos. MD2934 AND MD2935)," August 28, 2008 (ADAMS Accession No. ML081770071).
6. Letter from W. H. Ruland (NRC) to J. Gray (BWR Owners Group), "Safety Evaluation of Topical Report NEDC-32988, Rev. 2, 'Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants' (TAC No. MB1054)," September 27, 2002.
7. NRC NUREG-1434, Volume 1 - Specifications, "Standard Technical Specifications General Electric BWR/6 Plants," Revision 4, April 2012 (ADAMS Accession No. ML12104A195).
8. NRC Regulatory Guide1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," July 1998 (ADAMS Accession No. ML003740133).
9. NRC Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decision-Making: Technical Specifications," August 1998 (ADAMS Accession No. ML003740176).
10. Technical Specification Task Force Traveler TSTF-423, "Technical Specifications End States, NEDC-32988-A," Revision 1, December 22, 2009 (ADAMS Accession No. ML093570241).

Edwin I. Hatch Nuclear Plant – Units 1 & 2
Revision to Technical Specification End State for Residual Heat Removal Drywell Spray

Attachment 1

HNP Unit 1 and Unit 2 Technical Specifications Marked-Up Pages

3.6 CONTAINMENT SYSTEMS

3.6.2.5 Residual Heat Removal (RHR) Drywell Spray

LCO 3.6.2.5 Two RHR drywell spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR drywell spray subsystem inoperable.	A.1 Restore RHR drywell spray subsystem to OPERABLE status.	7 days
B. Two RHR drywell spray subsystems inoperable.	B.1 Restore one RHR drywell spray subsystem to OPERABLE status.	8 hours
C. Required Action and associated Completion Time not met.	C.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3. ~~AND~~ ~~C.2 Be in MODE 4.~~	12 hours ~~36 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.5.1	Verify each RHR drywell spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position or can be aligned to the correct position.	In accordance with the Surveillance Frequency Control Program

3.6 CONTAINMENT SYSTEMS

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LCO 3.6.2.5 Two RHR drywell spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

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C. Required Action and associated Completion Time not met.	C.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours
	~~AND~~	
	~~C.2 Be in MODE 4.~~	~~36 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.5.1	Verify each RHR drywell spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position or can be aligned to the correct position.	In accordance with the Surveillance Frequency Control Program

Edwin I. Hatch Nuclear Plant – Units 1 & 2
Revision to Technical Specification End State for Residual Heat Removal Drywell Spray

Attachment 2

HNP Unit 1 and Unit 2 Technical Specifications Clean-Typed Pages

3.6 CONTAINMENT SYSTEMS

3.6.2.5 Residual Heat Removal (RHR) Drywell Spray

LCO 3.6.2.5 Two RHR drywell spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

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C. Required Action and associated Completion Time not met.	C.1 --------NOTE-------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.5.1	Verify each RHR drywell spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position or can be aligned to the correct position.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.2.5 Residual Heat Removal (RHR) Drywell Spray

LCO 3.6.2.5 Two RHR drywell spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR drywell spray subsystem inoperable.	A.1 Restore RHR drywell spray subsystem to OPERABLE status.	7 days
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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.5.1	Verify each RHR drywell spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position or can be aligned to the correct position.	In accordance with the Surveillance Frequency Control Program

(continued)

Edwin I. Hatch Nuclear Plant – Units 1 & 2
Revision to Technical Specification End State for Residual Heat Removal Drywell Spray

Attachment 3

HNP Unit 1 and Unit 2 Technical Specifications Bases Marked-Up Pages (Information Only)

BASES (continued)

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause the pressurization of, and the release of fission products into, the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to pressure and temperature limitations in these MODES. Therefore, maintaining RHR drywell spray subsystems OPERABLE is not required in MODE 4 or 5.

ACTIONS

A.1

With one drywell spray subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE RHR drywell spray subsystem is adequate to perform the primary containment fission product scrubbing and temperature and pressure reduction functions.

However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in the loss of the scrubbing and temperature and pressure reduction capabilities of the RHR drywell spray system. The 7 day Completion Time was chosen because of the capability of the redundant and OPERABLE RHR drywell spray subsystem and the low probability of a DBA occurring during this period.

B.1

With both RHR drywell spray subsystems inoperable, at least one subsystem must be restored to OPERABLE status within 8 hours. In this Condition, there is a substantial loss of the fission product scrubbing and temperature and pressure reduction functions of the RHR drywell spray system. The 8 hour Completion Time is based on the low probability of a DBA during this period.

C.1 ~~and C.2~~

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which ~~the LCO does not apply~~overall plant risk is minimized. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours~~ and MODE 4 within 36 hours~~. The allowed Completion Times ~~is~~are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

(continued)

Remaining in the Applicability of the LCO is acceptable because the plant risk in MODE 3 is similar to or lower than the risk in MODE 4 (Ref. 4) and because the time spent in MODE 3 to perform the necessary repairs to restore the system to OPERABLE status will be short. However, voluntary entry into MODE 4 may be made as it is also an acceptable low-risk state.

Required Action C.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 3, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.2.5.2 (continued)

If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the SR is met and past system Operability is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the RHR Drywell Spray System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

RHR Drywell Spray System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative subset of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

SR 3.6.2.5.3

This surveillance is performed following maintenance which could result in nozzle blockage to verify that the spray nozzles are not obstructed and that flow will be provided when required. The frequency is adequate to detect degradation in performance due to the passive nozzle design and its normally dry state and has been shown to be acceptable through operating experience.

REFERENCES

1. FSAR Section 4.8.

2. Unit 2 FSAR, Section 15.3.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

~~3.~~4. NEDC-32988-A, Revision 2, Technical Justification to Support Risk-Informed Modification to Selected Required End States for BWR Plants, December 2002.

BASES (continued)

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause the pressurization of, and the release of fission products into, the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to pressure and temperature limitations in these MODES. Therefore, maintaining RHR drywell spray subsystems OPERABLE is not required in MODE 4 or 5.

ACTIONS

A.1

With one drywell spray subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE RHR drywell spray subsystem is adequate to perform the primary containment fission product scrubbing and temperature and pressure reduction functions.

However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in the loss of the scrubbing and temperature and pressure reduction capabilities of the RHR drywell spray system. The 7 day Completion Time was chosen because of the capability of the redundant and OPERABLE RHR drywell spray subsystem and the low probability of a DBA occurring during this period.

B.1

With both RHR drywell spray subsystems inoperable, at least one subsystem must be restored to OPERABLE status within 8 hours. In this Condition, there is a substantial loss of the fission product scrubbing and temperature and pressure reduction functions of the RHR drywell spray system. The 8 hour Completion Time is based on the low probability of a DBA during this period.

C.1 ~~and C.2~~

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which ~~the LCO does not apply~~overall plant risk is minimized. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours ~~and MODE 4 within 36 hours~~. The allowed Completion Times ~~are~~ is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner without challenging plant systems.

Remaining in the Applicability of the LCO is acceptable because the plant risk in MODE 3 is similar to or lower than the risk in MODE 4 (Ref. 4) and because the time spent in MODE 3 to perform the

(continued)

necessary repairs to restore the system to OPERABLE status will be short. However, voluntary entry into MODE 4 may be made as it is also an acceptable low-risk state.

Required Action C.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 3, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.2.5.2 (continued)

If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the SR is met and past system Operability is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the RHR Drywell Spray System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

RHR Drywell Spray System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative subset of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

SR 3.6.2.5.3

This surveillance is performed following maintenance which could result in nozzle blockage to verify that the spray nozzles are not obstructed and that flow will be provided when required. The frequency is adequate to detect degradation in performance due to the passive nozzle design and its normally dry state and has been shown to be acceptable through operating experience.

REFERENCES

1. FSAR Section 5.5.7.

2. Unit 2 FSAR, Section 15.3.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

~~3.~~4. NEDC-32988-A, Revision 2, Technical Justification to Support Risk-Informed Modification to Selected Required End States for BWR Plants, December 2002.