November 10, 2003 TSTF-03-09

Dr. William D. Beckner, Director
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: TSTF-430, Revision 1, "AOT Extension to 7 Days for LPI and Containment Spray (BAW-2295-A, Rev. 1)"

Dear Dr. Beckner:

Enclosed for NRC review is Revision 1 to TSTF-430, "AOT Extension to 7 Days for LPI and Containment Spray (BAW-2295-A, Rev. 1)." This revision addresses the NRC's comments of September 10, 2002, regarding the "discovery of failure to meet the LCO" Completion Times. The TSTF has held several meetings and conference calls with your staff to understand their concerns. Based on those discussions, we believe we have addressed the staff's concerns by modifying the justification to explain the changes to these Completion Times and to reference a precedent.

This Traveler will be incorporated into the proposed Revision 3 of the Improved Technical Specification NUREGs (e.g., NUREG-1430 through -1434).

Should you have any questions, please do not hesitate to contact us.

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Enclosure

cc: Drew Holland (NRC)

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Technical Specification Task Force
Improved Standard Technical Specifications Change Traveler

AOT Extension to 7 Days for LPI and Containment Spray (BAW-2295-A, Rev. 1)

NUREGs Affected: ☑ 1430 ☐ 1431 ☐ 1432 ☐ 1433 ☐ 1434

Classification: 1) Technical Change Recommended for CLIIP?: Yes

Correction or Improvement: Improvement

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1.0 Description

This change implements the changes described in Topical Report BAW-2295-A, Revision 1, "Justification For Extension Of Allowed Outage Time For Low Pressure Injection And Reactor Building Spray Systems." BAW-2295 was approved by the NRC on July 15, 1999. The ITS 3.5.2 Completion Time for a single Low Pressure Injection (LPI) train inoperable is extended from 72 hours to [7] days. The ITS 3.6.6 Completion Time for a containment spray train inoperable is extended from 72 hours to [7] days. The maximum time that LCO 3.6.6 cannot be met in ACTIONS A and C is extended from 10 days to [14] days.

2.0 Proposed Change

The proposed change extends the Completion Time for a single inoperable Low Pressure Injection (LPI) train from 72 hours to [7] days. The Completion Time for an inoperable containment spray train is extended from 72 hours to [7] days.

The "modified time zero" Completion Times in Specification 3.6.6, Conditions A and C are revised from 10 days to 14 days. The "discovery of failure to meet the LCO" Completion Times are an administrative limit intended to prevent plants from successively entering and exiting ACTIONS associated with different systems governed by one LCO without ever meeting the LCO (i.e., "flip flopping") . The "discovery of failure to meet the LCO" Completion Times are the sum of the Conditions which can be successively entered, in this case Specification 3.6.6, Conditions A and C. These administrative limits are calculated without regard to the method used to determine the component Completion Times. Therefore, an extension of one of the component Completion Times will result in a corresponding extension of the "discovery of failure to meet the LCO" Completion Time. This portion of the change is consistent with the Staff's approval of Grand Gulf Nuclear Station, Unit 1, Amendment 151, dated July 16, 2002.

3.0 Background

The LPI serves a dual function as a component of the decay heat removal (DHR) system, and as a component of the emergency core cooling system (ECCS) in the emergency operating mode. In the B&W plant design, the DHR system and LPI are combined and share most components, including pumps, valves, and piping. The function of LPI portion of the ECCS is to flood the core with borated water immediately following a large or intermediate loss-of-coolant accident (LOCA) to prevent a significant amount of cladding failure with subsequent release of fission products into the containment. The DHR system is a high-capacity, low-head system with separation and sufficient number of components to provide two-train redundancy for the safeguards mode of operation. It also removes heat from the core for extended periods of time following a LOCA, and in non-emergency conditions such as shutdown and refueling operations.

The containment spray system removes heat and fission products from the post-accident containment atmosphere by directing borated water spray into the containment following a LOCA. The system consists of two pumps, two spray headers, and necessary piping, valves, instrumentation, and controls.

The LPI and containment spray are related systems in that they both take suction from the borated water storage tank (BWST) and can also draw suction from the reactor building sump for coolant recirculation. When the water in the BWST reaches a low level during the injection mode, the recirculation mode is initiated by realigning the LPI/containment spray pump suction from the BWST to the reactor building emergency sump. Each LPI train shares common suction piping with its corresponding containment spray train.

The TS that are affected by this proposed change are 3.5.2, "ECCS - Operating" and 3.6.6, "Containment Spray and Cooling Systems." Currently, 3.5.2 requires two trains of ECCS to be OPERABLE. With one train of ECCS inoperable, a Completion Time of 72 hours is allowed to restore the train or commence a shutdown. The proposed change provides an additional action which allows one train of LPI to be inoperable for [7] days. The high pressure injection (HPI) Completion Time is not being extended at this time. At times, one train of containment spray is affected by LPI train maintenance because of the common suction piping. Therefore, the proposed change extends the Completion Time for one inoperable train of containment spray to [7] days. Under the conventions in the Writer's Guide, the extension of the Completion Time for one train of containment spray from 72 hours to [7] days also requires an extension of the "modified time zero" portion of 3.6.6 from 10 days to [14] days.

4.0 Technical Analysis

The analysis for this change is presented in detail in BAW-2295-A, Revision 1, "Justification For Extension Of Allowed Outage Time For Low Pressure Injection And Reactor Building Spray Systems." BAW-2295 was approved by the NRC on July 15, 1999. The NRC's evaluation of BAW-2295 considered both deterministic and probabilistic analyses.

Effect on Safety Analyses

The deterministic evaluation consisted of each utility's review of the systems and safety functions that are affected by the entry into the LPI / containment spray train AOT. The licensee assured that all the affected DHR, LPI and RBS safety functions were identified and quantitatively and qualitatively assessed. The licensees determined that there are no systems, structures, or components that will change status due to the proposed changes (i.e., no additional systems, structures, or components will become significant to public health and safety due to the proposed change). The licensees determined that no new accidents or transients will be introduced by the proposed change.

Effect on Risk Informed Analysis

BAW-2295, Revision 1 (October 1997) describes the risk informed evaluation that was performed to evaluate the extension of the Completion Time for LPI and containment spray to 7 days. The NRC found this evaluation acceptable, as detailed in their Safety Evaluation dated July 15, 1999.

Specific compensatory measures are required in an effort to reduce the risk impacts. The compensatory measures defined as part of the proposed LPI and containment spray Completion Time changes are:

> Avoiding simultaneous outages of additional risk-significant components during the Completion Time of the LPI and containment spray system trains. These components whose simultaneous outages are identified to be avoided, in addition to the current TS requirements, are both trains of the emergency feedwater (EFW), high pressure injection (HPI), reactor building cooling unit (RBCU), and their power supplies.

> Defining specific criteria for scheduling only those preventive maintenances which can be completed within the Completion Time, such that the chance for needing a forced outage for failing to complete the maintenance is negligible.

> Assuring that the frequency of entry into the Completion Time and consequently, the average maintenance duration per year remains within that assumed in the submittal. In some cases, a reduction of the number of entries in to the Completion Time was assumed.

> Taking measures to assure that when maintaining the LPI and containment spray trains both are not made unavailable unless it is necessary. In many situations, maintenance in one of the trains can be conducted without affecting the other train.

The NRC's Safety Evaluation also requires the licensees implement a "Configuration Risk Management Program" which meets the criteria put forward in the Safety Evaluation. Mainteance Rule 10 CFR 50.65(a)(4) eliminates the need for a Configuration Risk Management Program to support this change as 10 CFR 50.65(a)(4) mandates a similar program.

5.0 Regulatory Analysis

5.1 No Significant Hazards Consideration

The TSTF has evaluated whether or not a significant hazards consideration is involved with the proposed generic change by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed 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 one inoperable Low Pressure Injection train and/or Containment Spray train for [7] days. The Low Pressure Injection system or Containment Spray system are not initiators for any accident previously evaluated. The consequences of an event during the extended Completion Time are no more severe than the consequences of the same event during the current Completion Time. Therefore, the consequences of an event previously analyzed are not increased. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed change allows one inoperable Low Pressure Injection train and/or Containment Spray train for [7] days. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

   Response: No.

   The proposed change allows one inoperable Low Pressure Injection train and/or Containment Spray train for [7] days. An evaluation presented in Topical Report BAW-2295 and accepted by the NRC concluded that the extended Completion Time did not result in a significant reduction in the margin of safety. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, the TSTF concludes that the proposed change presents no 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.

5.2 Applicable Regulatory Requirements

The analysis in BAW-2295-A demonstrates that the proposed changes continue to meet the applicable regulatory requirements and 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 approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

6.0 Environmental Impact Consideration

A review has determined that the proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent 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.

7.0 References

BAW-2295-A, Revision 1, Justification for Extension of Allowed Outage Time for Low Pressure Injection and Reactor Building Spray Systems.

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: BWOG

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 23-Mar-00

Owners Group Comments:
EXCEL to make indicated changes

Owners Group Resolution: Superceeded Date: 02-Aug-00

OG Revision 1 Revision Status: Closed

Revision Proposed by: BWOG

Revision Description:
Revised the description and justification to more closely match the NRC's Safety Evaluation for BAW-2295-A.

OG Revision 1 Revision Status: Closed

Owners Group Review Information

Date Originated by OG: 07-Dec-00

Owners Group Comments:
(No Comments)

Owners Group Resolution: Approved Date: 07-Dec-00

TSTF Review Information

TSTF Received Date: 12-Feb-01 Date Distributed for Review: 12-Feb-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

2/14/2001 - discussed by TSTF. BWOG only. BWOG to revise to make consistent with similar CEOG change. Bracket the 7 and 14 days. Put Reviewer's Note in the Bases to explain the adoption of the Topical. Leave in one TSTF since this is the way the Topical is written. Evaluate the need for a Condition when both Spray and Cooling is inoperable for 72 hours. WOG and CEOG want to hear the resolution of the need for the combination before approval of the Traveler.

3/6/2001 - Incorporate comments from BWOG meeting. BWOG would like this to be a high priority CLIIP item.

12/15/01 - Revised mark on Rev. 2 pages, revised description and justification to met new format, revised to number references in order of appearance.

TSTF Resolution: Approved Date: 23-Jan-02

NRC Review Information

NRC Received Date: 01-Feb-02

NRC Comments: Date of NRC Letter: 10-Sep-02

This is to inform you that disposition has been made on Technical Specification Task Force (TSTF)-439 containing proposed changes to the Standard Technical Specification (STS) NUREG-1430, Babmck and Wilcox Plants, made by the Nuclear Energy Institute (NEI) TSTF. The staff is prepared to approve TSTF-430 with respect to the proposed changes to Low Pressure Injection and Containment Spray completion time extensions. The staff is not prepared to approve the proposed completion time extensions to the modified time zero" completion times, since the resolution of TSTF-439 will apply to those completion times. The staff is closing out TSTF-430 with a recommendation to modify it and submit TSTF430 Revision 1 based upon the final results of approved TSTF-439.

Final Resolution: Superceded by Revision Final Resolution Date: 10-Sep-02

TSTF Revision 1 Revision Status: Active

Revision Proposed by: BWOG

Revision Description:
In a letter dated September 10, 2002, the NRC stated, "The staff is prepared to approve TSTF-430 with respect to the proposed changes to Low Pressure Injection and Containment Spray completion time extensions. The staff is not prepared to approve the proposed completion time extensions to the 'modified time zero' completion times, since the resolution of TSTF-439 will apply to those completion times."

TSTF Revision 1 Revision Status: Active

The TSTF and the NRC held several discussions on the history and purpose of the "modified time zero" or "discovery of failure to meet the LCO" Completion Times. The "discovery of failure to meet the LCO" Completion Times are an administrative limit intended to prevent plants from successively entering and exiting ACTIONS associated with different systems governed by one LCO without ever meeting the LCO (e.g., "flip flopping") . The "discovery of failure to meet the LCO" Completion Times are generally the sum of the longest and shortest Completion Times that could be successively entered (in this case, Specification 3.6.6 Conditions A and C). This administrative limit is calculated without regard to the method used to determine the component Completion Times. Therefore, an extension of one of the component Completion Times will result in a corresponding extension of the "discovery of failure to meet the LCO" Completion Time. The NRC determined that increasing the "discovery of failure to meet the LCO" Completion Times based on adding a risk-based and deterministic Completion Time was consistent with the Staff's approval of Grand Gulf Nuclear Station, Unit 1, Amendment 151, dated July 16, 2002.

This revision changes TSTF-430 by expanding the justification under the "Proposed Change" section to explain the purpose of the "discovery of failure to meet the LCO" Completion Times. No other changes are made to the Traveler.

TSTF Review Information

TSTF Received Date: 15-Oct-03 Date Distributed for Review: 26-Oct-03

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 29-Oct-03

NRC Review Information

NRC Received Date: 11-Nov-03

Affected Technical Specifications

Ref. 3.5.2 Bases	ECCS - Operating	
Action 3.5.2.A	ECCS - Operating	
	Change Description:	Relabeled B
Action 3.5.2.A	ECCS - Operating	
	Change Description:	New
Action 3.5.2.A Bases	ECCS - Operating	
	Change Description:	New
Action 3.5.2.A Bases	ECCS - Operating	
	Change Description:	Relabeled B

Action 3.5.2.B	ECCS - Operating Change Description: Relabeled C
Action 3.5.2.B Bases	ECCS - Operating Change Description: Relabeled C
Action 3.5.2.C	ECCS - Operating Change Description: Relabeled D
Action 3.5.2.C Bases	ECCS - Operating Change Description: Relabeled D
SR 3.5.2.1 Bases	ECCS - Operating
SR 3.5.2.4 Bases	ECCS - Operating
Ref. 3.6.6 Bases	Containment Spray and Cooling Systems
Action 3.6.6.A	Containment Spray and Cooling Systems
Action 3.6.6.A Bases	Containment Spray and Cooling Systems
Action 3.6.6.C	Containment Spray and Cooling Systems
Action 3.6.6.C Bases	Containment Spray and Cooling Systems
SR 3.6.6.4 Bases	Containment Spray and Cooling Systems

INSERT 1

With one LPI subsystems inoperable, action must be taken to restore it to OPERABLE status within 7 days. In this condition, the remaining OPERABLE ECCS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure to the remaining LPI subsystem could result in loss of ECCS function. The [7] day Completion Time is reasonable to perform corrective maintenance on the inoperable LPI subsystem. The [7] day Completion Time is based on the findings of the deterministic and probabilistic analysis in Reference 3. Reference 3 concluded that extending the Completion Time to [7] days for an inoperable LPI subsystem proves plant operational flexibility while simultaneously reducing overall plant risk. This is because the risks incurred by having the LPI subsystem unavailable for a longer time at power will be substantially offset by the benefits associated with avoiding unnecessary plant transitions and by reducing risk during plant shutdown operations.

INSERT 2

3. BAW-2295-A, Revision 1, Justification for Extension of Allowed Outage Time for Low Pressure Injection and Reactor Building Spray Systems.

INSERT 3

With one containment spray train inoperable, action must be taken to restore it to OPERABLE status within [7] days. In this condition, the remaining OPERABLE containment spray train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure to the remaining containment spray train could result in loss of spray function. The [7] day Completion Time is reasonable to perform corrective maintenance on the inoperable containment spray train. The [7] day Completion Time is based on the findings of the deterministic and probabilistic analysis in Reference 5. Reference 5 concluded that extending the Completion Time to [7] days for an inoperable containment spray train proves plant operational flexibility while simultaneously reducing overall plant risk. This is because the risks incurred by having the containment spray train unavailable for a longer time at power will be substantially offset by the benefits associated with avoiding unnecessary plant transitions and by reducing risk during plant shutdown operations.

INSERT 4

5. BAW-2295-A, Revision 1, Justification for Extension of Allowed Outage Time for Low Pressure Injection and Reactor Building Spray Systems.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

- NOTE -

[Operation in MODE 3 with high pressure injection (HPI) de-activated in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is allowed for up to [4] hours.]

APPLICABILITY: MODES 1, 2, and 3.

for reasons other than Condition 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	C.1 Enter LCO 3.0.3	Immediately

A. One Low Pressure Injection (LPI) subsystem inoperable.	A.1 Restore LPI subsystem to OPERABLE status.	[7] days

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray and Cooling Systems

LCO 3.6.6 Two containment spray trains and two containment cooling trains shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours [7] days AND 10 [14] days from discovery of failure to meet the LCO
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 84 hours
C. One [required] containment cooling train inoperable.	C.1 Restore [required] containment cooling train to OPERABLE status.	7 days AND 10 [14] days from discovery of failure to meet the LCO
D. Two [required] containment cooling trains inoperable.	D.1 Restore one [required] containment cooling train to OPERABLE status.	72 hours

BASES

APPLICABILITY

In MODES 1, 2, and 3, the ECCS train OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The HPI pump performance is based on the small break LOCA, which establishes the pump performance curve and is less dependent on power. The HPI pump performance requirements are based on a small break LOCA. MODES 2 and 3 requirements are bounded by the MODE 1 analysis.

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

Insert 1

inoperable for reasons other than Condition A

With one or more trains operable and at least 100% of the injection flow equivalent to a single OPERABLE ECCS train available, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on NRC recommendations (Ref. 3) that are based on a risk evaluation and is a reasonable time for many repairs.

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. This allows increased flexibility in plant operations under circumstances when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 3) has shown the risk of having one full ECCS train

BASES

ACTIONS (continued)

inoperable to be sufficiently low to justify continued operation for 72 hours.

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

C.1 and C.2

If the inoperable components cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and at least MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1

Condition A is applicable with one or more trains inoperable. The allowed Completion Time is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removal of power or by key locking the control in the correct position ensures that the valves cannot change position as the result of an active failure. These valves are of the type described in Reference 5, which can disable the function of both ECCS trains and invalidate the accident analyses. The 12 hour Frequency is considered reasonable in view of other administrative controls that will ensure the unlikelihood of a mispositioned valve.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. The 31 day Frequency is appropriate because the valves are operated under administrative control, and an inoperable valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.3

With the exception of systems in operation, the ECCS pumps are normally in a standby, nonoperating mode. As such, the flow path piping has the potential to develop voids and pockets of entrained gases. Maintaining the piping from the ECCS pumps to the RCS full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an ESFAS signal or during shutdown cooling. The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the existence of procedural controls governing system operation.

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code (Ref. 6). This type of testing may be accomplished by measuring the pump's developed head at only one point of the pump's characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is greater than or equal to the performance assumed in the plant accident analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the

BASES

SURVEILLANCE REQUIREMENTS (continued)

Frequency has been found to be sufficient to detect abnormal degradation and has been confirmed by operating experience.

REFERENCES

1. 10 CFR 50.46.

2. FSAR, Section [6.3].

Insert 2

4 3. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

5 4. IE Information Notice 87-01, "RHR Valve Misalignment Causes Degradation of ECCS in PWRs," January 6, 1987.

6 5. ASME, Boiler and Pressure Vessel Code, Section XI, Inservice Inspection, Article IWV-3400.

BASES

ACTIONS

A.1

Insert 3

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

[147]

The 10 day portion of the Completion Time for Required Action A.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this LCO coupled with the low probability of an accident occurring during this time. Refer to Section 1.3, Completion Times, for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

B.1 and B.2

If the inoperable containment spray train cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time to attempt restoration of the containment spray train and is reasonable when considering the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

C.1

With one of the required containment cooling trains inoperable, the inoperable containment cooling train must be restored to OPERABLE status within 7 days. The components in this degraded condition provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs after an accident. The 7 day Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the Containment Spray System and Containment Cooling System and the low probability of a DBA occurring during this period.

BASES

ACTIONS (continued)

The 10 day portion of the Completion Time for Required Action C.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this LCO coupled with the low probability of an accident occurring during this time. Refer to Section 1.3 for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

D.1

With two of the required containment cooling trains inoperable, one of the required containment cooling trains must be restored to OPERABLE status within 72 hours. The components in this degraded condition (both spray trains are OPERABLE or else Condition F is entered) provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs after an accident. The 72 hour Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the Containment Spray System and Containment Cooling System and the low probability of a DBA occurring during this period.

E.1 and E.2

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

F.1

With two containment spray trains or any combination of three or more containment spray and containment cooling trains inoperable, the unit is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Verifying the correct alignment for manual, power operated, and automatic valves in the containment spray flow path provides assurance that the proper flow paths will exist for Containment Spray System operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position.

SR 3.6.6.2

Operating each [required] containment cooling train fan unit for $\geq$ 15 minutes ensures that all trains are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. The 31 day Frequency was developed considering the known reliability of the fan units and controls, the two train redundancy available, and the low probability of a significant degradation of the containment cooling trains occurring between surveillances and has been shown to be acceptable through operating experience.

SR 3.6.6.3

Verifying that each [required] containment cooling train provides an essential raw water cooling flow rate of $\geq$ [1780] gpm to each cooling unit provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 1). The Frequency was developed considering the known reliability of the Cooling Water System, the two train redundancy available, and the low probability of a significant degradation of flow occurring between surveillances.

SR 3.6.6.4

Verifying that each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head ensures that spray pump performance has not degraded during the cycle. Flow and differential pressure are normal tests of centrifugal pump performance required by Section XI of the ASME Code (Ref. 6). Since the Containment Spray System pumps cannot be tested with flow through the spray headers, they are tested on recirculation flow. This test

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 38, GDC 39, GDC 40, GDC 41, GDC 42, and GDC 43.

2. FSAR, Section [14.1].

3. FSAR, Section [6.3].

4. FSAR, Section [14.2].

Inset 4

6 8 ASME, Boiler and Pressure Vessel Code, Section XI.