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Waterford 3

W3F1-2010-0019

February 22, 2010

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

Subject: Technical Specification Table 3.4-1 Isolation Valve Addition
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Waterford Steam Electric Station Unit 3 (Waterford 3).

The proposed amendment adds valve SI-4052A (RC LOOP 2 SDC SUCTION INSIDE CONTAINMENT BYPASS ISOL) and valve SI-4052B (RC LOOP 1 SDC SUCTION INSIDE CONTAINMENT BYPASS ISOL) to Technical Specification Table 3.4-1. The purpose of this line is to equalize the shutdown cooling system pressure down stream of valve SI-405A (RC LOOP 2 SDC SUCTION INSIDE CONTAINMENT ISOL) and valve SI-405B (RC LOOP 1 SDC SUCTION INSIDE CONTAINMENT ISOL).

Attachment 1 provides an analysis of the proposed Technical Specification change. Attachment 2 provides a mark-up of the proposed changed page. Attachment 3 provides a clean copy of the proposed changed page.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using the criteria in 10 CFR 50.92(c), and it has been determined that the changes involve no significant hazards consideration. The bases for these determinations are included in the attached submittal.

The proposed change includes new commitments listed in Attachment 4. Entergy requests approval of the proposed amendment by February 22, 2011. Once

ADD
LRR

approved, the amendment shall be implemented prior to Mode 4 following refuel 17. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact Robert J. Murillo at 504-739-6715.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 22, 2010.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert J. Murillo". The signature is fluid and cursive, with the first name being the most prominent.

JAK/RJM/WJS

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Operating License Condition Change (mark-up)
3. Proposed Operating License Condition Change (clean copy)
4. List of Regulatory Commitments

cc: Mr. Elmo E. Collins, Jr.
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Attachment 1

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Analysis of Proposed Technical Specification Change

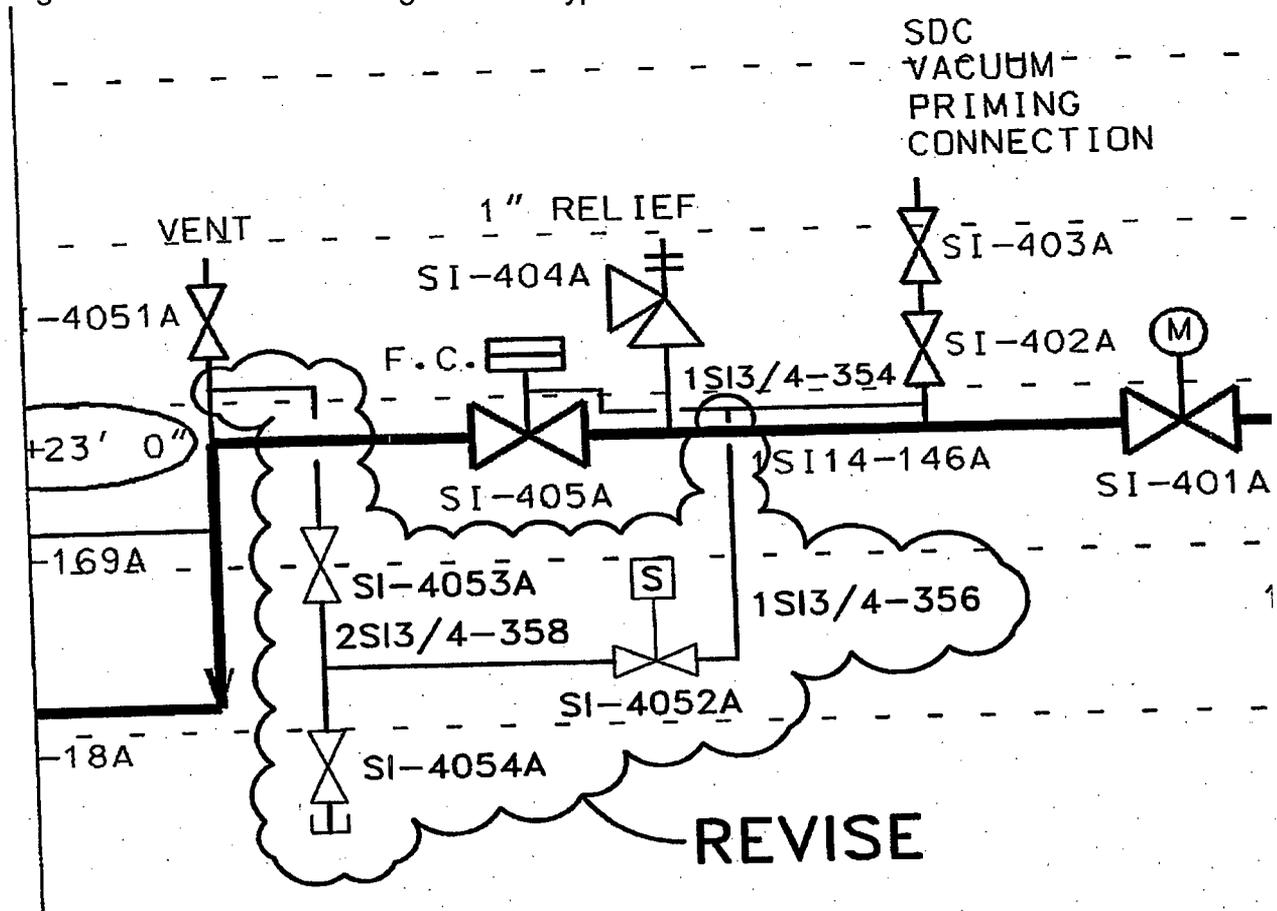
1.0 DESCRIPTION

The proposed change adds valve SI-4052A (RC LOOP 2 SDC SUCTION INSIDE CONTAINMENT BYPASS ISOL) and valve SI-4052B (RC LOOP 1 SDC SUCTION INSIDE CONTAINMENT BYPASS ISOL) to Technical Specification Table 3.4-1 (Reactor Coolant System Pressure Isolation Valves). This change also adds a SI-4052A(B) leakage requirement of 0.375 gpm consistent with NUREG-1432 Section 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) guidance.

SI-4052A(B) will be solenoid valves installed to bypass shutdown cooling isolation valve SI-405A (RC LOOP 2 SDC SUCTION INSIDE CONTAINMENT ISOL) and SI-405B (RC LOOP 1 SDC SUCTION INSIDE CONTAINMENT ISOL), respectively. The purpose of this line is to equalize the shutdown cooling system pressure down stream of valves SI-405A(B) in order to minimize the pressure transient in the system when valves SI-405A(B) are opened.

Figure 1 shows the new valves and line configuration. Figure 1 is specifically for the "A" train; the "B" train is a similar configuration.

Figure 1. Shutdown Cooling Suction Bypass Line



2.0 PROPOSED CHANGE

The proposed Technical Specification change (mark-ups) which is submitted for NRC review and approval is provided in Attachment 2. Attachment 3 provides the clean copy of the proposed change.

3.0 BACKGROUND

The function of the Shutdown Cooling (SDC) System during normal and abnormal operation is to provide a means for removing decay heat from the reactor by providing flow to the reactor core through shutdown cooling heat exchangers. Shutdown Cooling Suction Isolation Valves, SI-405A(B) and SI-4052A(B) are required for containment isolation and they are also the class boundary separating the SDC Class 1 line from the Class 2 low pressure safety injection (LPSI) pump suction piping. SI-405A(B) and SI-4052A(B) are required to be interlocked with pressurizer pressure to prevent over pressurization of the LPSI pump suction piping. The Open Permissive Interlock (OPI) prevents opening the valves until Reactor Coolant System (RCS) pressure is below 386 psia. Shutdown Cooling entry is not permitted until RCS pressure is less than 392 psia.

4.0 TECHNICAL ANALYSIS

The proposed change adds SI-4052A(B) to Technical Specification Table 3.4-1. This change also adds a SI-4052A(B) leakage requirement of 0.375 gpm consistent with NUREG-1432 Section 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) guidance to verify leakage from each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm at a RCS pressure of $\geq [2215]$ psia and $\leq [2255]$ psia.

Once this change is installed, valves SI-405A(B) and SI-4052A(B) become parallel inside containment isolation valves in the shutdown cooling system suction lines. SI-4052A(B) will also be listed as Containment Isolation Valves in UFSAR Table 6.2-32 and are designed to fail closed on loss of power. These valves will be normally closed except during shutdown cooling operations or if the alignment of Low Temperature Overpressurization relief(s) are required. Valves SI-401A(B) are upstream of SI-405A(B) and SI-4052A(B) and also will be normally closed. Valves SI-407A(B) are the outside containment isolation valves, also normally closed. The configuration of SI-405A(B) and SI-4052A(B) includes interlocks such that these valves cannot be inadvertently opened with the RCS above the design pressure of the shutdown cooling system. Once SI-405A(B) is open, SI-4052A(B) may be independently closed from the control room. This change does not affect the capability of these valves to isolate the RCS from SDC. Therefore, there is no credible mechanism by which this change can introduce an inter-system LOCA (ISLOCA) as previously evaluated in the UFSAR. These features are discussed in FSAR section 7.6.1.1.2.

The new line will create a bypass around valves SI-405A(B) to minimize the void formed during the plant operating cycle downstream of SI-405A(B) before SI-405A(B) is opened. The solenoid valves, SI-4052A(B), which will be installed in parallel with valves SI-405A(B) will be part of the class boundary separating class 1 and class 2 piping and are identified as a containment isolation valves.

Mechanical and Civil

SI-4052A(B) will be procured as a Safety Class 1 and Seismic Category 1 with a similar code edition as SI-405A(B). The new bypass line will be procured and installed as Safety Related, ASME Section III, Class 1 up to and including solenoid valve SI-4052A(B). Downstream of the solenoid valve the line is Class 2. Line 1SI3/4-356 (357) will be 3/4" schedule 160 SA-376 piping and is rated for the design pressure of 2485 psig and temperature of 650 °F of the system. Line 2SI3/4-358 (359) will be 3/4" schedule 80 SA-376 piping and is rated for the design pressure of 440 psig and temperature of 400 °F. The stainless steel material is suitable for use in this borated water system. This material is currently in use in this system.

SI-405A(B) were constructed to the ASME B&PV Code, Section III, Subsection NB, 1971 Edition through winter 1972 Addenda with no Code Case applied. The code of record for the design of Class 1 piping is ASME B&PV Code, Section III, 1974 Edition, including addenda through Summer 1975. The applicable Code of record for the class 1 piping supports is ASME B&PV Code, Section III, Subsection NF, 1974 Edition through Summer Addenda 1975. Class 2 piping and piping supports code is ASME Section III, 1971 through winter Addenda 1972.

A code reconciliation will be performed for any components procured to a different code edition than described above. The seismic qualification of the new solenoid valves will meet the requirements of FSAR Section 3.9C and the new valves will be added to FSAR Table 3.9-9 and 3.9C-1.

Based on UFSAR 3.6A.1.2.5, "Typical cases for jet impingement loading on piping were analyzed. The pipe supports/restraints are assumed to be functional under jet impingement load on pipe. Based on this assumption, the essential piping under jet impingement load was found to meet stress criteria of ASME Section III". The pipe analysis methods used to analyze the new bypass line are equal to or more conservative than the methods used at the time of original plant design. The methods used previously were found to be sufficient to prevent overstress of pipe under jet impingement events per UFSAR 3.6A.1.2.5. The pipe is fabricated and installed to appropriate plant specifications and procedures for ASME Class 1 or 2 pipe. Thus, the new by-pass line is adequate for jet impingement loads. In addition, the consequences of a jet impingement load on the new bypass line would be no different than the consequences of jet impacts on adjacent SI lines 1SI3-278(279), 1SI1-91A(91B), and 1SI1-32A(34B) due to the fact that these lines are all

in the same location; would be affected by the same jet; would impact the same target (if these lines were to become missiles); and are of similar size and schedule.

The new bypass line will require 2 supports at the new solenoid valves SI-4052A(B) at the vertical class 2 piping run.

The addition of insulation on the bypass fill piping does not affect the GSI-191 (Debris Generation Calculation) since the bypass fill line is located outside of the zone of influence for any GSI-191 postulated pipe breaks.

Electrical / I & C

The SI-4052A(B) solenoid valves and controls will be powered from the safety related A and B battery banks, respectively. The batteries and power distribution panels were evaluated and determined to have acceptable margin available for this modification. The control circuit length was also evaluated with respect to voltage drop and determined that sufficient voltage exists for proper operation.

The SI-4052A(B) indicating lights will be powered from Static Uninterruptable Power Supplies (SUPS) 3A and 3B, respectively. The SUPS and power distribution panels were evaluated and determined to have acceptable margin available for this modification. Separating the control and position indication power, allows the 125 VDC controls power to be de-energized at the 125 VDC distribution panel to SI-4052A(B) valves whenever the RCS pressure is above 392 psia. SI-4052A(B) are failed closed valves so this will provide an additional means of protection against accidental or spurious operation.

Manual operation capability of SI-4052A(B) is provided in the Main Control Room (MCR) and Shutdown Control panel LCP-43. SI-4052A(B) operation are tied to the same Open Permissive Interlock (OPI) as SI-405A(B), which prevents opening the SDC valves until RCS pressure is below 386 psia. Regulatory Guide 1.75 requirements for separation of class 1E components will be maintained for wiring changes.

Circuit logic and physical design is established to ensure that Appendix R requirements are met. If a new solenoid valve were to spuriously open, the SI-401A(B) valve ensures high to low pressure boundary integrity. This failure scenario is no different than the current configuration if SI-405A(B) spuriously opened.

The solenoid valves will be procured to withstand the environmental and accident conditions inside containment as shown in FSAR Table 3.11-1. Seismic qualifications for the controls will meet IEEE-344-1975 requirements.

Containment Analysis

The proposed change to containment net free volume by the addition of two bypass lines is within the documented margin to the minimum net free volume. The

containment steel volume and surface area limits are met and the maximum allowable values are not challenged. Based on no increase in the maximum containment pressure and temperature, containment integrity is not challenged by this modification.

The new bypass line is above the safety injection sump maximum level. Therefore, no safety injection sump parameters are challenged and the dose consequences for accidents which are mitigated using the safety injection sump (e.g., LOCA) are not increased.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

CRITERION 54 - PIPING SYSTEMS PENETRATING CONTAINMENT

Piping systems penetrating primary reactor containment shall be provided with leak detection, isolation, and containment capabilities which reflect the importance to safety of isolating these piping systems. Such piping systems shall be designed with a capability to test periodically the operability of the isolation valves and associated apparatus to determine if valve leak-off is within acceptable limits.

CRITERION 55 - REACTOR COOLANT PRESSURE BOUNDARY PENETRATION CONTAINMENT

Each line that is part of the reactor coolant pressure boundary and that penetrates primary reactor containment shall be provided with containment isolation valves as follows, unless it can be demonstrated that the containment isolation provisions for a specific class of lines, such as instrument lines, are acceptable on some other defined basis:

- a) One locked closed isolation valve inside and one locked closed isolation valve outside containment or,
- b) One automatic isolation valve inside and one locked closed isolation valve outside containment or,
- c) One locked closed isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment or,
- d) One automatic isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment.

Isolation valves outside containment shall be located as close to containment as practical and upon loss of actuating power, automatic isolation valves shall be designed to take the position that provides greater safety.

The revised containment isolation configuration satisfies GDC 54 and 55 criteria, with the new solenoid valve SI-4052A(B) serving as the inboard containment

isolation valve in parallel with existing inboard containment isolation valve SI-405A(B). Existing valve SI-407A(B) is the outboard containment isolation valve. SI-4052A(B) will be included in Technical Requirements Table 3.6-2 (Containment Isolation Valves) similar to SI-405A(B) to demonstrate compliance with GDC 55(a).

Manual valves SI-4053A(B) serve no containment isolation function. This open manual valve is in series with solenoid valve SI-4052A(B) and functions only to maintain pressure boundary during plant operations. The SI-4053A(B) valve will normally only be closed to facilitate testing when the plant is in an outage. Because this open manual valve is never required to perform a containment isolation function, no position indication is required.

GDC 55 requirements are considered satisfied based on the following:
The GDC does not specifically prohibit the location of another valve in the piping between the containment wall and the valve designated as the Containment Isolation Valve (CIV). The only statement in GDC 55 regarding location of the CIVs is: "*Isolation valves outside containment shall be located as close to the containment as practical...*". However, this statement is specifically directed at the outboard side only. There is no such statement in GDC 55 relevant to isolation valves on the inboard side of containment. The GDC 55 statement does not specifically apply to the location of the SI-4053A(B) valves relative to the inboard SI-4052A(B) CIVs since they are inside containment. ANSI N271-1976 Figure B-3 shows a case where an additional valve exists between the designated inboard CIV and the containment wall.

The manual valve SI-4053A(B) is being installed to accommodate testing provisions as specified in Section 5.3.2 of ANSI N271-1976. This section states "The designer must then add to the fluid system test and vent connections, test barriers such as additional valves, or other provisions necessary to establish a test volume to conduct the leakage rate tests." As such, the SI-4053A(B) valves are similar in function to the existing test valves SI-4051A(B) as they provide a test barrier, except during normal operation this test barrier valve is left open. In this configuration, the SI-4053A(B) valve is a passive component and functions the same as the piping to maintain a pressure boundary.

Based on these considerations, (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 continue to be conducted in accordance with the site licensing basis, and (3) the approval of the proposed change will not be inimical to the common defense and security or the health and safety of the public.

In conclusion, Waterford 3 has determined that the proposed change does not require any exemptions or relief from regulatory requirements and does not affect conformance with any GDC described in the Final Safety Analysis Report (FSAR).

5.2 No Significant Hazards Consideration

Waterford 3 has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 addition of the bypass fill line will decrease the likelihood of a pressure transient in the Shutdown Cooling System suction piping which increases the reliability of the Shutdown Cooling System. Once this change is installed valves SI-405A(B) and SI-4052A(B) become parallel inside containment isolation valves in the shutdown cooling system suction lines. The configuration of SI-405A(B) and SI-4052A(B) includes interlocks such that these valves cannot be inadvertently opened with the RCS above the design pressure of the shutdown cooling system. This change does not affect the capability of these valves to isolate the RCS from SDC. Therefore, there is no credible mechanism by which this change can introduce an inter-system LOCA (ISLOCA) different than previously evaluated in the UFSAR. These features are discussed in FSAR section 7.6.1.1.2.

Therefore, this 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.

Once this change is installed valves SI-405A(B) and SI-4052A(B) become parallel inside containment isolation valves in the shutdown cooling system suction lines. SI-4052A(B) and its associated lines and valves are designed to the same requirements as SI-405A(B) and its associated lines. The previously evaluated SI-405A(B) failure modes bound those failure modes possible by SI-4052A(B). Thus, no failure of SI-4052A(B) exists that would be different or more severe than SI-405A(B).

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

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

Response: No.

The proposed amendment adds SI-4052A(B) to Technical Specification Table 3.4-1. The change also adds an allowed leakage limit to SI-4052A(B) consistent with NUREG-1432 guidance.

Since the SI-4052A(B) leakage limit is commensurate with the valve size, this does not represent a significant reduction in a margin of safety.

5.3 Environmental Considerations

The proposed amendment 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 amendment meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 PRECEDENCE

NUREG-1432 Section 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) provides the leakage limit guidance applied to this application.

7.0 REFERENCES

- 7.1. Waterford Steam Electric Station Unit No. 3, Updated Final Safety Analysis Report, Revision 303, June 2009.
- 7.2. Waterford Steam Electric Station Unit No. 3, Technical Specification.
- 7.3. NUREG-1432 Revision 3, Standard Technical Specification Combustion Engineering Plants, June 2004.

Attachment 2

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Proposed Technical Specification Change (mark-up)

ADD

SI-4052A
SI-4052B

SDC Suction Bypass Isolation
SDC Suction Bypass Isolation

TABLE 3.4-1

REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES

SECTION A

SI-329A	SIT Check
SI-329B	"
SI-330A	"
SI-330B	"
SI-336A	Cold Leg Injection Check
SI-336B	"
SI-335A	"
SI-335B	"
SI-510A	Hot Leg Injection Check
SI-512A	"
SI-510B	"
SI-512B	"
SI-241	HPSI Check
SI-242	"
SI-243	"
SI-244	"

SECTION B

SI-142A	LPSI Check
SI-142B	"
SI-143A	"
SI-143B	"

SECTION C POWER-OPERATED VALVES

SI-401A	SDC Suction Isolation
SI-401B	"
SI-405A	"
SI-405B	"

(a) Maximum Allowable Leakage (each valve):

1. 2. Except as noted below, leakage rates greater than 1.0 gpm are unacceptable. *Replace* **SI-401A(B) and SI-405A(B)**
2. 3. For ~~power operated valves (POVs) only~~, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. *Replace* **SI-401A(B) and SI-405A(B)**
2. 4. For ~~power operated valves (POVs) only~~, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. *Replace*
4. 5. Leakage rates greater than 5.0 gpm are unacceptable. *Replace*

(b) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.

(c) Minimum test differential pressure shall not be less than 200 psid.
WATERFORD - UNIT 3 3/4 4-20

ADD

1. SI-4052A(B) leakage limit is less than or equal to 0.375 gpm.

Attachment 3

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Proposed Technical Specification Change (clean copy)

TABLE 3.4-1
REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES

<u>SECTION A</u>	
SI-329A	SIT Check
SI-329B	"
SI-330A	"
SI-330B	"
SI-336A	Cold Leg Injection Check
SI-336B	"
SI-335A	"
SI-335B	"
SI-510A	Hot Leg Injection Check
SI-512A	"
SI-510B	"
SI-512B	"
SI-241	HPSI Check
SI-242	"
SI-243	"
SI-244	"
<u>SECTION B</u>	
SI-142A	LPSI Check
SI-142B	"
SI-143A	"
SI-143B	"
<u>SECTION C POWER-OPERATED VALVES</u>	
SI-401A	SDC Suction Isolation
SI-401B	"
SI-405A	"
SI-405B	"
SI-4052A	SDC Suction Bypass Isolation
SI-4052B	SDC Suction Bypass Isolation

(a) Maximum Allowable Leakage (each valve):

1. SI-4052A(B) leakage limit is less than or equal to 0.375 gpm.
 2. Except as noted below, leakage rates greater than 1.0 gpm are unacceptable.
 3. For SI-401A(B) and SI-405A(B), leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.
 4. For SI-401A(B) and SI-405A(B), leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.
 5. Leakage rates greater than 5.0 gpm are unacceptable.
- (b) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.
- (c) Minimum test differential pressure shall not be less than 200 psid.

Attachment 4

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List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
SI-4052A(B) will be procured as a Safety Class 1 and Seismic Category 1 with a similar code edition as SI-405A(B). The new bypass line will be procured and installed as Safety Related, ASME Section III, Class 1 up to and including solenoid valve SI-4052A(B).	X		Prior to Refuel 17 return to Mode 4
A code reconciliation will be performed for any components procured to a different code edition than described above.	X		Prior to Refuel 17 return to Mode 4
SI-4052A(B) seismic qualification will meet the requirements of FSAR Section 3.9C and the new valves will be added to FSAR Table 3.9-9 and 3.9C-1.	X		Prior to Refuel 17 return to Mode 4
SI-4052A(B) will be procured to withstand the environmental and accident conditions inside containment as shown in FSAR Table 3.11-1.	X		Prior to Refuel 17 return to Mode 4
SI-4052A(B) will be included in Technical Requirements Table 3.6-2 (Containment Isolation Valves) similar to SI-405A(B) to demonstrate compliance with GDC 55(a).	X		Prior to Refuel 17 return to Mode 4
Seismic qualifications for the controls will meet IEEE-344-1975 requirements.	X		Prior to Refuel 17 return to Mode 4