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SUBJECT: Forwards response to GL 95-07, "Pressure Locking & Thermal Binding of Safety-Related Power-Operated Gate Valves."

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Carolina Power & Light Company
Robinson Nuclear Plant
3581 West Entrance Road
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Robinson File No: 13510I
Serial: RNP-RA/96-0035
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United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
RESPONSE TO GENERIC LETTER 95-07,
"PRESSURE LOCKING AND THERMAL BINDING OF
SAFETY-RELATED POWER-OPERATED GATE VALVES"

Gentlemen:

On August 17, 1995, the NRC issued Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves." The GL 95-07 requested that licensees provide a written response within 60 days, indicating whether or not the addressee will implement the action(s) requested by the GL and, if the addressee intends to implement the requested action(s), a schedule for completing implementation be provided. Carolina Power & Light (CP&L) Company responded to GL 95-07 for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 by letter dated October 16, 1995, committing to complete the requested actions within the time requested in GL 95-07.

The GL 95-07 also required that within 180 days a written response be provided containing a summary description of the susceptibility evaluation of the operational configurations, including the bases or criteria for determining that valves are or are not susceptible to pressure locking or thermal binding, the results of the susceptibility evaluation, including a listing of the susceptible valves identified, and the corrective actions, or other dispositioning, for the valves identified as susceptible to pressure locking or thermal binding. The purpose of this letter is to provide a summary description of the susceptibility evaluation that meets the GL 95-07 required response providing the requested information. Accordingly, the enclosure provides the requested information, and is required to be submitted to the NRC by February 13, 1995.

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Should you have any questions regarding this matter, please contact Mr. A. L. Garrou at (803) 857-1544.

Very truly yours,

R. M. Krich
Manager - Regulatory Affairs

DTG\klb
Enclosure:

1. Affidavit
2. Summary Description of GL 95-07 Susceptibility Evaluation with Attachments

c: Mr. S. D. Ebneter, Regional Administrator, USNRC, Region II
Ms. B. L. Mozafari, USNRC Project Manager, HBRSEP
Mr. W. T. Orders, USNRC Senior Resident Inspector, HBRSEP

Affidavit

State of South Carolina
County of Darlington

C. S. Hinnant, having been first duly sworn, did depose and say that the information contained in letter RNP-RA/96-0035 is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

C S Hinnant

Sworn to and subscribed before me

this 13 day of Feb. 1996

(Seal) David C Crook
Notary Public for South Carolina

My commission expires: March 21, 2005

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
SUMMARY DESCRIPTION OF GL 95-07 SUSCEPTIBILITY EVALUATION

The following is the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 summary description of Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves" susceptibility evaluation of the operational configurations, including the bases or criteria for determining that valves are or are not susceptible to pressure locking or thermal binding, the results of the susceptibility evaluation, including a listing of the susceptible valves identified, and the corrective actions, or other dispositioning, for the valves identified as susceptible to pressure locking or thermal binding.

I. SUMMARY OF THE 90 DAY SUSCEPTIBILITY SCREENING

GL 95-07 Applicability Screen

A list of all safety-related power-operated (i.e., motor, air or hydraulic-operated) valves was prepared from the HBRSEP, Unit No. 2 Engineering Data Base System (EDBS). The list of valves was then compared to the plant's Piping and Instrumentation Drawings (P&IDs) and the Plant Operating Manual procedure Technical Management Manual (TMM)-004, "In-Service Inspection Testing," (i.e. In-Service Inspection (ISI) valve list), in order to validate the accuracy of the information collected from EDBS. HBRSEP, Unit No. 2 applicable gate valves were identified from the validated EDBS list. As a result, 56 gate valves were identified as having a safety-related function and were selected for intial applicability screening. These valves are listed in Attachment 1, "HBRSEP, Unit No. 2 Summary Description of GL 95-07 Valves, Applicability Screen," which includes the valve identification number, valve safety-related function, valve and actuator size, valve class, and valve manufacturer information. The valves found to be normally or occasionally closed and had a safety-related function to open were selected for further evaluation. Based on the above, 32 gate valves were determined applicable to be screened for potential susceptibility to Pressure Locking/Thermal Binding (PL/TB) according to the 90 day Requested Action No. 1 of GL 95-07.

Susceptibility Screening

The 32 gate valves were screened for potential susceptibility to PL/TB. The results are documented in Attachment 2, "HBRSEP, Unit No. 2 Summary Description of GL 95-07 Valves, Susceptibility Screen." The gate valves were classified as one of three types (i.e., double disc, solid wedge or flex wedge). The double disc gate valves were evaluated only for pressure locking, the solid wedge gate valves were evaluated only for thermal binding, and the flex wedge gate valves were evaluated for thermal binding and pressure locking.

The evaluation considered the following operational conditions:

- normal operation,
- startup,
- shutdown,
- surveillance testing,
- accident conditions, and
- post-accident conditions.

The following plant sources were consulted in determining the operational conditions to which each valve may be subjected:

- Operating Procedures,
- System Descriptions,
- Design Basis Documents,
- P&IDs,
- Environmental Reports,
- Updated Final Safety Analysis Report (UFSAR), and
- Technical Specifications.

In addition to these plant sources, discussions were held with Operations Unit personnel, Robinson Engineering Support Section system engineers, Nuclear Fuels & Safety Assessment Section fuel design and accident analysis personnel, and other company persons knowledgeable of system operation or accident scenarios.

As a result, 26 of the 32 gate valves were found potentially susceptible to pressure locking and/or thermal binding. Of these 26 valves, nine were determined not to be susceptible to pressure locking since their high pressure discs have pressure equalizing holes. Accordingly, the susceptibility screening determined that 17 gate valves were potentially susceptible to pressure locking or thermal binding. The performance of the susceptibility screening as described above meets the 90 day Requested Action No. 1 of GL 95-07.

The operability of the 17 potentially susceptible valves was evaluated. There were no operability concerns based on the results of the engineering evaluations performed. Accordingly, these operability evaluations meet the 90 day Requested Action No. 2 of GL 95-07.

II. SUMMARY OF THE 180 DAY SUSCEPTIBILITY EVALUATION AND DISPOSITION

The remaining 17 susceptible gate valves were further evaluated to determine what, if any, affect the postulated pressure locking or thermal binding conditions could have on valve capability to open under design basis conditions.

Auxiliary Feedwater (AFW) V2-14A, B, and C

Function:

The safety-related function of these double disc valves is to automatically open in order to supply AFW to the Steam Generators (SGs) during an accident.

Susceptibility:

Hydraulic Pressure Locking

When these valves are required to open in response to a Main Steam (MS) line break or Feedwater (FW) line break accident, the bonnet is considered to be pressurized to the SG pressure of 1,006 psig (i.e., from the intact SG). The upstream pressure of the valves is approximately zero psig and the downstream pressure of these valves is approximately 500 psig; therefore, a potential pressure locking condition could exist.

Thermally Induced Pressure Locking

When these valves receive a signal to open, the ambient temperature in the room according to the UFSAR Section 9.4 could be as high as 104°F, and the bonnet temperature of these valves could be higher than the ambient temperature (i.e., the actual temperature recorded on September 11, 1995, was 136°F) due to the proximity of the feedwater lines to these valves. The increase in the temperatures of these bonnets could cause the fluid trapped in the bonnet cavity to expand thereby allowing for a pressure rise above the maximum pressure in the upstream or downstream piping; therefore, a potential pressure locking condition could exist.

In summary, these valves could have a potential hydraulic and/or thermally induced pressure locking condition.

Acceptability:

The valves are acceptable for operation based on the following considerations.

1. These valves are tested under similar conditions that would be expected in the event of an accident. The valves are opened at power prior to or after plant cold shutdowns during the performance of procedure Operations Surveillance Test (OST)-206, "Steam Driven Auxiliary Feedwater Pump Flow Test." During the test, the upstream pressure on the valves is approximately zero psig and the downstream pressure on the valves is based on the plant power level (i.e., 100% power level corresponds to 810 psig) when the valves are required to open. Any potential for pressure locking would be detected during this periodic testing.

2. Since these valves are not routinely leak tested, some leakage past the valve seats is expected.

3. These valves have not experienced or exhibited any problems when required to open during the above required surveillance test. This indicates that the pressure in the bonnet does not reach a high enough temperature to cause the above described thermal pressure locking condition.

4. The thermal overload relays for these valves were tested during Refueling Outage (RO)-16 and were measured to actuate between 35.53 to 44.88 seconds. The SDAFW pump is expected to come up to speed and develop a shutoff head within seconds. Therefore, the upstream disc of the valves would experience a pump discharge pressure of approximately 1,298 psig before the valve motor can trip on thermal overload. Since only one of the disc seating surface of the valves will tend to resist the valve motion, the hydraulic pressure locking conditions can not exist under this condition.

Long Term Disposition:

Drill an equalizing hole in the high pressure side disc of the valves.

AFW-V2-16A, B and C

Function:

The safety-related function of these double disc valves is to automatically open in order to supply AFW to the SGs during an accident.

Susceptibility:

When these valves are required to open in response to a MS line break or FW line break accident, the bonnet is considered to be pressurized at the SG pressure of 1,006 psig. The upstream pressure of the valves is approximately zero psig and the downstream pressure of the valves is approximately 500 psig (i.e., provided an intact SG exists). Therefore, during these accidents conditions, a potential for pressure locking condition could exist.

Acceptability:

These valves are acceptable for operation based on the following considerations.

1. These valves are stroked tested during the monthly performance of procedure OST-201A, "MDAFW System Component Test - Train 'A'," under similar conditions that would be expected in the event of an accident. During stroke testing of the valves, the upstream pressure on the valves is approximately zero psig and the downstream pressure on these valves is based on the plant power level (i.e., 100% power level corresponds to 810 psig). Any potential for pressure locking would be detected during this periodic testing.

2. The thermal overload relays for these valves were tested during Refueling Outage (RO)-16 and were measured to actuate between 37.80 to 43.20 seconds. The MDAFW pump is expected to come up to speed and develop a shutoff head within seconds. Therefore, the upstream disc of the valves would experience a pump discharge pressure of approximately 1,298 psig before the valve motor can trip on thermal overload. Since only one of the valve disc seating surfaces of the valves will tend to resist the valve motion, the hydraulic pressure locking conditions can not exist under this condition.

3. Since these valves are not routinely leak tested, some leakage past the valve seats is expected.

4. These valves were differential pressure (dp) tested at 118% of the design basis dp (i.e., 1,200 psid) during RO-15. The valves did not exhibit any problems opening during the dp test.

Long Term Disposition:

Drill an equalizing hole in the high pressure side disc of the valves.

MS-V1-8A, B and C

Function:

The safety-related function of these double disc valves is to automatically open in order to supply steam to the SDFAW pump turbine.

Susceptibility:

When these valves are required to open in response to a MS line break accident, the bonnet is considered pressurized at the SG pressure of 1,006 psig. The upstream pressure of the valves associated with an intact steam generator may decrease to 500 psig and the downstream pressure of the valves is zero psig. Therefore, during this accident a potential for pressure locking condition could exist.

Acceptability:

The valves are acceptable for short-term operation based on the following considerations.

1. These valves are stroke tested (i.e., open/closed) during plant heatup when the surveillance test procedure OST-205, "Steam Driven Auxiliary Feedwater System Valve Test," is performed. The test conditions are when the plant is in cold shut down. During the stroke testing of the valves, the upstream and downstream pressure on the valves is approximately zero psig.

2. These valves are tested under similar conditions that would be expected in the event of an accident. The valves are opened prior to or following plant cold shutdowns during the performance of procedure OST-206. The test conditions are based on plant power level. During the stroke testing of the valves, the upstream pressure on the valves is approximately 810 psig and the downstream pressure on the valves is approximately zero psig at 100% power when the valves are required to open. Any potential for pressure locking would be detected during this periodic testing.

3. Since these valves are not routinely leak tested, some leakage past the valve seats is expected.

Long Term Disposition:

Drill an equalizing hole in the high pressure side disc of the valves.

Residual Heat Removal (RHR)-744A and B

Function:

The safety-related function of these flex wedge valves is to automatically open in response to a Safety Injection (SI) signal to provide an injection pathway into the Reactor Coolant System (RCS).

Susceptibility:

Hydraulic Pressure Locking

The check valves downstream of RHR-744A and B are assumed to leak, thereby filling the valve(s) bonnet with RCS fluid resulting in pressurizing each valve bonnet to approximately the normal operating pressure of 2,235 psig. However, the pressure could be as high as 2,320 psig due to the addition of reactor coolant pump head. When the valves are required to open, in response to an SI signal, the upstream and downstream pressures on the valves are assumed to be zero (i.e., during the large break Loss of Coolant Accident (LOCA)) with the pressure of the fluid in each valve bonnet at the assumed pressure of approximately 2,320 psig. This condition could cause a dp across the upstream and downstream side of the valves to be approximately 2,320 psid, resulting in a potential pressure locking condition.

Thermal Binding

During a normal plant heatup, the RHR system is secured prior to exceeding 350°F, whereby valves RHR-744A and B, which are located inside containment, are closed. During the remainder of the plant startup, the valve temperature could potentially decay to the containment ambient temperature (i.e., approximately 120°F or below). If a LOCA occurs at this time, the valves will receive an SI open signal. Since the valves could have potentially cooled down from 350°F to $\leq$120°F, they are susceptible to thermal binding.

Acceptability:

These valves are acceptable for continued operation based on the following considerations.

Hydraulic Pressure Locking

1. These valves were cycled on January 18, 1995 (i.e., RHR-744A) and February 20, 1995 (i.e., RHR-744B) after the plant had operated at 100% power for approximately 270 days. The downstream pressure of the valves was measured to be 680 psig and the upstream pressure on the valves was measured to be 10 psig. This condition is apparently caused from RCS leakage past check valves downstream of the valves. We have assumed that the downstream pressure of the susceptible valves reached the maximum value and the valve bonnet cavity pressure of the valves equalized with the downstream line pressure as a result of the leakage past the downstream discs of the valves.

   These valves opened satisfactorily when cycled. The motor torques were calculated from the most current data available as recorded from using the Valve Operation Test and Evaluation System (VOTES) software. The calculation results were 18.5 ft-lbs for RHR-744A and 19.7 ft-lbs for RHR-744B.

   During the LOCA described above, we have assumed that the upstream and downstream pressures of the valves are zero psig, and the valve bonnet cavity fluid pressure of the valves is 680 psig. This condition creates a 680 psid across both valve discs of each valve. Therefore, the valves will be required to open against an effective dp of 1,360 psid (i.e., the sum of the dp across each valve disc). The motor torque required to open the valves against a dp of 1,360 psid is approximately 37 ft-lbs and 39.4 ft-lbs for valves RHR-744A and B, respectively.

   Under degraded voltage conditions, RHR-744A and B valve motors are capable of developing approximate torque values of 54 ft-lbs and 58 ft-lbs, respectively. This demonstrates that the valves are able to open during an accident with a degraded voltage present under pressure locked conditions. The required thrust to unseat valves RHR-744A and B in a pressure locking condition is 3,1584 lbs, as calculated using our Design Guide (DG)-I.11, "Limitorque Motor-Operated Valve Mechanical Evaluations," methodology, and is also below the actuator and valve limits of 126,000 lbs and 57,167 lbs, respectively.

2. These valves are stroked tested (i.e., open/closed) during the quarterly performance of procedures OST-252-1, "RHR Pump 'A' and Components Test," and OST-252-2, "RHR Pump 'B' and Components Test," while the plant is at 100% power. Any potential for pressure locking would be detected during this periodic testing.

3. The valves are not susceptible to significant hydraulic pressure locking based on the valve manufacturer's (i.e., Velan) design experience and because the valves have not experienced or exhibited any problems during the stroke testing.

Thermal Binding

These valves are not subject to thermal binding concerns because of the following reasons.

1. These valves are fitted with the Limitorque SB-3 actuator. This actuator has a spring compensator which will compensate for stem growth.

2. The valves are stroke tested during the quarterly performance of procedures OST-252-1 and OST-252-2. The valves have not experienced or exhibited any problems during the stroke testing while the plant is operating at 100% power. Any potential for thermal binding would be detected during this periodic testing.

3. There is no history of thermal binding associated with the valves over more than 20 years of plant operation.

4. According to the valve manufacturer, there is no significant thermal binding history associated with Velan manufactured valves during conditions when the valve is closed while hot and subsequently allowed to cool prior to opening. The RHR-744A and B valves are 10" flex wedge gate valves with a 1,500 lb thrust rating and are similar to the valves tested by Velan.

Future Enhancement

As stated above, under degraded voltage conditions the RHR-744A and B valve motors are capable of developing torques in the order of approximately 54 ft-lbs and 58 ft-lbs, respectively. We are planning to replace the motor gearing for the valves during RO-17 which is scheduled to start in September 1996. The new gear assembly will increase the available actuator torques from 1,067 ft-lbs to 1,533 ft-lbs for the valve RHR-744A, and from 1,148 ft-lbs to 1,650 ft-lbs for the valve RHR-744B. The new motor gearing will provide further assurance that the actuators develop enough torque to open the valves under postulated pressure locking conditions.

Long Term Disposition:

Based on the above, the valves are considered operable for the long term. However, to assure assumptions made above are correct, the following actions will be evaluated.

1. Modeling of valve temperatures during cooldown will be conducted to analytically determine the time needed to cool the valves from 350°F to 120°F or below. This cooldown occurs after the RHR system has been secured during a heatup of the plant.

2. The measurements of valve body temperatures will be taken during RO-17 scheduled to start in September 1996. Temperatures will be taken from the time the RHR system is secured (i.e., 350°F) until the time when the containment temperature is ≤120°F.

3. If the model and the temperature measurements indicate that the valves cooldown from 350°F to 120°F within the time interval of one to five days, then further evaluation and actions will be taken to address the potential for thermal binding during this short time interval.

RHR-759A and B

Function:

These solid wedge valves are normally open, and are closed during an accident when transferring over to cold leg recirculation using End Path Procedure (EPP)-9, "Transfer to Cold Leg Recirculation," and the valves are subsequently opened when transferring to long term recirculation using procedure EPP-10, "Transfer to Long Term Recirculation," when the RCS pressure drops below 125 psig in order to recirculate the containment sump fluid. However, since the design basis of the plant does not require the valves to open in order to mitigate an accident, they do not perform an active safety-related function to open. Accordingly, these valves are not susceptible to pressure locking.

Susceptibility:

These valves are not susceptible to thermal binding based on the following discussion.

Under the conditions of an accident involving a large break LOCA and during transfer to cold leg recirculation, the containment sump is lined up to recirculate flow to the reactor core using the RHR pumps. These valves are then in the open position and the temperature of the water flowing through the valves becomes equalized at the RHR heat exchangers outlet temperature (i.e., approximately 197.3°F). The valves are placed in the closed position when RCS cooling is transferred over to the "piggy back" mode (i.e., when the RHR pump is line-up to pump through an SI pump). When the valves are required to be opened when transferring RCS cooling over to long term recirculation, the temperature of the sump water will be at the same temperature as the RHR heat exchangers outlet temperature (i.e., approximately 160.8°F). Therefore, the temperature difference ($\triangle$T) between closing and then opening the valves is approximately 36.5°F (i.e., $\triangle$T between 197.3°F and 160.8°F). According to the Westinghouse Owners Group (WOG) screening criteria, the solid wedge gate valves are not susceptible to thermal binding if the $\triangle$T changes are below 50°F. Since the $\triangle$T (i.e., between the time valves RHR-759A and B are closed and then subsequently re-opened) is 36.5°F, thermal binding is not expected to occur when the valves are re-opened.

Under the conditions of an accident involving a small break LOCA with the RCS pressure $>$ 125 psig and the Refueling Water Storage Tank (RWST) level $<$ 9%, the valves will be closed (i.e., according to procedure EPP-9, step 41) in order to direct the containment sump water to the SI pumps (i.e., using the RHR pump piggy back mode) when either the RCS pressure is $>$ 125 psig or the water in the containment sump has a pH value less than 8.5. The temperature of the valves at the time the valves are closed will be assumed to be at the maximum ambient Reactor Auxiliary building temperature of approximately 104°F, because no containment sump water has passed through these valves. According to the WOG screening criteria, solid wedge gate valves are not susceptible to thermal binding if the system temperature is below 200°F.

Long Term Disposition:

No further actions are necessary.

Reactor Coolant (RC)-535 AND 536

Function:

The pressurizer Power Operated Relief Valves (PORVs) flex wedge block valves RC-535 and 536 are not safety-related equipment at HBRSEP, Unit No. 2; however, they do support the operability of the PORVs in performing the active safety-related function to provide Low-Temperature Overpressure Protection (LTOP) of the RCS. The valves are normally in the open position and are subsequently closed in order to isolate a leaking or stuck open pressurizer PORV. The valves, if closed previously, are required to be re-opened to permit the use of the PORV(s) for RCS pressure control during reactor cooldown. We have also evaluated the block valves for a Steam Generator Tube Rupture (SGTR) event even though this is not safety-related actuations, and are not accounted for in the safety analysis.

Susceptibility:

Thermal Binding

Accident Condition

Assuming the condition exists that the pressurizer PORV block valves are positioned closed because of leaking or stuck open pressurizer PORVs at the start of a SGTR accident, and the RCS is at operating pressure and temperature (i.e., 2235 psig and 653°F, respectively), a depressurization of the RCS can be used to mitigate the effects of the accident but is not required. However, the RCS pressure could be as high as 2,335 psig (i.e., PORV actuation setpoint). Accordingly, the plant's Emergency Operating Procedures (EOPs) utilize the PORVs as one of four options in order to reduce RCS pressure during this accident. If this option is selected, the PORV block valve(s) would be opened; however, thermal binding could prevent the valves from opening, as a result of the uncontrolled cooldown of these valves.

Cooldown Condition

Assuming the condition exists when the pressurizer PORV block valves are in the closed position because of leaking or stuck open pressurizer PORVs, and the plant must perform a cooldown from hot shutdown to cold shutdown, the RCS temperature is assumed to be at the maximum operating temperature of 653°F. Before placing LTOP into service at approximately ≥350°F, a PORV block valve is required to be opened. Under these conditions, thermal binding could prevent the valves from opening, as a result of the valves cooling down.

Hydraulic Pressure Locking

Under the above described conditions, the pressure of the fluid trapped in the valve bonnet of the valves is assumed to be approximately 2,235 psig or as high as 2,335 psig (i.e., at the PORV actuation setpoint). As discussed above, when the PORV block valves are used during a SGTR accident, the upstream pressure of the valves is at pressurizer pressure (i.e., 1,250 psig) and the downstream pressure of the valves is 0 psig. This dp condition could cause potential pressure locking.

Acceptability:

These valves are operable based on the following considerations.

Thermal Binding Cases

Accident Condition

If the Reactor Coolant Pumps (RCPs) are unavailable which respects the worst case with respect to thermal binding, RCS pressure will be reduced further when opening the pressurizer PORVs or PORV block valves. If the PORV block valves are opened at the RCS pressure of 1,250 psig (i.e., RCPs not operating) which has a corresponding saturation temperature of 572°F, the PORV block valves could undergo an 81°F ΔT (i.e., from 653°F to 572°F) cooldown prior to being opened. The cooldown is within the WOG 100°F ΔT cut-off criteria for flex wedge gate valves.

Cooldown Condition

Assuming that the PORV block valves are closed prior to the plant cooldown from hot shutdown to cold shutdown and at the time when trying to placing LTOP into service the block valves fail to open, the plant will not be allowed to cooldown or place LTOP into service until actions are taken to open a block valve. There is no condition where there is insufficient time to take the necessary actions to get a PORV block valve open before either having to place LTOP into service or venting the RCS and continuing cooldown to cold shutdown.

In addition, these valves have Limitorque SB-00 actuators. This actuator has a spring compensator which will compensate for stem growth.

Therefore, the PORV block valves are not susceptible to thermal binding.

Hydraulic Pressure Locking

These valves may not open when selected to do so during the SGTR accident. Because no credit is taken in the HBRSEP, Unit No. 2 accident analysis for the valves to mitigate a SGTR accident, these valves are not relied on to perform this function. The HBRSEP, Unit No. 2 EOPs utilize three different sources to reduce RCS pressure during a SGTR accident.

- Normal Spray with Reactor Coolant Pumps Running (primary)
- Opening PORVs or PORV Block Valves (alternate)
- Auxiliary Spray with Charging Pumps Running (third method)

In summary, using the PORV block valves to control RCS pressure is not a primary function for the mitigation of a SGTR accident. If the PORV block valves fail to open, the reactor coolant pressure boundary will not be affected.

Therefore, PORV blocks valves are considered operable.

Long Term Disposition:

No further actions are necessary.

SI-870A and B

Function:

These boron injection double disc valves are normally in the closed position during power operation and are opened to perform various surveillance test activities during normal operation. The valves receive an SI signal to automatically open when an SI is generated. The valves are opened and/or closed as necessary during the transfer over to long term recirculation, and when alternating flow between hot and cold leg injection.

Susceptibility:

Under accident conditions, these valves could be opened against an RCS pressure up to 2,235 psig depending upon the type of accident and the size of piping break causing the LOCA. If the check valves downstream of the susceptible valves are assumed to leak, RCS pressure (i.e., 2,235 psig) may become trapped inside the valve bonnet cavity. When the valves are required to open, it is assumed that the RCS pressure is 1,715 psig which corresponds to a low pressurizer pressure and the valves' upstream pressure is 1,516 psig (i.e, SI pump shutoff head). The dp across the valves upstream and downstream discs are in the order of approximately 719 psid and 520 psid, respectively. This condition may cause a potential for pressure locking of the valves.

Acceptability:

These valves are acceptable for operation based on the following considerations.

Utilizing the Commonwealth Edison methodology and the equations from NUREG/CR-5807, "Improvements in Motor-Operated Gate Valve Design and Prediction Model for Nuclear Power Plant Systems," dated May 19, 1992, the derived thrust required to open the valves is lower than the thrust available from the motor under degraded voltage conditions. The required thrust is also lower than the valve actuator capabilities.

Long Term Disposition:

Evaluate appropriate measures to alleviate potential pressure locking condition.

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
AFW-V2-14A	SDAFW PUMP DISCHARGE TO SG "A"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
AFW-V2-14B	SDAFW PUMP DISCHARGE TO SG "B"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
AFW-V2-14C	SDAFW PUMP DISCHARGE TO SG "C"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
AFW-V2-16A	MDAFW PUMP DISCHARGE TO SG "A"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
AFW-V2-16B	MDAFW PUMP DISCHARGE TO SG "B"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
AFW-V2-16C	MDAFW PUMP DISCHARGE TO SG "C"	DOUBLE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
CC-716B	RCP CCW INLET ISOLATION VALVE	DOUBLE	6"	150	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
CC-730	RCP CCW RETURN ISOLATION VALVE	DOUBLE	6"	150	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
CC-735	RCP BARRIER COOLING WATER RETURN VALVE	FLEX WEDGE	3"	1500	VELAN	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
CC-749A	RHR HX "A" DISCHARGE ISOLATION VALVE	SOLID EDGE	16"	150	CRANE-ALOYCO	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
CC-749B	RHR HX "B" DISCHARGE ISOLATION VALVE	SOLID WEDGE	16"	150	CRANE-ALOYCO	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
CVC-381	RCP SEAL WATER RETURN ISOLATION VALVE	DOUBLE	3"	150	CRANE-ALOYCO	MOV	SMB-000	LIMITORQUE	CLOSE	NO	NO
FCV-626	RCP BARRIER COOLING WATER RETURN VALVE	FLEX WEDGE	3"	1500	VELAN	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
FP-248	ELECTRICAL PENETRATION SPRINKLER SYSTEM UPSTREAM ISOLATION VALVE	FLEX WEDGE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
FP-249	ELECTRICAL PENETRATION SPRINKLER SYSTEM UPSTREAM ISOLATION VALVE	FLEX WEDGE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
FP-256	RCP "A," "B," & "C" PRE-ACTION SPRINKLER SYSTEM UPSTREAM ISOLATION VALVE	FLEX WEDGE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
FP-258	RCP "A," "B," & "C" PRE-ACTION SPRINKLER SYSTEM ISOLATION VALVE	FLEX WEDGE	4"	900	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	CLOSE	NO	NO
FW-V2-6A	FEEDWATER DISCHARGE VALVE TO SG "A"	SOLID WEDGE	16"	900	CRANE-ALOYCO	MOV	SMB-2	LIMITORQUE	CLOSE	NO	NO
FW-V2-6B	FEEDWATER DISCHARGE VALVE TO SG "B"	SOLID WEDGE	16"	900	CRANE-ALOYCO	MOV	SMB-2	LIMITORQUE	CLOSE	NO	NO

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
FW-V2-6C	FEEDWATER DISCHARGE VALVE TO SG "C"	SOLID WEDGE	16"	900	CRANE-ALOYCO	MOV	SMB-2	LIMITORQUE	CLOSE	NO	NO
MS-V1-8A	STEAM ADMISSION VALVES TO SDAFW PUMP	DOUBLE	2"	900	ANCHOR DARLING	MOV	SMB-000	LIMITORQUE	OPEN	YES	YES
MS-V1-8B	STEAM ADMISSION VALVES TO SDAFW PUMP	DOUBLE	2"	900	ANCHOR DARLING	MOV	SMB-000	LIMITORQUE	OPEN	YES	YES
MS-V1-8C	STEAM ADMISSION VALVES TO SDAFW PUMP	DOUBLE	2"	900	ANCHOR DARLING	MOV	SMB-000	LIMITORQUE	OPEN	YES	YES
RC-535	PZR ISOLATION TO PORV PCV-456	FLEX WEDGE	3"	1500	WESTINGHOUSE	MOV	SB-00	LIMITORQUE	CLOSE/OPEN	YES	YES
RC-536	PZR ISOLATION TO PORV PCV-455C	FLEX WEDGE	3"	1500	WESTINGHOUSE	MOV	SB-00	LIMITORQUE	CLOSE/OPEN	YES	YES
RHR-744A	RHR LOOP TO RCS COLD LEG	FLEX WEDGE	10"	1500	VELAN	MOV	SB-3	LIMITORQUE	OPEN/CLOSE	YES	YES
RHR-744B	RHR LOOP TO RCS COLD LEG	FLEX WEDGE	10"	1500	VELAN	MOV	SB-3	LIMITORQUE	OPEN/CLOSE	YES	YES
RHR-750	LOOP 2 HOT LEG TO RHR ISOLATION VALVE	DOUBLE	14"	1500	COPES-VULCAN	MOV	SMB-1	LIMITORQUE	CLOSE	YES	YES
RHR-751	LOOP 2 HOT LEG TO RHR ISOLATION VALVE	DOUBLE	14"	1500	COPES-VULCAN	MOV	SMB-1	LIMITORQUE	CLOSE	YES	YES
RHR-752A	RHR PUMP SUCTION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-2	LIMITORQUE	CLOSE	NO	NO

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
RHR-752B	RHR PUMP SUCTION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-2	LIMITORQUE	CLOSE	NO	NO
RHR-759A	RHR HX "A" OUTLET ISOLATION VALVE	SOLID WEDGE	10"	300	CRANE-ALOYCO	MOV	SMB-1	LIMITORQUE	CLOSE	YES	YES
RHR-759B	RHR HX "B" OUTLET ISOLATION VALVE	SOLID WEDGE	10"	300	CRANE-ALOYCO	MOV	SMB-1	LIMITORQUE	CLOSE	YES	YES
SI-860A	CONTAINMENT SUMP RECIRCULATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-860B	CONTAINMENT SUMP RECIRCULATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-861A	CONTAINMENT SUMP RECIRCULATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-861B	CONTAINMENT SUMP RECIRCULATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-862A	RWST TO RHR LOOP ISOLATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	CLOSE	NO	NO
SI-862B	RWST TO RHR LOOP ISOLATION VALVE	DOUBLE	14"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	CLOSE	NO	NO
SI-863A	RHR LOOP RECIRCULATION ISOLATION VALVE	DOUBLE	8"	300	CRANE-ALOYCO	MOV	SMB-00	LIMITORQUE	OPEN	YES	YES
SI-863B	RHR LOOP RECIRCULATION ISOLATION VALVE	DOUBLE	8"	300	CRANE-ALOYCO	MOV	SMB-00	LIMITORQUE	OPEN	YES	YES
SI-864A	RWST DISCHARGE ISOLATION VALVE	DOUBLE	16"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	CLOSE	NO	NO

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
SI-864B	RWST DISCHARGE ISOLATION VALVE	DOUBLE	16"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	CLOSE	NO	NO
SI-869	LOOP 2 & 3 HOT LEG ISOLATION VALVE	DOUBLE	3"	1500	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
SI-870A	BORON INJECTION TANK OUTLET ISOLATION VALVE	DOUBLE	3"	1500	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
SI-870B	BORON INJECTION TANK OUTLET ISOLATION VALVE	DOUBLE	3"	1500	ANCHOR DARLING	MOV	SMB-00	LIMITORQUE	OPEN/CLOSE	YES	YES
SI-880A	CV SPRAY PUMP A DISCHARGE ISOLATION VALVE	DOUBLE	6"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-880B	CV SPRAY PUMP A DISCHARGE ISOLATION VALVE	DOUBLE	6"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-880C	CV SPRAY PUMP B DISCHARGE ISOLATION VALVE	DOUBLE	6"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
SI-880D	CV SPRAY PUMP B DISCHARGE ISOLATION VALVE	DOUBLE	6"	300	ANCHOR DARLING	MOV	SMB-0	LIMITORQUE	OPEN	YES	YES
FCV-1930A	SG A BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
APPLICABILITY SCREEN

VALVE TAG	FUNCTION	VALVE DESCRIPTION				ACTUATOR DESCRIPTION			GL No. 95-07 APPLICABILITY		
		DISC TYPE	SIZE	CLASS	MANUFACTURER	TYPE	SIZE	MANUFACTURER	DESIGN BASIS SAFETY FUNCTION	NORMALLY OR OCCASIONALLY CLOSED?	GL 95-07 APPLICABLE?
FCV-1930B	SG A BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO
FCV-1931A	SG B BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO
FCV-1931B	SG B BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO
FCV-1932A	SG C BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO
FCV-1932B	SG C BLOW DOWN RETURN ISOLATION VALVE	DOUBLE	3"	600	ANCHOR DARLING	AOV	A-63B2N	MILLER FLUID POWER	CLOSE	NO	NO

HBRSEP, UNIT NO. 2 SUMMARY DESCRIPTION OF GL 95-07 VALVES SUSCEPTIBILITY SCREEN

VALVE TAG	PRESSURE LOCKING SCREEN[c]			THERMAL BINDING SCREEN[d,e]			SUSCEPTIBLE TO PRESSURE LOCKING?[f]	SUSCEPTIBLE TO THERMAL BINDING?[g]	DISPOSITION	SCHEDULE FOR LONG-TERM DISPOSITION
	SUSCEPTIBLE TO HYDRAULICALLY-INDUCED DOUBLE DISC DRAG FORCES?	SUSCEPTIBLE TO THERMALLY-INDUCED DOUBLE DISC DRAG FORCES	PROVIDED WITH PL MITIGATING FEATURE?	MAXIMUM OPERATING TEMPERATURE ≤ 200°F?	MAXIMUM ΔT ≤ 50°F FOR SOLID OR ≤ 100°F FOR FLEX?	PROCEDURE CONTROLS TO MITIGATE TB?				
AFW-V2-14A	YES	YES	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
AFW-V2-14B	YES	YES	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
AFW-V2-14C	YES	YES	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
AFW-V2-16A	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
AFW-V2-16B	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
AFW-V2-16C	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)

HBRSEP, UNIT NO. 2 SUMMARY DESCRIPTION OF GL 95-07 VALVES SUSCEPTIBILITY SCREEN

VALVE TAG	PRESSURE LOCKING SCREEN[c]			THERMAL BINDING SCREEN[d,e]			SUSCEPTIBLE TO PRESSURE LOCKING?[f]	SUSCEPTIBLE TO THERMAL BINDING?[g]	DISPOSITION	SCHEDULE FOR LONG-TERM DISPOSITION
	SUSCEPTIBLE TO HYDRAULICALLY-INDUCED DOUBLE DISC DRAG FORCES?	SUSCEPTIBLE TO THERMALLY-INDUCED DOUBLE DISC DRAG FORCES	PROVIDED WITH PL MITIGATING FEATURE?	MAXIMUM OPERATING TEMPERATURE ≤ 200°F?	MAXIMUM ΔT ≤ 50°F FOR SOLID OR ≤ 100°F FOR FLEX?	PROCEDURE CONTROLS TO MITIGATE TB?				
CC-749A	N/A NOTE 2	N/A NOTE 2	N/A NOTE 2	YES	N/A	NO	NO	NO	ACCEPTABLE	N/A
CC-749B	N/A NOTE 2	N/A NOTE 2	N/A NOTE 2	YES	N/A	NO	NO	NO	ACCEPTABLE	N/A
MS-V1-8A	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
MS-V1-8B	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
MS-V1-8C	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 3 LONG-TERM: DRILL HOLE IN HIGHPRESSURE DISC	RO-18 (1998)
RC-535	YES	NO	NO	NO NOTE 5	NO NOTE 6	NO	YES	YES	ACCEPTABLE NOTE 3 LONG-TERM: NOTE 18	N/A
RC-536	YES	NO	NO	NO NOTE 5	NO NOTE 6	NO	YES	YES	ACCEPTABLE NOTE 3 LONG-TERM: NOTE 18	N/A
RHR-744A	YES	NO	NO	NO NOTE 7	NO NOTE 8	NO	YES	YES	ACCEPTABLE NOTE 3 LONG-TERM: NOTE 19	N/A

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
SUSCEPTIBILITY SCREEN

VALVE TAG	PRESSURE LOCKING SCREEN[c]			THERMAL BINDING SCREEN[d,e]			SUSCEPTIBLE TO PRESSURE LOCKING?[f]	SUSCEPTIBLE TO THERMAL BINDING?[g]	DISPOSITION	SCHEDULE FOR LONG-TERM DISPOSITION
	SUSCEPTIBLE TO HYDRAULICALLY-INDUCED DOUBLE DISC DRAG FORCES?	SUSCEPTIBLE TO THERMALLY-INDUCED DOUBLE DISC DRAG FORCES	PROVIDED WITH PL MITIGATING FEATURE?	MAXIMUM OPERATING TEMPERATURE ≤ 200°F?	MAXIMUM ΔT ≤ 50°F FOR SOLID OR ≤ 100°F FOR FLEX?	PROCEDURE CONTROLS TO MITIGATE TB?				
RHR-744B	YES	NO	NO	NO NOTE 7	NO NOTE 8	NO	YES	YES	ACCEPTABLE NOTE 3 LONG-TERM: NOTE 19	N/A
RHR-750	N/A NOTE 9	YES NOTE 13	YES NOTE 13	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE NOTE 9	N/A
RHR-751	N/A NOTE 9	N/A NOTE 9	N/A NOTE 9	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE NOTE 9	N/A
RHR-759A	N/A NOTE 2	N/A NOTE 2	N/A NOTE 2	NO NOTE 10	YES NOTE 10	NO	NO	NO	ACCEPTABLE NOTE 9	N/A
RHR-759B	N/A NOTE 2	N/A NOTE 2	N/A NOTE 2	NO NOTE 10	YES NOTE 10	NO	NO	NO	ACCEPTABLE NOTE 9	N/A
SI-860A	NO	YES NOTE 4a	YES NOTE 11	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-860B	NO	YES NOTE 4a	YES NOTE 11	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-861A	NO	YES NOTE 4 & 4a	YES NOTE 12	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-861B	NO	YES NOTE 4a	YES NOTE 12	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-863A	NO	YES NOTE 4a	YES NOTE 11	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-863B	NO	YES NOTE 4a	YES NOTE 11	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-869	NO NOTE 14	NO NOTE 15	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
SUSCEPTIBILITY SCREEN

VALVE TAG	PRESSURE LOCKING SCREEN[c]			THERMAL BINDING SCREEN[d,e]			SUSCEPTIBLE TO PRESSURE LOCKING?	SUSCEPTIBLE TO THERMAL BINDING?[f,g]	DISPOSITION	SCHEDULE FOR LONG-TERM DISPOSITION
	SUSCEPTIBLE TO HYDRAULICALLY-INDUCED DOUBLE DISC DRAG FORCES?	SUSCEPTIBLE TO THERMALLY-INDUCED DOUBLE DISC DRAG FORCES	PROVIDED WITH PL MITIGATING FEATURE?	MAXIMUM OPERATING TEMPERATURE ≤ 200°F?	MAXIMUM ΔT ≤ 50°F FOR SOLID OR ≤ 100°F FOR FLEX?	PROCEDURE CONTROLS TO MITIGATE TB?				
SI-870A	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 16 LONG TERM: Note 20	RO-18 (1998)
SI-870B	YES	NO	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	YES	NO	ACCEPTABLE NOTE 16 LONG TERM: NOTE 20	RO-18 (1998)
SI-880A	NO NOTE 17	NO NOTE 15	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-880B	NO NOTE 17	NO NOTE 15	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-880C	NO NOTE 17	NO NOTE 15	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A
SI-880D	NO NOTE 17	NO NOTE 15	NO	N/A NOTE 1	N/A NOTE 1	N/A NOTE 1	NO	NO	ACCEPTABLE	N/A

HBRSEP, UNIT NO. 2 SUMMARY DESCRIPTION OF GL 95-07 VALVES SUSCEPTIBILITY SCREEN

GENERAL NOTES:

a. GL No. 95-07 is applicable if the valve has a design basis safety-related function to open and is either normally or occasionally closed.

b. Only those valves for which GL No. 95-07 is determined to be applicable are included in this table for further screening.

c. Solid wedge gate valves are considered to be non-susceptible to pressure locking.

d. Double disc gate valves are considered to be non-susceptible to thermal binding.

e. Thermal binding temperature limits are from Westinghouse Owners Group document ESBU/WOG-95-387, "Generic Temperature and Pressure Screening Criteria for Valves Susceptible to PTB (MUHP-6050)," dated December 6, 1995.

f. A valve is considered susceptible to pressure locking if it is a flexible wedge or a double disc design, that is susceptible to either hydraulically-induced or thermally-induced double disc drag forces, and which has no mitigating feature.

g. A valve is considered susceptible to thermal binding if it is a solid wedge or flexible wedge design, that is subjected to operating temperature in excess of 200°F or differential temperature in excess of 50°F (i.e., solid wedge) or 100°F (i.e., flexible wedge), for which no procedural mitigating controls are in place.

VALVE SPECIFIC NOTES:

1. Valve is a double disc gate valve and is therefore not susceptible to thermal binding.

2. Valve is a solid wedge gate valve and is therefore not susceptible to pressure locking.

3. See text for details.

4. LER 82-011, dated September 15, 1982, provided details on the thermally induced pressure locking event on SI-861A.

4a. Westinghouse document "Design Criteria for Internal Overpressurization Protection of Double Disc Gate Valves," dated March 30, 1970, and CP&L memorandum 82-507, dated September 8, 1972.

5. The valves could be at 653°F during cooldown fron hot shutdown to cold shutdown if closed due to leaking or stuck open PORV(s).

6. The valves could be cooled down from 653°F to 350°F ($\Delta T > 100°F$) prior to opening. However, this happens during normal operations , and is not the safety function of the valves.

7. The valves would be closed at 350°F during plant heat up when RHR is secured.

8. The valves could be cooled down from 350°F to 120°F or below ($\Delta T > 100°F$) while closed.

HBRSEP, UNIT NO. 2 SUMMARY
DESCRIPTION OF GL 95-07 VALVES
SUSCEPTIBILITY SCREEN

9. The valves do not perform an open safety-related function.

10. The temperture of the fluid flowing through the valves at the time of closing is 209°F. The temperature of the fluid at the time of opening is 167°F(ΔT <50°F).

11. Relief holes were drilled in the upstream (high pressure) side of the discs of SI-860A and B and SI-863A and B via Mod-792 in 1984.

12. Relief holes were drilled in the downstream (high pressure side)of the discs of SI-861A and B via Mod-677 in 1982.

13. Relief hole was drilled in high pressure side of the disc of RHR-750 by Westinghouse in 1970.

14. At the time of the accident, the pressure of the fluid trapped in the bonnet cavity is considered equal to the maximum SI pump pressure of 1516 psig. The upstream and downstream pressure is assumed to be equal to zero. The valve has been set up to open against a dp of 1685 psig.

15. The inital temperature of the fluid in the bonnet cavity is assumed to be at 70° F. The maximum postulated ambient temeprature in the vicinity of the valve at the time of opening is 104° F. The valve is insulated and the line is always full with water. Significant heating of the bonnet cavity fluid is not expected.

16. Valve analytically demonstrated to be capable of opening with a 2235 psig bonnet pressure and an upstream pressure of 1516 psig (SI pump shut off head) and a downstream pressure of 1715 psig (low pressurizer pressure). The required opening thrust was derived based on conservative application of the methodology presented in NUREG CR-5807 and that developed by ComEd. The required opening thrust and torque were determined to be less than that available under design basis operating conditions; actuator and valve limits were not exceeded. This analysis will serve as the short-term capability justification, pending valve modification to eliminate susceptibility.

17. During surveillance testing, the valves are opened prior to the start of the spray pump and closed after the pump has been stopped. That means high pressure will not be trapped in the bonnet. During an accident, the valves are opened after its corresponding pump has been started. In this case there is no double disc drag at the time of opening.

18. The valves are considered operable in the long-term due to the reasons listed in the text. The active safety-related function of these valves is for LTOP. These valves are not safety-related plant equipment.

19. The valves are considered operable in the long-term. However, to assure assumptions made are correct, actions listed in the disposition section of of the text will be evaluated for long term disposition of the concerns related to these valves.

20. Evaluate appropriate measures to alleviate potential pressure locking condition.