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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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February 13, 1996

10 CFR 50.54(f)

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Response to Generic Letter 95-07

Reference: 1) NRC Generic Letter 95-07: Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves, dated August 17, 1995

In accordance with the reporting requirements of Reference 1, this letter is Wisconsin Public Service Corporation's 180 day response to the information request specified in Generic Letter (GL) 95-07.

GL 95-07 was issued to request that addressees perform the following actions. First, within 90 days, identify the valves which are potentially susceptible to pressure locking and thermal binding and provide a basis for their operability. Second, within 180 days, conduct an evaluation of susceptible valves and perform further analysis and corrective actions with justification for longer implementation schedules as needed.

In accordance with the 180 day required response, the following is provided:

1) The susceptibility evaluation of operational configurations performed in response to (or consistent with) the 180-day Requested Action 1 of Generic Letter 95-07, and the further analysis performed in response to (or consistent with) the 180-day Requested Action 2 of Generic Letter 95-07, including the bases or criteria for determining that valves are

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or are not susceptible to pressure locking or thermal binding. This information is provided in Attachment 1, "POGV Initial Screening Criteria for KNPP."

2) The results of the susceptibility evaluation and the further analyses referred to in 1) above, including a listing of the susceptible valves identified. This information is provided in Attachment 2, "System Level Screening to Eliminate Remaining Non-Susceptible POGV's" and Attachment 3, "Dispositioning for Valves Identified in Attachments 1 & 2".

3) The corrective actions, or other dispositioning, for the valves identified as susceptible to pressure locking or thermal binding, including: (a) equipment or procedural modifications completed and planned (including the completion schedule for such actions); and (b) justification for any determination that particular safety-related power-operated gate valves susceptible to pressure locking or thermal binding are acceptable as is. This information is provided in Attachment 3, "Dispositioning for Valves Identified in Attachments 1 & 2".

If you have questions or need additional information, please contact a member of my staff.

Sincerely,

Clark R. Steinhardt
Senior Vice President - Nuclear Power

BJD

cc - US NRC, Region III
US NRC Senior Resident Inspector
Mr. Lanny Smith, PSCW

Subscribed and Sworn to
Before Me This 13th Day
of February 1996

Notary Public, State of Wisconsin

My Commission Expires:
June 13, 1999

ATTACHMENT 1

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

February 13, 1996

POGV Initial Screening for KNPP

POGV INITIAL SCREENING FOR KNPP

Valve #	System	Description	Valve Type	Wedge or disk type	Valve Normal Position	2. Function (If either answer is NO, valve is considered non-applicable for PLTB)		3. Component Design for Pressure Locking	4. Component Design for Thermal Binding (If yes, valve is considered non applicable for TB)		List of Applicable/Non-Applicable POGVs	
						Does the valve have a safety-related function to open?	Is it normally or occasionally closed during normal or safety-related oporarions?	Is the valve a solid wedge gate valve? (If yes, valve considered non-applicable for PL)	Is the valve a double disk gate valve?	Is the valve a parallel disk gate valve?	Valve considered applicable for Pressure Locking?	Valve considered applicable for Thermal Binding?
AFW-10A,B	Auxiliary Feedwater	Turbine Driven AFW Pump Cross-Connects	MOV	SOLID	OPEN	YES	YES	YES	NO	NO	NO	YES
CC-6A.B	Component Cooling	CC Heat Exchanger Discharge	MOV	SOLID	OPEN	YES	NO	---	---	---	NO	NO
CC-400A,B	Component Cooling	CC to RHR Heat Exchanger	MOV	SOLID	CLOSED	YES	YES	YES	NO	NO	NO	YES
CC-600	Component Cooling	CC Supply to Containment	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
CC-601A,B	Component Cooling	CC Supply to RXCPs	MOV	SOLID	OPEN	NO	---	---	---	---	NO	NO
CC-612A,B	Component Cooling	CC Supply from RXCPs	MOV	SOLID	OPEN	NO	---	---	---	---	NO	NO
CC-653	Component Cooling	CC from Excess Letdown HX	MOV	SOLID	OPEN	NO	---	---	---	---	NO	NO
CVC-1	Chemical and Volume Control	Volume Control Tank Outlet	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
CVC-211	Chemical and Volume Control	Reactor Coolant Pump Seal Return	MOV	SPLIT	OPEN	NO	---	---	---	---	NO	NO
CVC-212	Chemical and Volume Control	Reactor Coolant Pump Seal Return	MOV	SPLIT	OPEN	NO	---	---	---	---	NO	NO
CVC-301	Chemical and Volume Control	Refueling Water Storage Tank (RWST) Supply to Charging Pump	MOV	FLEX	CLOSED	NO	---	---	---	---	NO	NO
FW-12A,B	Feedwater	Main FW to S/G Isolation	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
ICS-2A,B	Internal Containment Spray	RWST Supply to ICS Pumps	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
ICS-5A,B ICS-6A,B	Internal Containment Spray	ICS Pumps Discharge	MOV	SOLID	CLOSED	YES	YES	YES	NO	NO	NO	YES
MD(R)-323A,B	Misc. Drains and Sumps	Deaerated Drains Tank to Containment Isol. Valve	MOV	FLEX	CLOSED	NO	---	---	---	---	NO	NO
MS-100A,B	Main Steam	MS to Turbine Driven AFW Pump	MOV	SOLID	OPEN	NO	---	---	---	---	NO	NO
MS-102	Main Steam	MS to Turbine Driven AFW Pump	MOV	PARALLEL	CLOSED	YES	YES	NO	NO	YES	YES	NO
PR-1A,B	Reactor Coolant	Pressurizer Relief Block Valve	MOV	FLEX	OPEN	YES	YES	NO	NO	NO	YES	YES
RHR-1A,B RHR-2A,B	Residual Heat Removal	RHR Take Off from RCS Hot Leg	MOV	FLEX	CLOSED	NO	---	---	---	---	NO	NO

POGV INITIAL SCREENING FOR KNPP

Valve #	System	Description	Valve Type	Wedge or disk type	Valve Normal Position	2. Function (If either answer is NO, valve is considered non-applicable for PLTB)		3. Component Design for Pressure Locking	4. Component Design for Thermal Binding (If yes, valve is considered non applicable for TB)		List of Applicable/Non-Applicable POGVs	
						Does the valve have a safety-related function to open?	Is it normally or occasionally closed during normal or safety-related oporarions?	Is the valve a solid wedge gate valve? (If yes, valve considered non-applicable for PL)	Is the valve a double disk gate valve?	Is the valve a parallel disk gate valve?	Valve considered applicable for Pressure Locking?	Valve considered applicable for Thermal Binding?
RHR-11	Residual Heat Removal	RHR to Loop B Cold Leg	MOV	PARALLEL	CLOSED	NO	---	---	---	---	NO	NO
RHR-300A,B	Residual Heat Removal	RHR to SI Pumps	MOV	SPLIT	CLOSED	YES	YES	NO	NO	NO	YES	YES
RHR-400A,B	Residual Heat Removal	RHR Supply to ICS Pumps	MOV	SOLID	CLOSED	YES	YES	YES	NO	NO	NO	YES
SI-2A,B & 3	Safety Injection	BAT to SI Pumps	MOV	FLEX	CLOSED	NO	---	---	---	---	NO	NO
SI-4A,B	Safety Injection	RWST to SI Pumps	MOV	SPLIT	OPEN	NO	---	---	---	---	NO	NO
SI-5A,B	Safety Injection	RWST to SI Pumps	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
SI-9A	Safety Injection	High Pressure SI to Cold Legs	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
SI-9B	Safety Injection	High Pressure SI to Reactor Vessel	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
SI-20A,B	Safety Injection	Accumulator Isolation Valve	MOV	FLEX	OPEN	YES	NO	---	---	---	NO	NO
SI-300A,B	Safety Injection	RWST to RHR Pumps	MOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
SI-302A,B	Safety Injection	Low Head SI to Reactor Vessel	MOV	FLEX	OPEN	YES	NO	---	---	---	NO	NO
SI-350A,B	Safety Injection	Containment Sump Recirc to RHR	MOV	FLEX	CLOSED	YES	YES	NO	NO	NO	YES	YES
SI-351A,B	Safety Injection	Containment Sump Recirc to RHR	MOV	FLEX	CLOSED	YES	YES	NO	NO	NO	YES	YES
SW-502	Service Water	SW Supply to Turbine Driven AFW Pump	MOV	SOLID	CLOSED	YES	YES	YES	NO	NO	NO	YES
SW-601A,B	Service Water	SW Supply to AFW Pump	MOV	SOLID	CLOSED	YES	YES	YES	NO	NO	NO	YES
SW-901A,B,C,D	Service Water	Shroud cooling coil Inlet	AOV	FLEX	O/C	NO	---	---	---	---	NO	NO
SW-903A,B,C,D	Service Water	SW Return from Containment Fan Coil Unit	MOV	SOLID	OPEN	YES	YES	YES	NO	NO	NO	YES
SW-911AB,CD	Service Water	Shroud cooling coil Inlet	AOV	FLEX	OPEN	NO	---	---	---	---	NO	NO
SW-914A,B,C,D	Service Water	Shroud cooling coil outlet	AOV	FLEX	O/C	NO	---	---	---	---	NO	NO

ATTACHMENT 2

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

February 13, 1996

System Level Screening to Eliminate
Remaining Non-Susceptible POGV's

		System Level Screening to Eliminate Remaining Non-Susceptible POGVs														
	5.	7A. Pressure Locking - Hydraulic Effect			7B. Pressure Locking - Thermal Effects					8A. Thermal Binding - Wedge Effect				8B. Thermal Binding - Stem Effect		
Valve #	Component Level Screening to Eliminate Non Susceptible Valves—— Does the valve have a design featura that mitigates PL?	Is the valve normally or occasionally exposed to high pressure fluid and is the attached piping potentially depressurized prior to valve actuation?	Is the valve, which is not normally exposed to high pressure fluid, potentially subjected to high pressure fluid due to leakage from a high pressure source and is the attached piping potentially depressurized prior to valve actuation?	Is valve susceptible to PL due to Hydraulic Effects?	Is the valve stem oriented in a horizontal or below horizontal configuration as to trap steam condensate in the bonnet when closed?	Does the valve which is not normally or occasionally. exposed to not fluid, potentially experience body temperatura changes from fluid temperature conditions in the attached piping?	Does the valve, which is not normally exposed to high temperature conditions, potentially experience hot temperature conditions? (eg. HELB, LOCA)	Can the valve see a temperature increase greater then normal ambient swings?	Is valve susceptible to PL due to Thermal Effects?	Is the valve closed not followed by a significant cooldown and then required to open?	Is the not valve required to close while system/valve is cooling down (i.e., subject valve closure terminates cooling) and required to open after valve has cooled down?	Can a significant temperature gradient develop across the valve after it is closed and is the valve then required to be opened?	Is valve susceptible to TB due to wedge effect?	Is the valve closed hot, with no subsequent cooldown, then required to open?	Is the valve required to close while the system/ valve is being cooled down and signaled to open before the valve cools down (i.e. not completely cooled down)?	Is valve susceptible to TB due to stem effect?
AFW-10A,B	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
CC-400A,B	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
ICS-5A,B ICS-6A,B	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
MS-102*	YES	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PR-1A,B	NO	YES	NO	YES	NO	NO	YES	YES	YES	NO	NO	NO	NO	YES	NO	YES
RHR-300A,B	NO	NO	NO	NO	—	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RHR-400A,B	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
SI-350A,B	NO	NO	NO	NO	—	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
SI-351A,B*	YES	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
SW-502	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
SW-601A,B	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO
SW-903A,B,C,D	NO	—	—	—	—	—	—	—	—	NO	NO	NO	NO	NO	NO	NO

*These valves have a hole drilled in ons sids of ths disk which precludes pressure locking.

ATTACHMENT 3

Letter from C. R. Steinhardt (WPSC)

To

Document Control Desk (NRC)

Dated

February 13, 1996

Dispositioning for Valves Identified in Attachments 1 & 2

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Attachment 3
Dispositioning for Valves Identified in Attachments 1 & 2

General

Acronyms:
HELB - High Energy Line Break
HSD - Hot Shutdown
LCO - Limited Condition of Operation
LOCA - Loss of Coolant Accident
POGV - Power Operated Gate Valve
PL- Pressure Locking
RWST - Refueling Water Storage Tank
SG - Steam Generator
SGTR - Steam Generator Tube Rupture
TB - Thermal Binding
TS - Technical Specification
WOG - Westinghouse Owners Group

Assumptions and/or Positions:

- Kewaunee Nuclear Power Plant is licensed as a hot shutdown plant.
- The Oct. 13, 1995 screening criteria developed by the Westinghouse Owners Group PLTB Task Team will be utilized to assess the safety related POGVs at the Kewaunee Nuclear Power Plant.
- For a potentially susceptible valve in a multi-function system/subsystem, for which the susceptibility is only in a mode from which the subsystem is not designed to automatically or manually recover to support a safety-related function (i.e. the safety-related function of the subsystem is not required to be OPERABLE), GL95-07 does not apply.
- Mispositioning (in regards to GL 89-10) does not apply to the scope of GL 95-07.
- Valves subject to normal ambient temperature fluctuations (either routine or seasonal) are not considered susceptible to PL or TB.
- Design Basis/Licensing Commitment events are considered. Events beyond Design Basis or Licensing Commitments are excluded from the scope of GL 95-07.
- Solid wedge gate valves are not susceptible to pressure locking.
- Surveillance Procedures that enter an LCO by placing a system out of service are not considered for PLTB since the valve(s) need to be restored to operable status before exiting the LCO.

- Valves ICS-2A(B), MS-100A(B), SI-5A(B), SI-9A, and SI-300A(B) are all normally open valves that are maintained open. They have no automatic actuation signals and they are not required to change position, from closed to open, to mitigate any design basis accident. Thus, these valves were screened as part of GL 95-07 response as having no safety-related function to open. Some of the valves are closed during normal or abnormal operations and these specific instances are evaluated for PTLB susceptibility (see valve specific discussions).

AFW-10A & AFW-10B

These valves provide a flow path from the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) to each steam generator. If these valves are closed a LCO is entered in accordance with the plant Technical Specifications (TS 3.4.b). The auxiliary feedwater piping that these valves are located in is not subjected to hot temperatures. Condensate and service water temperatures are below 100°F. The differential temperature to cause TB is not present. These valves are in a steam exclusion area and are not subject to high ambient temperatures. These valves are not susceptible to TB during normal plant operation. In the event of a leaking Auxiliary Feedwater (AFW) line check valve (AFW-4A(B)), that train of AFW is declared inoperable and a LCO is entered. These valves are solid disk valves and are not subject to pressure locking.

CC-6A/B

These valves have a safety function to open. They do receive a Safety Injection signal to automatically open even though they are maintained open. These valves can be closed during normal operations for maintenance on the component cooling heat exchanger, however, a LCO is entered (TS 3.3.d).

CC-400A & CC-400B

These valves have solid wedge disks and are not susceptible to PL. These valves are not subject to significant temperature changes nor are they "hot". The component cooling water supply temperature is maintained relatively constant around 100°F. The differential temperature to cause TB is not present. These valves are in a steam exclusion area and are not subject to high ambient temperatures. These valves are not susceptible to TB. These valves have solid wedge discs and are not susceptible to PL.

ICS-2A & ICS-2B

These valves are maintained open in their safe position during normal operating conditions in order to align the RWST to the suction of the Internal Containment Spray (ICS) pumps. The valves do not have any automatic functions. If long term post accident containment sump recirculation is required for operation of the ICS, then these valves will be closed to isolate the

RWST. Once closed, there is no safety function that requires the valves to be re-opened. The valves are closed for testing purposes only during normal operating conditions. During this surveillance testing, the train is considered inoperable and the applicable Technical Specification LCO (TS 3.3.c.1.A.3) is entered. Based on the above, no additional evaluation is required to satisfy the concerns of GL 95-07 for these valves. It should be noted that when these valves are closed for testing, conditions for PL or TB are not present, and thus these valves are not susceptible to PLTB.

ICS-5A, ICS-5B, ICS-6A, & ICS-6B

These valves have solid wedge discs and are not susceptible to PL.

When these valves are operated, the fluid temperature is near ambient, or RWST temperature which is $<100°F$. These valves are not closed hot and allowed to cool. There is no temperature differential to cause TB. These valves are in a steam exclusion area and are not subject to high ambient temperatures. These valves are not susceptible to TB.

MS-100A & MS-100B

These valves are the header isolation valves for steam supply to the Turbine Driven Auxiliary Feedwater Pump (TDAFW) pump. These valves are administratively controlled during plant startup to assure they are open when required according to plant conditions. They are required to be open for steam supply to the TDAFW pump. These valves are maintained open during normal operations, and are closed for testing purposes only. For abnormal operations, they are also required to be closed for isolation of a SG in case of a ruptured or faulted SG, or SGTR (not required to be re-opened in these cases). During the valve testing, the TDAFW Pump is declared inoperable and the applicable Technical Specification LCO (TS 3.4.b.2) is followed. Based on this, no additional evaluation is required to satisfy the concerns of GL 95-07 for these valves. It should be noted that when these valves are closed for testing, conditions to cause TB are not present. These valves are not susceptible to TB. PL is not applicable since the valves have solid wedges.

MS-102

Valve is a spring loaded parallel disk gate valve with a hole drilled in the upstream disk. The valve is not susceptible to PLTB.

PR-1A & PR-1B

Except for surveillance testing, these valves are maintained open during normal operations. The valves can be closed to isolate a leaking Power Operated Relief Valve (PORV) without the plant entering into an LCO (refer to TS 3.1.a). These valves are not required to achieve hot shutdown nor are they required for low pressure overtemperature protection (LTOP).

Per TS 3.1.a.5 basis, the PORV block valves must be operable to provide an alternate means of mitigating a design basis steam generator tube rupture. Thus, if a PORV block valve is closed due to a leaking PORV, the block valve has to be capable of re-opening in the event of a SGTR.

Since these valves can be closed for testing or to isolate a leaking PORV, they have to be evaluated for PLTB effects for potential impact on the response to a SGTR.

These valves are maintained with a high pressure on the upstream (RCS) side. No credible accident has been identified that would depressurize the RCS to the point where pressure locking could occur and where the PORV block valve would be required to open. A calculation method developed by Commonwealth Edison assessed these valves for potential PL effects for their opening in response to a SGTR (the valve was assumed closed prior to the event due to a leaking PORV and the RCS was not pressurized to the point of requiring overpressure protection). The calculation has been verified through testing performed by Commonwealth Edison with support from the Westinghouse Owners Group PLTB Task Team. The results of this calculation indicate that the valve is capable of being opened under the conditions that it would be exposed to during a SGTR.

Based on an 18 plant survey done by the WOG PLTB Task Team, no occurrences of pressure locking or thermal binding of Pressurizer PORV Block Valves were reported over many years of PORV Block Valve operation. Literature search uncovered one case where thermal binding was reported (NUREG 1275). Discussions between the WOG PLTB Task Team and Dr. Earl Brown (NRC) revealed that the failed valve was a solid wedge gate valve which was subsequently replaced with a flex-wedge gate valve. The affected plant was not a Westinghouse plant. No information was made available on the differences in plant design. In addition during normal power operation there is steam on the upstream side of the valve. The high conductivity of the steel used in the valve body and the gate preclude a significant upstream and downstream temperature difference that may cause thermal binding.

These valves are located in containment and can therefore be exposed to rapid ambient temperature changes resulting from a LOCA or HELB. If the valve were closed prior to the initiation of one of these accidents, the valve may be susceptible to thermally induced pressure locking. The valves are also susceptible to pressure locking due to a rapid de-pressurization of the high pressure side (RCS). However, the PORVs are not required to open to mitigate the consequences of these design basis accidents and therefore an assessment for this condition is not required within thescope of GL 95-07.

A preliminary calculation was completed to evaluate the potential for thermal binding due to stem growth. The reviews for this calculation have not been completed at this time. Administrative controls may be applied if determined necessary pending calculation results. These valves have previously been subjected to conditions that could cause thermal binding due

to stem growth with no apparent adverse effects. Thermal binding due to stem growth is beyond the requirements for thermal binding as defined in GL 95-07.

RHR-1A, 1B, 2A, 2B, & 11

These valves do not have any engineered safeguard functions. These valves do not have a safety function to open to mitigate the consequences of a design basis accident. These valves are not required for the plant to achieve hot shutdown conditions. These valves are not required to be assessed within the scope of GL 95-07.

RHR-300A & RHR-300B

RHR-300A and RHR-300B are the isolation valves for RHR supply to the suction of the safety injection (SI) pumps, and may be required for containment recirculation. These valves are normally closed.

Post accident, these valves remain closed until they are required to be opened to establish containment sump recirculation flow to the suction of the SI pumps. The thermal conditions, both fluid and ambient, at the valve when it is opened will not be any different than normal conditions. The fluid temperature in the line up to the valve will be about the temperature of the RWST fluid (< 100 °F). Since the differential temperature to cause TB is not present, these valves are not susceptible to TB. These valves are located in a steam exclusion area with safeguards fan coil units for cooling. The valves will not be subject to significant ambient temperature variations. These valves are not subject to thermally induced pressure locking.

During plant startup, the RHR system is utilized to provide for core cooling. Under these conditions the valves are exposed to pressures greater than RHR system pressures under accident conditions. When the RHR system is isolated from the RCS, there is a potential for the valves to be susceptible to pressure locking following system depressurization. Administrative controls have been established to cycle the valves, depressurizing the bonnets, precluding the potential for pressure locking verifying operability.

RHR-400A and RHR-400B

These valves provide a flow path from the containment recirculation (RHR pumps) to the ICS pumps. These valves are normally closed.

These valves have solid wedge disks and are not susceptible to PL.

When these valves are operated, the fluid temperature is near ambient, or RWST temperature which is < 100°F. These valves are not closed hot and allowed to cool. There is no

temperature differential to cause TB. These valves are in a steam exclusion area and are not subject to high ambient temperatures. These valves are not susceptible to TB.

SI-4A & SI-4B

SI-4A & B are normally open to provide a flowpath from the RWST to the SI pump suction. The valves are maintained open, with power locked off, and therefore have a passive function post-accident. They have no safety function to operate for accident mitigation. Technical Specification TS 3.3.b.1.B is followed which requires that either SI-4A or SI-4B be open with power breaker locked out for system operability.

SI-5A & SI-5B

These valves are maintained open in their safe position during normal operating conditions in order to align the RWST to the suction of the SI pumps. The valves do not have any automatic functions. If long term post accident containment sump recirculation is required for operation of the high head SI, then these valves will be closed to isolate the RWST from the SI pump suction. Once closed, there is no safety function that requires them to be re-opened. During normal operations, these valves are closed for surveillance testing purposes only. During this surveillance testing, the system is declared inoperable and the applicable Technical Specification LCO (TS 3.3.b.2) is followed. Based on the above, no additional evaluation is required to satisfy the concerns of GL95-07 for these valves. It should be noted that when these valves are closed for testing, conditions for PL or TB are not present. These valves are not susceptible to PLTB.

SI-9A

This valve is maintained open (power locked off) per Technical Specification 3.3.b.1.

SI-20A & SI-20B

These valves are maintained open (power locked off) per Technical Specification 3.3.a.1.B. However, they can be closed during power operations in response to an abnormal operating condition to check for leakage into the accumulator due to a degraded accumulator check valve. Closure of this valve would be a very unusual condition, and per Tech Specs, the plant enters into a 1 hour LCO. Since the valve and the accumulator are declared out of service during this condition and the applicable plant TS is followed, additional evaluation for PLTB during this specific case when the valve is closed is not required within the scope of GL95-07.

SI-300A & SI-300B

These valves provide a flowpath from the RWST to suction of the RHR pumps. These valves are administratively controlled during plant startup to assure they are open when required

according to plant conditions. Following an accident, these valves provide RWST fluid to the RHR pumps for low head SI. These valves remain open until they have to be closed for switching over to containment sump recirculation mode. Once transferred to recirculation mode, there is no safety function for these valves to open again. During normal operations, these valves are closed for surveillance testing purposes only. During this surveillance testing, the system is declared inoperable and the applicable Technical Specification LCO (TS 3.3.b.2) is followed. Based on the above, no additional evaluation is required to satisfy the concerns of GL 95-07 for these valves. It should be noted that when these valves are closed for testing, conditions for PL or TB are not present. These valves are not susceptible to PLTB.

SI-302A & SI-302B

These valves are required to be open for accident mitigation to provide a flowpath for SI to the reactor vessel. These valves are administratively controlled during plant startup to assure they are open when required according to plant conditions. During normal operations these valves are maintained open. They also remain open during the low head injection and containment sump recirculation modes of safety injection.

The valves are located in containment and could be exposed to high ambient temperature conditions in the event of a LOCA or HELB. However, in response to either of these design basis accidents, the valve is open at the onset. Thermally induced pressure locking is not a concern in these accidents.

These valves can be closed during an emergency condition to try and isolate a LOCA outside containment (this is a condition beyond the design basis). If closure of one of the valves does not isolate the LOCA outside containment, then that valve is opened to re-establish the SI flowpath, and the process is repeated for the opposite train valve. Under this condition, the valve will not have a delta-P (or it will be very little) because of the upstream check valves. There is not enough time for leakage to occur past both check valve seats and pressurize the piping and the bonnet of SI-302A (assuming that the RCS is still at a high pressure), and then have a coincident LOCA to depressurize the piping. In addition, there is not ample time for a thermal transient to induce PL in the short time the valve would be closed. Likewise, thermal binding will not develop during the time the valve is closed. Thus, these valves are not susceptible to PLTB in this case.

SI-350A & SI-350B

These valves are normally closed. They are required to open post-accident to establish containment sump recirculation.

During a LOCA, hot RCS fluid will fill the containment sump and piping up to SI-350A and B. The hot fluid will transmit heat to SI-350A & B causing the valve to increase in temperature. If the bonnet of this valve was full of water, the temperature increase could cause the valve to

become pressure locked due to the heat transfer to the valve body and the fluid in the bonnet. However, this valve has air in the bonnet, and this air pocket is maintained during normal operations. As the valve heats up and the fluid expands, the air in the bonnet will slightly compress, without any significant change in bonnet pressure. These valves are cycled through administrative controls during plant startup and during the operating cycle. During the procedure, SI-351A(B) is opened while SI-350A(B) remains closed. When SI-351A(B) is opened, water will try to fill the section of pipe between the two valves (due to the head from the RWST). SI-351A(B) is closed, and then SI-350A(B) is opened. The water trapped in the pipe between the two valves will drain out into the sump piping and containment sump B area. Since the 1995 refueling outage, the piping in between SI-350A(B) and SI-351A(B) was verified to contain air. This was done by venting the piping and then connecting tygon tubing to the test connection on the bottom of the pipe. Using the tubing, the elevation of the water in the pipe was determined and it was verified that air was present in the space between the valves. Since air was still located in the pipe between the valves after 3 months, then air would still be present in the bonnet of SI-350A(B).

These valves are considered not susceptible to PL because they have air in the bonnet.

When these valves are closed, the piping system is near ambient temperature. These valves are not closed hot and allowed to cool. There is no temperature differential to cause TB. These valves are not susceptible to TB.

SI-351A & SI-351B

These valves are normally closed. They are required to open post-accident to establish containment sump recirculation.

These valves have a hole drilled in the disk of the valve and therefore are not susceptible to pressure locking.

These valves are maintained closed during normal operations, except for testing. Whenever the valve is cycled, the valve temperature is near ambient conditions. These valves are not closed hot and allowed to cool. There is no temperature differential to cause TB. These valves are not susceptible to TB.

SW-502, SW-601A, SW-601B
SW-903A, SW-903B, SW-903C, and SW-903D

These valves have solid wedge disks and are not susceptible to PL. These valves are located in a cold fluid system. These valves are not closed hot and allowed to cool. The valves are not subject to a significant temperature differential and are therefore not susceptible to TB.