WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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July 12, 1996
GO2-96-140

Docket No. 50-397

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

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NO. NPF-21**
FINAL RESPONSE TO GENERIC LETTER 95-07, "PRESSURE LOCKING AND THERMAL BINDING OF SAFETY-RELATED POWER OPERATED GATE VALVES" (TAC NO. M93539)

References:

1. Letter GO2-96-027, dated February 13, 1996, JV Parrish (SS) to NRC, "Response to Generic Letter 95-07, 'Pressure Locking and Thermal Binding of Safety-Related Power Operated Gate Valves' - Supplemental Information (TAC No. M93539)"

2. Letter GI2-96-017, dated January 18, 1996, JW Clifford (NRC) to JV Parrish (SS), "Request for Additional Information (RAI) for Generic Letter 95-07, 'Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves,' for the Washington Public Power Supply System (WPPSS) Nuclear Project No. 2 (WNP-2) (TAC NO. M93539)"

3. Letter GO2-95-221, dated October 13, 1995, JV Parrish (SS) to NRC, "Response to Generic Letter 95-07, 'Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves'"

4. NRC Generic Letter 95-07, dated August 17, 1995, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves"

The Supply System hereby provides the final response to Generic Letter (GL) 95-07 (Reference 4). As required, this response includes a summary description of (1) the pressure locking and thermal binding (PLTB) susceptibility evaluation and further analyses performed; (2) the results of the susceptibility evaluation and further analyses; and (3) the corrective actions, or other dispositioning, for the valves identified as susceptible to PLTB. This letter, in conjunction with the Reference 1 and 3 letters, completes the Supply System's written response requirements of GL 95-07.

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INITIAL PLTB SUSCEPTIBILITY EVALUATION PROGRAM AND ANALYSES

Description

The Supply System performed an initial PLTB susceptibility evaluation in 1993 that included only the WNP-2 GL 89-10 Program valves. This population consisted of approximately 100 safety-related motor-operated gate valves. A subsequent evaluation, also considered part of the initial PLTB susceptibility evaluation, included an additional 12 safety-related air-operated gate valves. There are no safety-related hydraulically-operated or solenoid-operated gate valves at WNP-2. The GL 89-10 motor-operated and safety-related air-operated valve evaluations were completed prior to the submittal of the Reference 3 response to GL 95-07. Attachment 1 is a logic diagram of the PLTB valve screening process that was used.

Valves with the potential for PLTB were determined from reviews of relevant information, which included:

- WNP-2 Final Safety Analysis Report (FSAR)
- WNP-2 Technical Specifications
- WNP-2 Operating and Emergency Procedures
- WNP-2 GL 89-10 Program Requirements
- WNP-2 Motor Operated Valve Maintenance Records
- WNP-2 Surveillance Test Procedures
- WNP-2 Local Leak Rate Test (LLRT) Records
- WNP-2 Motor Operated Valve Design Basis Calculations
- WNP-2 System and Design Engineer Reviews
- Industry Events Reviews

The initial susceptibility evaluation for Pressure Locking (PL) and Hydraulic Locking (henceforth termed thermally induced PL) included flexible-wedge disc and parallel sliding disc gate valves. The screening process was in accordance with NRC Special Study AEOD/S92-07, "Pressure Locking and Thermal Binding of Gate Valves," dated December 1992. Operating and testing modes were considered in the screening process.

PL occurs when pressure is trapped in the valve body-bonnet cavity of a flexible-wedge disc or parallel sliding disc gate valve such that the trapped pressure is at a higher pressure than the line pressure on either side of a closed disc. This typically results from a rapid depressurization of the upstream and/or downstream piping (e.g., due to a Loss of Coolant Accident (LOCA) or loss of feedwater transient). However, bonnet cavity pressurization can also be caused by the thermal expansion of trapped fluid in the bonnet cavity due to disc heating or an increase in the ambient air temperature. Both of these processes could potentially result in pressure being locked between the valve discs, causing the discs to be forced against the seats. The resultant drag force could increase the open (unseating or pullout) thrust requirements such that the valve would not open when actuated. Solid-wedge disc gate valves are not considered susceptible to PL because there is insufficient movement or flexibility for the upstream seat to seal (i.e., cannot

seal on both seats simultaneously). Also, there is no internal gate cavity to be pressurized or expanded. The screening process included a review of system operation to determine if open operation of the valves was required after a potential PL condition existed. The screening process also included criteria to determine if a potential PL condition would be eliminated by repressurization of the upstream valve seat before valve operation.

The initial PLTB susceptibility evaluation considered thermally induced PL to be a subset of PL. Thermally induced PL occurs when trapped fluid (with no vapor or gas pockets) in a valve bonnet cavity is heated and expands due to the resulting pressure rise. Thermally induced PL could prevent the valve from opening when actuated due to the same increase in disc drag force as occurs in PL. The thermally induced PL effect is a rare industry occurrence and is difficult to reproduce even under ideal conditions. This effect is only a concern if the valve bonnet cavity is filled completely solid with fluid. The compressibility of gases prevents thermally induced PL from occurring when vapor or gas pockets are present in a valve bonnet cavity. Thus, air (or other gas) systems are not considered susceptible to thermally induced PL. Furthermore, the initial PLTB susceptibility evaluation assumed that if the valve bonnet orientation is above horizontal, the bonnet would trap vapor or gas at its high point and prevent the bonnet from becoming solid with fluid. If the bonnet is below horizontal, the bonnet area could be vented of all vapor or gas and be filled solid with fluid. Thus, the initial susceptibility evaluation screening process included an evaluation of the valve orientation as well as evaluations of the potential temperature increases due to heat conduction through the piping or via the surrounding air. Based on the initial evaluation screening criteria, valves were not considered susceptible to thermally induced PL if their bonnets were oriented above horizontal. Solid-wedge disc gate valves are not considered susceptible to thermally induced PL for the same reasons that they are not considered susceptible to PL (i.e., the valves cannot seal on both seats simultaneously and because there is no internal gate cavity to be pressurized or expanded). Therefore, solid-wedge disc gate valves were not screened for thermally induced PL.

If a wedge disc type gate valve is closed while at an elevated temperature, Thermal Binding (TB) can occur as the associated system cools. The valve body and discs mechanically interfere because of the different thermal expansion and contraction characteristics of the valve body, stem, and discs. The differences in thermal contraction can increase the seat forces against the disc. The increased seat load results in additional drag forces and a corresponding increase in the thrust requirement to open the valve. This TB effect could prevent the valve from opening when actuated. High closing forces tend to increase the TB effect. The initial PLTB susceptibility evaluation assumed that TB would not occur in flexible-wedge disc or parallel sliding disc gate valves because of their inherent disc flexibility. These valves were developed specifically to minimize the potential for TB in high temperature applications. Therefore, the initial evaluation screening for TB was restricted to solid-wedge disc gate valves that close at high temperatures.

Further Analyses and Corrective Actions

The initial PLTB susceptibility evaluation of the GL 89-10 motor-operated gate valves was performed jointly by the Supply System and a contracted valve expert. The 12 safety-related air-operated gate valves were subsequently evaluated for PLTB susceptibility by Supply System personnel. The evaluations concluded that none of the air-operated valves screened were susceptible to PL, thermally induced PL, or TB. It was further concluded that none of the motor-operated valves (MOVs) screened were susceptible to thermally induced PL or TB. However, 7 MOVs were determined to be susceptible to PL and 3 of the 7 valves have been modified with a disc bypass modification to prevent PL. This modification continuously vents the valve body-bonnet cavities to the high pressure piping. The remaining 4 valves were subsequently shown to have sufficient open thrust capability to overcome the additional PL load and were determined to be acceptable without modification. Nine (9) additional MOVs were identified as being marginally susceptible to PL such that open operation of the valves could potentially be affected. These valves were typically small valves subject to low differential pressure during design basis conditions. All 9 valves were subsequently shown to be acceptable based on sufficient actuator thrust capability to overcome the additional PL load. The results of the calculations demonstrating the capability to overcome PL were compared with industry test data and the results of the comparison show that the analyzed operating margins are conservative.

Although the disc bypass modifications of the 3 valves determined to be susceptible to PL permanently changed the valves to one-directional types, there were no special training requirements associated with the modifications. By modifying the valves to vent the bonnets to the upstream (reactor side) piping, the reactor side valve disks/seats no longer have isolation capability. However, it was verified that the affected valves are only required to provide non-reactor side seat/wedge sealing capability for flow path isolation during normal operation, testing, and design basis conditions. Thus, there were no significant changes to plant operation, maintenance, or testing requirements, and no special training of plant personnel was deemed necessary.

The initial PLTB susceptibility evaluation identified one additional MOV as being susceptible to PL during test conditions. A surveillance procedure was changed to make test personnel aware of the potential for PL in the MOV during the prescribed test conditions. No special training associated with the procedure change was necessary as the change was informational in nature.

The MOVs identified as being susceptible (or marginally susceptible) to PL are documented in WNP-2 Pressure Locking and Thermal Binding Report WPPSS-ENT-0136, issued December 29, 1993. Operability evaluations of the susceptible valves were performed and the bases for operability are documented in Problem Evaluation Report (PER) 294-0074, dated February 1, 1994.

In summary, the initial PLTB susceptibility evaluation did not find any power-operated gate valves that were susceptible to thermally induced PL or TB. The 16 valves found to be susceptible or marginally susceptible to PL were subsequently either determined to be operable or modified to prevent PL. A list of these valves, including short descriptions of the PL conditions and resolutions, is provided in Table 1 of Attachment 2.

PLTB SUSCEPTIBILITY RE-EVALUATION PROGRAM AND ANALYSES

Description

Pursuant to the recommendations of GL 95-07, the Supply System has completed a PLTB susceptibility re-evaluation and analyses using a structured program with more detailed screening criteria than the initial PLTB susceptibility evaluation program discussed above. The scope of the re-evaluation program consisted of 144 safety-related power-operated gate valves, including the 100 GL 89-10 motor-operated and 12 safety-related air-operated gate valves previously evaluated under the initial PLTB susceptibility evaluation program. Attachment 3 is a logic diagram of the PLTB valve screening process that was used for the re-evaluation.

The scope of 144 safety-related power-operated gate valves applicable to the PLTB susceptibility re-evaluation was developed based on reviews of:

- WNP-2 Master Equipment List (MEL)
- WNP-2 MEL reports
- Past Supply System reviews (e.g., SOER 84-06)
- Inservice Test (IST) program basis data tables
- WNP-2 GL 89-10 program valves
- WNP-2 flow diagrams
- Vendor valve drawings

The initial PLTB susceptibility evaluation program assumed that PL occurs when pressure is trapped in the valve body-bonnet cavity of a flexible-wedge disc or parallel sliding disc gate valve such that the trapped pressure is at a higher pressure than the line pressure on either side of a closed disc. This typically results from a rapid depressurization of the upstream and/or downstream piping (e.g., due to a LOCA or loss of feedwater transient). Solid-wedge disc gate valves are not considered susceptible to PL because there is insufficient movement or flexibility for the upstream seat to seal (i.e., cannot seal on both seats simultaneously). Also, there is no internal gate cavity to be pressurized or expanded. The assumptions for the PL susceptibility portion of the re-evaluation program were essentially the same as for the initial evaluation program (comparison of Attachments 1 and 3).

The initial PLTB susceptibility evaluation program assumed that thermally induced PL is caused by valve bonnet cavity pressurization due to thermal expansion of trapped fluid (with no air or gas pockets) in the bonnet cavity. This condition can occur as a result of disc heating or an increase in the ambient air temperature. It was also assumed that if the valve bonnet orientation

was above horizontal, the bonnet would trap vapor or gas at its high point and prevent the bonnet from becoming solid with fluid. Since the thermally induced PL effect is only a concern when the valve bonnet cavity is filled completely solid with fluid, the initial evaluation screened out valves with bonnets oriented above horizontal as not being susceptible to thermally induced PL. It was later concluded, based on comments from the NRC staff during a MOV inspection, that valve bonnet orientation may be considered in the evaluations for thermally induced PL but should not be used as screenout criteria. Additional justification should be provided to demonstrate that a valve with its bonnet oriented above horizontal is not susceptible to thermally induced PL. Consistent with this new guidance, the PLTB susceptibility re-evaluation screening criteria for thermally induced PL (see Attachment 3) does not include a horizontal valve bonnet orientation screenout logic decision block. Solid-wedge disc gate valves are not considered susceptible to thermally induced PL because the valves cannot seal on both seats simultaneously and there is no internal gate cavity to be pressurized or expanded. Due to the changes to the screening criteria for thermally induced PL, the scope of the PLTB susceptibility re-evaluation program included the valves previously screened for thermally induced PL under the initial PLTB susceptibility evaluation program plus an additional 16 flexible-wedge disc and parallel sliding disc gate valves.

The initial PLTB susceptibility evaluation for TB was restricted to solid-wedge disc gate valves. Flexible-wedge disc and parallel sliding disc gate valves were not considered susceptible to TB based on their inherent disc flexibility and because these valves were designed specifically to minimize the potential for TB in high temperature applications. The PLTB susceptibility re-evaluation program assumptions still did not consider parallel sliding disc gate valves to be susceptible to TB since their design allows the unwedging forces to be relaxed during unseating. However, industry experience has shown that TB can occur on flexible-wedge disc gate valves. Thus, the PLTB susceptibility re-evaluation program screened flexible-wedge disc gate valves for susceptibility to TB. As a result, the scope of the PLTB susceptibility re-evaluation program included the valves previously screened for TB under the initial PLTB susceptibility evaluation program plus an additional 22 GL 89-10 Program flexible-wedge disc gate valves.

The PLTB susceptibility re-evaluation program methodology consisted of four steps. The actions performed during each step are summarized below.

Step 1 - Functionality Review

In Step 1, a review of each valve was performed to determine if an open safety function existed. A bulk PLTB screening was also performed in Step 1 based on disc type and completed modifications to preclude PLTB.

Step 2 - Pressure and Temperature Conditions

In Step 2, an evaluation of the pressure and temperature conditions was performed. This step established and documented the basic operating conditions for each valve. System isometric drawings were used in some cases to determine the proximity to heat sources.

Step 3 - Evaluation of Local Heat Sources

In Step 3, plant walkdowns were performed to identify local heat sources for each valve identified as potentially susceptible to PL. Local heat sources were further reviewed for the impact on valve bonnet temperatures in a temperature effects evaluation.

Step 4 - Susceptibility Evaluation

In Step 4, susceptibility to PLTB was determined based on the reviews and evaluations performed in Steps 1 through 3. The evaluation for PL considered rapid depressurization events and bonnet pressurization due to thermal heating. The evaluation for TB considered valve cooling, thermal transients across the valve, and stem expansion.

Step 5 - Resolution/Disposition

In Step 5, the valves that were determined to be susceptible to PL were evaluated to verify that the required unseating thrust during a PL event would not exceed the estimated actuator capability. Valves that were determined to be susceptible to TB were evaluated for possible procedure changes to eliminate the concern.

Further Analyses and Corrective Actions

PLTB is only a concern for valves that are required to open to perform a safety function. Of the 144 safety-related power-operated gate valves evaluated under the PLTB susceptibility re-evaluation program, only 48 were determined to have a design basis accident function to move from closed to open. The functional requirements were based on reviews and cross-checks of WNP-2 licensing and design requirements documents; component classification evaluation records (CCERs); approved MOV system level calculations; surveillance procedures; and system, emergency, and abnormal operating procedures. The 48 valves determined to have open safety functions were further evaluated to determine their susceptibility to PLTB using the methodology described above.

The PLTB susceptibility re-evaluation program found 15 valves to be susceptible to PL. No valves were found to be susceptible to thermally induced PL. A list of the 15 valves, including short descriptions of the PL conditions and resolutions, is provided in Table 2 of Attachment 4. The 15 valves include 3 valves that had not previously been identified as being susceptible to PL under the initial PLTB susceptibility evaluation program. Also, there were two valves that had previously been identified to be susceptible to PL under the initial program, but were subsequently determined not to be susceptible under the re-evaluation program. One of the valves was screened out based on disc type (solid-wedge). The other valve was screened out based on not having an active open safety function (key-locked open). Of the 15 valves determined to be susceptible to PL, 5 valves require disc bypass modifications as long term corrective actions. This modification will continuously vent the valve body-bonnet cavities to the high pressure piping to prevent PL. No immediate actions to implement the modifications

were deemed necessary as adequate capability of the 5 valves to open under PL conditions has been demonstrated by evaluation to provide assurance of interim operability. No significant changes to plant operation, maintenance, or testing requirements are expected as a result of the modifications. Thus, no special training of plant personnel should be necessary. It should also be noted that disc bypass modifications had been completed for 5 other valves prior to their re-evaluation for susceptibility to PL. Without the modifications, these 5 valves would also have been determined to be susceptible to PL under the re-evaluation program.

The PLTB susceptibility re-evaluation program found 16 valves to be susceptible to TB for normally closed valves subject to a temperature gradient. No valves were determined to be subject to TB as a result of being closed hot and having to reopen to perform a safety function. The initial evaluation program had not identified any valves susceptible to TB for either of these two potential TB conditions. A list of the 16 valves, including short descriptions of the TB conditions and resolutions, is provided in Table 3 of Attachment 4. Based on temperature effects evaluations of the 16 valves under design basis conditions, there was no appreciable increase in temperature at the valves. Since no significant temperature increase occurs, there is no significant increase in the mechanical interferences between the valve body and disc caused by differences in the thermal expansion and contraction characteristics of the valve components. Thus, there is no significant increase in valve unseating or pullout thrust which could result in TB. Based on the conclusions of the temperature effects evaluation, no procedure changes or modifications to the valves to prevent TB were deemed to be necessary.

The NRC staff has stated that normally open, safety-related power-operated gate valves which are closed for test or surveillance, but must return to the open position, should be evaluated within the scope of GL 95-07. The Supply System does not consider disposition of this issue as a requirement for closure of GL 95-07. There is currently a Boiling Water Reactor Owners Group (BWROG) committee addressing the issue as a generic concern and will be meeting with the NRC for resolution. It is the BWROG and Supply System position that the test return recommendations provided by the NRC for safety-related power-operated valves are outside the BWR plant design bases. It has also been determined that the probability of a failure of a power-operated valve to return to its normally open safety position after being closed for a surveillance is so low that the event is not considered credible. Thus, the Supply System does not believe it prudent to commit to any actions related to the test return valve issue until final resolution of the generic concern. This position has also been expressed during GL 89-10 closeout inspections associated with Inspection Reports 95-24 and 96-04.

The valves in question have been identified and evaluated under the PLTB susceptibility re-evaluation program. The majority of the valves require entering the applicable Limiting Condition for Operability (LCO) prior to performing a surveillance that removes the valve from its normally open safety position. However, based on the current screening criteria, the valves are not considered to be susceptible to PLTB since they do not have an active open safety function. Thus, these valves are not currently included in the GL 95-07 population.

The assumptions, methodology, and results of the PLTB susceptibility re-evaluation program are detailed in the Generic Letter 95-07 Evaluation Report (TM-2107, Revision 0). Additional valve operability, capability, heat source, and temperature effects evaluations are documented in PER 294-0074 and WNP-2 Calculations ME-02-94-31, ME-02-94-32, ME-02-96-19, ME-02-96-20, ME-02-96-21, and ME-02-96-23. These evaluations are available for NRC staff review.

Should you have any questions or desire additional information regarding this matter, please call me or L. C. Fernandez at (509) 377-4147.

Respectfully,

J. V. Parrish for
Chief Executive Officer
Mail Drop 1023

CDM

Attachments

1. PLTB Screening Process Diagram - Initial Susceptibility Evaluation
2. Results of Initial PLTB Susceptibilty Evaluation
3. PLTB Screening Process Diagram - Susceptibility Re-evaluation
4. Results of PLTB Susceptibility Re-evaluation

cc: LJ Callan - NRC RIV
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STATE OF WASHINGTON)
)
COUNTY OF BENTON)

Subject: Final Response to Generic Letter 95-07 "Pressure Locking and Thermal Binding of Safety-Related Power Operated Gate Valves"

I, J. W. BAKER, being duly sworn, subscribe to and say that I am acting for the Chief Executive Officer for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have the full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information, and belief the statements made in it are true.

DATE July 12, 1996

J. W. Baker
Acting Chief Executive Officer

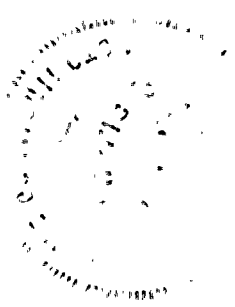
On this date personally appeared before me J. W. BAKER, to me known to be the individual who executed the foregoing instrument, and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 12 day of July 1996.

Notary Public in and for the
STATE OF WASHINGTON

Residing at Kennewick

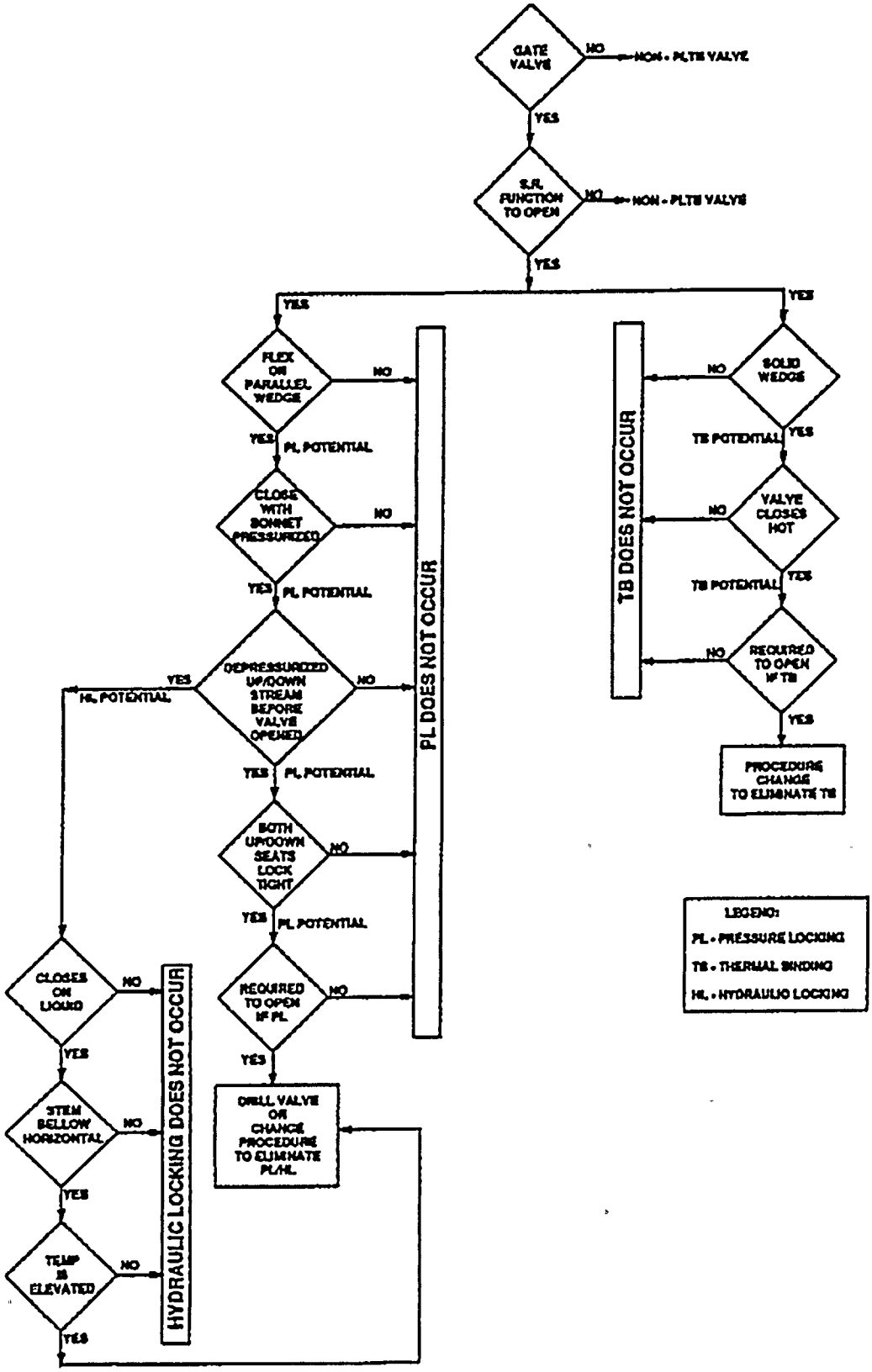
My Commission Expires 4/28/98



Attachment 1

PLTB Screening Process Diagram - Initial Susceptibility Evaluation

PLTB VALVE SCREENING PROCESS



Attachment 2

Results of Initial PLTB Susceptibility Evaluation

RESPONSE TO GENERIC LETTER 95-07

Pressure Locking

The valves listed in Table 1 were identified as being susceptible to PL during the initial PLTB susceptibility evaluation.

TABLE 1

Valve No.	Issue	Resolution
CAC-V-2,4,6, 8,11,13,15,17	Valves are normally closed. Valve body-bonnet cavity could become pressurized to peak drywell pressure of 35 psig during a LOCA. The pressure could become locked prior to post-LOCA open actuation due to expected drywell pressure decrease.	Capability evaluation shows sufficient actuator thrust capability to overcome the additional PL load. No further actions recommended.
HPCS-V-4	Valve is normally closed. Valve body-bonnet cavity could become pressurized to 1446 psig by HPCS pump. PL could occur if pressure on both sides of valve is decreased and valve is opened during static (pump off) surveillance testing or HPCS system filling and draining.	Capability evaluation determined that HPCS pump pressure eliminates PL potential during an actual active safety-related open actuation and during dynamic valve stroke surveillance testing. Note added to valve static surveillance procedure to identify potential for PL.
LPCS-V-5	Valve is normally closed. Valve is subject to full reactor pressure (1052 psig). High pressure could be locked in valve body-bonnet cavity prior to open actuation for LPCS injection when reactor pressure decreases following a LOCA.	A disc bypass modification of the valve has been completed to continuously vent the body-bonnet cavity to the high pressure piping.
RCIC-V-13	Valve is normally closed. PL could occur if valve body-bonnet cavity becomes pressurized from reactor (DBA maximum is 1207 psi) and upstream pressure is subsequently decreased. This condition could occur prior to open actuation for RCIC injection following a LOCA, or during surveillance testing.	Capability evaluation shows sufficient actuator thrust capability to overcome the additional PL load. No further actions recommended.
RCIC-V-68	Valve is normally key-locked open. Following a LOCA isolation, suppression pool pressure (28 psig) could be locked in valve body-bonnet cavity due to subsequent upstream and downstream depressurization (RCIC turbine trip and suppression pool returning to 0 psig). PL could prevent re-opening of valve for RCIC operation.	Capability evaluation shows sufficient actuator thrust capability to overcome the additional PL load. No further actions recommended.

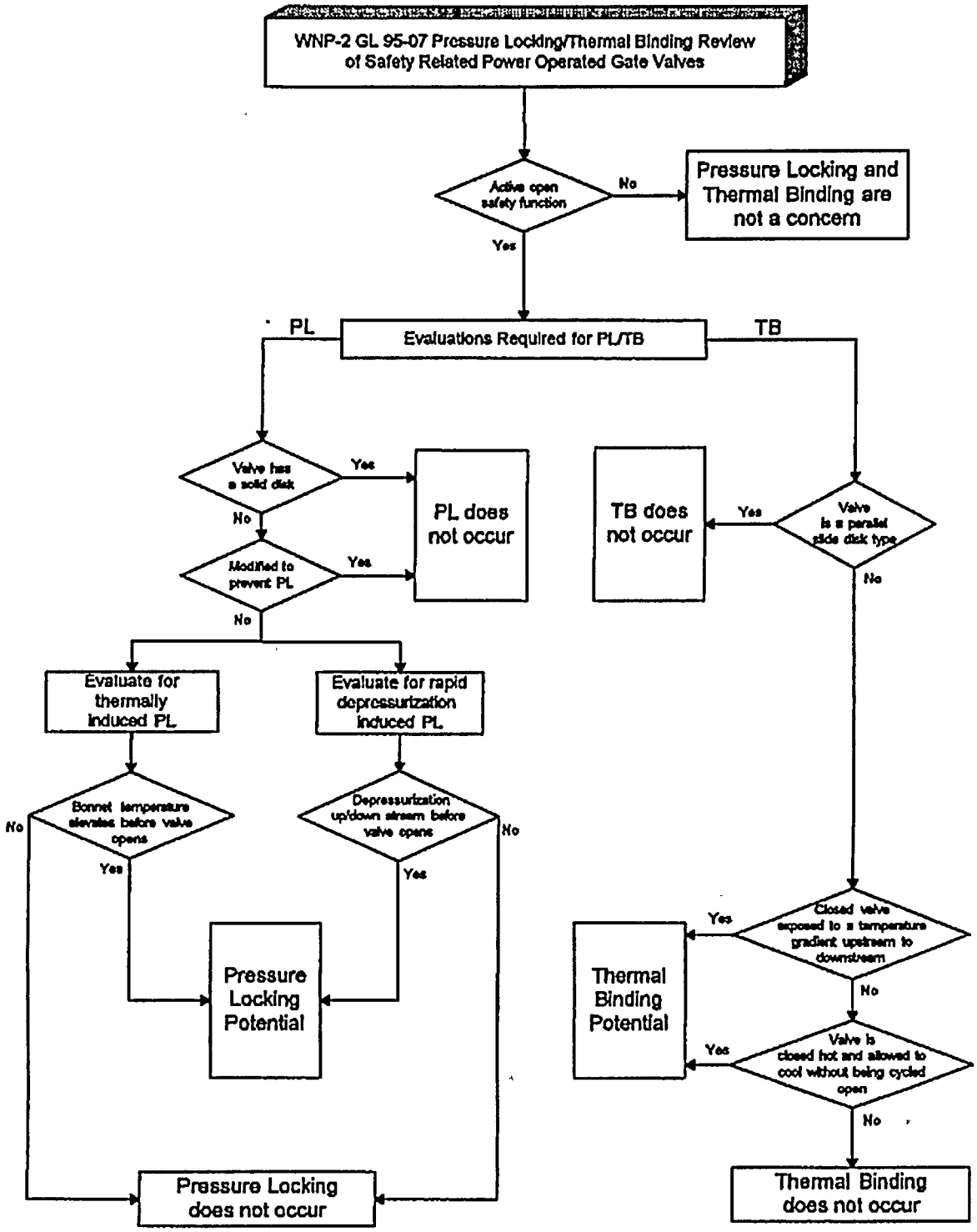
TABLE 1 (Continued)

Valve No.	Issue	Resolution
RHR-V-8,9	Valves are normally closed. Valve body-bonnet cavity can be pressurized to maximum reactor pressure (1062 psig). Pressure could become locked prior to open actuation for shutdown cooling when the upstream and downstream sides of the valves are depressurized to meet shutdown cooling requirements.	A disc bypass modification of each valve has been completed to continuously vent the body-bonnet cavity to the high pressure piping.
RHR-V-42A, 42B,42C	Valves are normally closed. Valve body-bonnet cavity can be pressurized from the reactor (1045 psig). Pressure could become locked prior to open actuation for LPCI when the upstream side of the valves are depressurized during a LOCA.	Capability evaluation shows sufficient actuator thrust capability to overcome the additional PL load. No further actions recommended.

Attachment 3

PLTB Screening Process Diagram - Susceptibility Re-evaluation

PLTB VALVE SCREENING PROCESS



Attachment 4

Results of PLTB Susceptibility Re-evaluation

RESPONSE TO GENERIC LETTER 95-07

Pressure Locking

The valves listed in Table 2 were determined to be susceptible to PL based on the results of the PLTB susceptibility re-evaluation.*

TABLE 2

Valve No.	Issue	Resolution
CAC-V-2,6,8, 11,13,15,17	Gradual containment depressurization prior to opening for post-LOCA containment atmosphere control.	Capability evaluation demonstrates high margin for PL condition. High margin used to disposition concern without modification.
HPCS-V-4	Rapid reactor depressurization prior to open signal for HPCS injection. HPCS pump will relieve PL in 2.6 seconds.	Capability evaluation demonstrates capability to open valve during the short transient. Transient condition combined with margin assures long-term capability without modification.
HPCS-V-12	Bonnet pressurized to HPCS pump shutoff, system allowed to depressurize prior to open signal for HPCS injection. HPCS pump will relieve PL in 2.6 seconds.	Capability evaluation demonstrates capability to open valve during the short transient. Transient condition combined with margin assures long-term capability without modification.
HPCS-V-15	Bonnet pressurized to maximum containment pressure as HPCS system is started for injection.	Capability evaluation demonstrates valve capability under PL conditions. Valve will be modified to provide bonnet venting to the high pressure piping.
RCIC-V-13	Rapid reactor depressurization prior to open signal for RCIC injection.	Capability evaluation demonstrates valve capability under PL conditions. Valve will be modified to provide bonnet venting to the high pressure piping.
RCIC-V-31	Bonnet pressurized to relief valve setpoint and line depressurized as RCIC system is started for injection.	Capability evaluation demonstrates valve capability under PL conditions. High margin used to disposition concern without modification.
RHR-V-42A, 42B,42C	Rapid reactor depressurization prior to open signal for LPCI injection.	Capability evaluation demonstrates valve capability under PL conditions. Valves will be modified to provide bonnet venting to the high pressure piping.

*Disc bypass modifications had been completed for LPCS-V-5, RHR-V-8, RHR-V-9, RHR-V-53A, and RHR-V-53B prior to re-evaluation of the valves for susceptibility to PL. Without the modifications to continuously vent the valve body-bonnet cavities, these valves would have been determined to be susceptible to PL during re-evaluation and included in Table 2. CAC-V-4 and RCIC-V-68 had previously been identified as being susceptible to PL, but were subsequently determined not to be susceptible during the re-evaluation. CAC-V-4 is a solid-wedge disc type gate valve, which is a valve type not considered susceptible to PL. RCIC-V-68 is normally key-locked open, and thus does not have an active open safety function.

RESPONSE TO GENERIC LETTER 95-07

Thermal Binding

The valves listed in Table 3 were determined to be susceptible to TB based on the results of the PLTB susceptibility re-evaluation.

TABLE 3

Valve No.	Issue	Resolution
CAC-V-2,4,6, 8,11,13,15,17	Valves potentially exposed to containment temperatures on one side of the disc prior to opening for post-LOCA containment atmosphere control.	A temperature effects evaluation determined no appreciable increase in temperature at the valve (<16°F).
MSLC-V-3A, 3B,3C,3D,5,9	Valves potentially exposed to main steam temperatures on one side of the disc prior to opening for main steam isolation valve leakage control.	A temperature effects evaluation determined no appreciable increase in temperature at the valve (<23°F).
RHR-V-17A,17B	Valves potentially exposed to containment temperatures on one side of the disc prior to opening for containment spray.	A temperature effects evaluation determined no increase in temperature at the valve.