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U.S. Nuclear Regulatory Commission
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Perry Nuclear Power Plant
Docket No. 50-440
Response (180 day) to Generic Letter 95-07
"Pressure Locking and Thermal Binding of
Safety-Related Power-Operated Gate Valves"

Gentlemen:

Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," dated August 17, 1995, requires 60-day and 180-day written responses. Letter PY-CEI/NRR-1991L, dated October 16, 1995, provided the Perry Nuclear Power Plant's (PNPP's) 60-day response. That letter committed PNPP to implement the actions requested in the GL, and also detailed the established schedule for implementation. This response fulfills the 180-day requirement of the GL and provides a summary description of the following items:

1. The susceptibility evaluation of operational configurations performed in response to (or consistent with) 180-day Requested Action 1, and the further analyses performed in response to (or consistent with) 180-day Requested Action 2, including the bases or criteria for determining that valves are or are not susceptible to pressure locking or thermal binding; (see Attachment 1)

2. The results of the susceptibility evaluation and the further analyses referred to in 1. above including a listing of the susceptible valves identified; (see Attachment 2)

3. The corrective actions, or other dispositioning, for the valves identified as susceptible to pressure locking or thermal binding, including: (a) equipment or procedure 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. (see Attachment 3)

PNPP has previously addressed the issues discussed in GL 95-07 through implementing the guidance contained in Supplement 6 to GL 89-10 or through implementing equivalent industry methods, including the PNPP corrective action program. During the revisitation of the issues as part of the review for GL 95-07, no safety-related hydraulically or pneumatically operated gate valves were identified for which an additional review would be necessary.

The valves at PNPP that have been identified as being susceptible to pressure locking/thermal binding have been determined to be capable of performing their required safety functions under the required modes of plant operation, including test configurations. Further corrective actions are not planned as a result of this review.

If you have questions or require additional information, please contact Mr. James D. Kloosterman, Manager-Regulatory Affairs, at (216) 280-5833.

Very truly yours,

for Donald C. Shelton

CRE:sc

Enclosure
Attachments

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III Administrator

USNRC

PY-CEI/NRR-2021L
Enclosure

I, Robert W. Schrauder, being duly sworn state that (1) I am Director, Perry Nuclear Services Department of the Cleveland Electric Illuminating Company, (2) I am duly authorized to execute and file this certification on behalf of The Cleveland Electric Illuminating Company and Toledo Edison Company, and as the duly authorized agent for Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

Robert W. Schrauder

Sworn to and subscribed before me, the 13th day of February, 1996.

Jane E. Mott

JANE E. MOTT
Notary Public, State of Ohio
My Commission Expires Feb. 20, 2000
(Recorded in Lake County)

Safety-related and non-safety related gate valves were reviewed for their susceptibility to pressure locking and thermal binding. The review was limited to motor operated and some manual gate valves. There were no safety-related hydraulically or pneumatically actuated gate valves identified for which a review would be required. Discussions in this response are in reference to safety-related motor operated gate valves only. The methodology used to evaluate the valves is delineated below.

THERMAL BINDING AND BONNET PRESSURE LOCKING EVALUATION METHODOLOGY

1. Valve Disc Identification

   The valve vendor drawings were reviewed to determine whether the valve discs are of solid wedge, split wedge, flexible wedge, or double-disc parallel-seat construction. Where the valve disc construction was not clear, the more conservative type was assumed for the thermal binding and bonnet pressure locking evaluations.

2. Thermal Binding Evaluation Criteria

   Piping thermal expansion loads are generally not significant and in fact, are not discussed as a failure mechanism in SOER 84-7 or AEOD/S92-07. Additionally, no documented industry gate valve failures presented in Information Notice 92-26, SER 20-84, SER 77-83, and SER 8-88 have been attributed to this failure mechanism. Therefore, review of gate valves for piping thermal expansion loads is not necessary.

   Valve thermal expansion loads (stem elongation) may create an excessive closing force which can contribute to thermal binding. This closing force will tend to drive the disc more tightly into the seat. On cooling, the thermal contraction load (body contraction) effects may be increased. These phenomena were evaluated concurrently using the criteria defined below.

   A. Valve Function: Thermal Binding may occur when valves are closed at high system temperatures and allowed to cool before being re-opened. Plant procedures, system design criteria, and system operating instructions were reviewed to determine the valve functions and system operating modes.

   B. System Temperature: Only valves located in systems with operating temperatures of 200 degrees Fahrenheit (F) or greater are evaluated. The operating temperatures used during this evaluation are the maximum service condition values specified in the system design specifications, operating procedures, or test procedures.

   C. Disc Configuration: Double-disc and split wedge type gate valves are not susceptible to thermal binding and therefore were eliminated from further

evaluation. For double-disc type valves, a wedging mechanism between the discs collapses as the stem rises allowing the discs to move inward away from the seats. Split wedge type gate valves are similar to solid wedge type gate valves but are comprised of two (2) separate pieces. The split wedge construction permits the gate assembly to more easily tolerate temperature transients by allowing each piece to move independently. These features will permit the discs to be raised regardless of system temperatures.

D. Potential for Movement: Valves that have their control power removed or are in some other way disabled or are key locked in position, were also considered for thermal binding since they may be expected to functionally change positions during plant maintenance and testing evolutions. The potential for movement was determined through the review of applicable Piping and Instrument Drawings (P&IDs) and plant procedures.

3. Hydraulic Locking Evaluation Criteria

Gate valve hydraulic locking phenomenon was evaluated using the following criteria:

A. Valve Function: Hydraulic locking can occur when a closed flex wedge, split wedge, or double-disc gate valve is required to open after a differential pressure condition has allowed higher pressure fluid into the bonnet cavity. Plant procedures, system design criteria, and system operating instructions were reviewed to determine the respective valve function(s).

B. Disc Configuration: Solid wedge gate valves were not considered for hydraulic locking since it is not possible for the faces of a solid wedge to be pushed in opposite directions against both seating surfaces.

C. Bonnet Relief: Valves with a bonnet drain, a bonnet relief valve, or a small hole through either the upstream side of the valve bridge or valve disc, were not considered for hydraulic locking. Any pressure which leaks into the bonnet area has a relief path that prevents hydraulic locking. If a bonnet drain is provided, it must be connected to an open piping path (drain piping installed and any in-line valves are open) to eliminate hydraulic locking as a concern. The existence of an open bonnet drain path was determined by use of the P&IDs and/or valve drawings, and confirmed by discussions with station engineers.

D. Potential for Movement: Valves that have their control power removed or are in some other way disabled or are key locked in position, were also considered for hydraulic locking since they may be expected to functionally change positions during plant maintenance and testing evolutions. The potential for movement was determined through the review of applicable P&ID's and plant procedures.

E. Line pressure: If the pressure in the piping upstream or downstream of the valve is greater than or equal to the pressure in the valve bonnet (valve bonnet pressure resulting from preceding system conditions) prior to opening the valve, pressure locking will not occur. The basis for this approach is that the line pressure will offset the pressure trapped between the faces of the disc and will result in a maximum differential pressure across a single face of the valve disc, as was analyzed in the existing Generic Letter 89-10 differential pressure calculations. The upstream piping pressure at opening was determined by using the system design specifications, operating procedures, and test procedures.

4. Boiler Effect Evaluation Criteria

Gate valve bonnet boiler effect phenomenon was evaluated using the following criteria:

A. Valve Function: Boiler effect can occur when a fluid-filled or partially filled bonnet is heated. The resulting pressure may prevent the valve from being reopened. Plant procedures, system design criteria, and system operating instructions were reviewed to determine the respective valve function(s).

B. Gas systems: Valves which are part of gas systems are not susceptible to liquid entrapment (boiler effect) if the valve stem is oriented above the horizontal. It is highly unlikely that the valve bonnet would contain liquid with this orientation. Without a significant amount of liquid, it is not possible for high pressures to build up in the bonnet which would arise from heating an incompressible fluid.

C. Bonnet Relief: Valves with a bonnet drain, a bonnet relief valve, or a small hole through either the upstream side of the valve bridge or valve disc, were not considered for boiler effect since any water that leaks into the bonnet area will have a relief path that will prevent pressure build-up. If a bonnet drain is provided, it must be connected to an open piping path (drain piping installed and any in-line valves are open) to eliminate boiler effect as a concern. The existence of an open bonnet drain path was determined by use of the P&IDs and/or valve drawings, and confirmed by discussions with station engineers.

D. Potential for Movement: Valves that have their control power removed or are in some other way disabled or key locked in position, were also considered for boiler effect since they may be expected to functionally change positions during plant maintenance and testing evolutions. The potential for movement was determined through the review of applicable P&IDs and plant procedures.

E. Valve Heatup: Valves which have water trapped in the bonnet cavity can experience the boiler effect phenomenon only when the trapped water is heated above its initial temperature. Industry experience has shown that the resulting pressure increase for trapped water is estimated to be anywhere from 33 psi/degree F (fluid temperatures of 145 degrees F) to 100 psi/degree F (fluid temperatures of 450 degrees F). In this evaluation, the 33 psi/degree F was used since the boiler effect occurs for conditions of "cold" water only. For boiler effect to apply, the valve must be in the closed position when the heat source is applied and the temperature of the heat source must be greater than the temperature of the trapped fluid at the time the subject valve was closed. The potential heat sources considered for this evaluation are:

1. Normal ambient conditions: Normal ambient conditions are typically not expected to cause boiler effect since the normal ambient temperature swings are small enough and/or gradual enough not to cause binding. There are no building areas where the maximum normal ambient temperatures are excessive and may cause boiler effect binding.

2. Accident ambient conditions: These conditions could potentially create boiler effect if they elevate the area temperature above the normal area temperatures for several hours while the valve is closed. Accident ambient condition and plant location drawings were used to identify potentially susceptible valves.

3. Fluid Temperature: If the closed valve is located in a branch of a hot system, there is a potential that the heat will conduct through the fluid and/or the piping. Piping temperature histograms provide the thermal gradients that bound the temperature utilized in the evaluations.

The methodologies above identified the safety-related power-operated gate valves shown in Attachment 2 (Table 2) as susceptible to pressure locking or thermal binding and the mode in which the susceptibility was expected (i.e., normal, testing, or accident). Note that the pressure locking evaluation criteria is comprised of the hydraulic locking and/or boiler effect evaluation criteria above.

VALVE REVIEW RESULTS

Table 1: Safety-Related Power-Operated Gate Valves Evaluated Under the Review

No.	MPL Number	Description
1)	1B21-F0016	Main Steamline Drain Isolation Valve
2)	1B21-F0019	Main Steamline Drain Isolation Valve
3)	1B21-F0065A	Feedwater Isolation Valve
4)	1B21-F0065B	Feedwater Isolation Valve
5)	1E12-F0006A	Shutdown Cooling Pump Suction Isolation Valve
6)	1E12-F0006B	Shutdown Cooling Pump Suction Isolation Valve
7)	1E12-F0008	Shutdown Cooling Isolation Valve
8)	1E12-F0049	Flush to Radwaste Valve
9)	1E12-F0064A	Residual Heat Removal Minimum Flow Valve
10)	1E12-F0064B	Residual Heat Removal Minimum Flow Valve
11)	1E12-F0105	Residual Heat Removal C Suppression Pool Suction Valve
12)	1E12-F0609	Suppression Pool Cleanup Return Isolation Valve
13)	1E12-F0610	Suppression Pool Cleanup Return Isolation Valve
14)	1E21-F0001	Low Pressure Core Spray Suppression Pool Suction Valve
15)	1E22-F0001	High Pressure Core Spray Condensate Storage Tank Suction Valve
16)	1E51-F0010	Reactor Core Isolation Cooling Condensate Storage Tank Suction Valve
17)	1E51-F0059	Reactor Core Isolation Cooling Return to Condensate Storage Tank
18)	1E51-F0063	Reactor Core Isolation Cooling Turbine Inboard Isolation Valve
19)	1E51-F0064	Reactor Core Isolation Cooling Turbine Outboard Isolation Valve

Table 1: Safety-Related Power-Operated Gate Valves Evaluated Under the Review (continued)

No.	HPL Number	Description
20)	1E51-F0068	Reactor Core Isolation Cooling Turbine Exhaust Valve
21)	1G33-F0001	Reactor Water Cleanup Inboard Isolation Valve
22)	1G33-F0004	Reactor Water Cleanup Outboard Isolation Valve
23)	1G33-F0028	Reactor Water Cleanup Blowdown Inboard Isolation Valve
24)	1G33-F0034	Reactor Water Cleanup Blowdown Outboard Isolation Valve
25)	1G33-F0039	Reactor Water Cleanup Outboard Isolation Valve
26)	1G33-F0040	Reactor Water Cleanup Inboard Isolation Valve
27)	1G33-F0053	Reactor Water Cleanup Inboard Isolation Valve
28)	1G33-F0054	Reactor Water Cleanup Outboard Isolation Valve
29)	1G33-F0100	Reactor Water Cleanup Inboard to Reactor Recirculation Isolation Valve (Safety-related body/Nonsafety-related electrical power)
30)	1G33-F0106	Reactor Water Cleanup Inboard to Reactor Recirculation Isolation Valve (Safety-related body/Nonsafety-related electrical power)
31)	1G50-F0272	Reactor Water Cleanup Filter/Demineralizer Discharge Valve
32)	1G50-F0277	Reactor Water Cleanup Filter/Demineralizer Discharge Valve
33)	1B33-F0023A	Reactor Recirculation Pump Suction Isolation Valve (Safety-related body/Nonsafety-related electrical power)
34)	1B33-F0023B	Reactor Recirculation Pump Suction Isolation Valve (Safety-related body/Nonsafety-related electrical power)
35)	1B33-F0067A	Reactor Recirculation Pump Discharge Isolation Valve (Safety-related body/Nonsafety-related electrical power)
36)	1B33-F0067B	Reactor Recirculation Pump Discharge Isolation Valve (Safety-related body/Nonsafety-related electrical power)

Table 1: Safety-Related Power-Operated Gate Valves Evaluated Under the Review (continued)

No.	MPL Number	Description
37)	1C11-F0083	Control Rod Drive Outboard Isolation Valve
38)	1E12-F0004A	Residual Heat Removal A Suppression Pool Suction Isolation Valve
39)	1E12-F0004B	Residual Heat Removal B Suppression Pool Suction Isolation Valve
40)	1E12-F0009	Residual Heat Removal Shutdown Cooling Inboard Isolation Valve
41)	1E12-F0026A	Residual Heat Removal A Heat Exchanger to Reactor Core Isolation Cooling Shutoff Valve
42)	1E12-F0026B	Residual Heat Removal B Heat Exchanger to Reactor Core Isolation Cooling Shutoff Valve
43)	1E12-F0027A	Residual Heat Removal A to Containment Outboard Isolation Valve
44)	1E12-F0027B	Residual Heat Removal B to Containment Outboard Isolation Valve
45)	1E12-F0028A	Residual Heat Removal A Containment Spray Shutoff Valve
46)	1E12-F0028B	Residual Heat Removal B Containment Spray Shutoff Valve
47)	1E12-F0042A	Residual Heat Removal A Low Pressure Coolant Injection Valve
48)	1E12-F0042B	Residual Heat Removal B Low Pressure Coolant Injection Valve
49)	1E12-F0042C	Residual Heat Removal C Low Pressure Coolant Injection Valve
50)	1E12-F0047A	Residual Heat Removal A Heat Exchanger Inlet Valve
51)	1E12-F0047B	Residual Heat Removal B Heat Exchanger Inlet Valve

Table 1: Safety-Related Power-Operated Gate Valves Evaluated Under the Review (continued)

No.	MPL Number	Description
52)	1E12-F0064C	Residual Heat Removal Pump C Minimum Flow Valve
53)	1E12-F0537A	Residual Heat Removal A Containment Spray Shutoff Valve
54)	1E12-F0537B	Residual Heat Removal B Containment Spray Shutoff Valve
55)	1E21-F0005	Low Pressure Core Spray Injection Valve
56)	1E21-F0011	Low Pressure Core Spray Pump Minimum Flow Valve
57)	1E22-F0004	High Pressure Core Spray Injection Valve
58)	1E22-F0012	High Pressure Core Spray Pump Minimum Flow Valve
59)	1E22-F0015	High Pressure Core Spray Suppression Pool Suction Valve
60)	1E32-F0001A	MSIV Leakage Control System Isolation Valve
61)	1E32-F0001E	MSIV Leakage Control System Isolation Valve
62)	1E32-F0001J	MSIV Leakage Control System Isolation Valve
63)	1E32-F0001N	MSIV Leakage Control System Isolation Valve
64)	1E32-F0002A	MSIV Leakage Control System Isolation Valve
65)	1E32-F0002E	MSIV Leakage Control System Isolation Valve
66)	1E32-F0002J	MSIV Leakage Control System Isolation Valve
67)	1E32-F0002N	MSIV Leakage Control System Isolation Valve
68)	1E32-F0003A	MSIV Leakage Control System Isolation Valve
69)	1E32-F0003E	MSIV Leakage Control System Isolation Valve
70)	1E32-F0003J	MSIV Leakage Control System Isolation Valve
71)	1E32-F0003N	MSIV Leakage Control System Isolation Valve
72)	1E32-F0008	MSIV Leakage Control System Isolation Valve

Table 1: Safety-Related Power-Operated Gate Valves Evaluated Under the Review (continued)

No.	MPL Number	Description
73)	1E32-F0009	MSIV Leakage Control System Isolation Valve
74)	1E51-F0013	Reactor Core Isolation Cooling Injection Valve
75)	1E51-F0031	Reactor Core Isolation Cooling Suppression Pool Suction Valve
76)	1G33-F0101	Reactor Drain to Reactor Water Cleanup Suction Isolation Valve (Safety-related body/Nonsafety-related electrical power)
77)	1G61-F0030	Drywell Equipment Drain Sump Isolation Valve
78)	1G61-F0035	Drywell Equipment Drain Sump Isolation Valve
79)	1G61-F0075	Containment Equipment Drain Sump Isolation Valve
80)	1G61-F0080	Containment Equipment Drain Sump Isolation Valve
81)	1G61-F0150	Drywell Floor Drain Sump Isolation Valve
82)	1G61-F0155	Drywell Floor Drain Sump Isolation Valve
83)	1G61-F0165	Containment Floor Drain Sump Isolation Valve
84)	1G61-F0170	Containment Floor Drain Sump Isolation Valve
85)	1N11-F0020A	Main Steam Shutoff Valve
86)	1N11-F0020B	Main Steam Shutoff Valve
87)	1N11-F0020C	Main Steam Shutoff Valve
88)	1N11-F0020D	Main Steam Shutoff Valve
89)	1P22-F0010	Mixed-Bed Demineralized Water System Containment/Drywell Isolation Valve
90)	1P54-F0340	Fire Protection System Containment/Drywell Isolation Valve
91)	1P54-F0395	Fire Protection System Containment/Drywell Isolation Valve

Table 2 : Safety-Related Power-Operated Gate Valves which have been evaluated to have a susceptibility to Pressure Locking (PL) and/or Thermal Binding (TB)

Note that the valves designated to PL or TB are further delineated as to the condition(s) Accident (A), Normal (N), or Testing (T), in which the valve is susceptible to the phenomenon. The pressure locking evaluation criteria is comprised of the hydraulic locking and/or boiler effect evaluation criteria delineated in Attachment 1.

No.	MPL Number	Active Safety Function	PL/TB	Comments
1)	1B21-F0016	Close	TB (N)	No open safety function
2)	1B21-F0019	Close	TB (N)	No open safety function
3)	1B21-F0065A	Close	TB/PL (N)	No open safety function
4)	1B21-F0065B	Close	TB/PL (N)	No open safety function
5)	1E12-F0006A	None	PL (N,T)	No open safety function, normally closed
6)	1E12-F0006B	None	PL (N,T)	No open safety function, normally closed
7)	1E12-F0008	Close	PL (N,T)	Open only during shutdown cooling mode of Residual Heat Removal
8)	1E12-F0049	None	PL (N,T)	No open safety function, normally closed
9)	1E12-F0064A	Open/Close	PL (N)	Shutdown Cooling only-loop inoperable for Low Pressure Coolant Injection
10)	1E12-F0064B	Open/Close	PL (N)	Shutdown Cooling only-loop inoperable for Low Pressure Coolant Injection
11)	1E12-F0105	None	PL (N)	Normally open, no position change for Design Basis Event
12)	1E12-F0609	Close	PL (N,T)	No open safety function

Table 2 : Safety-Related Power-Operated Gate Valves which have been evaluated to have a susceptibility to Pressure Locking (PL) and/or Thermal Binding (TB) (cont.)

Note that the valves designated to PL or TB are further delineated as to the condition(s) Accident (A), Normal (N), or Testing (T), in which the valve is susceptible to the phenomenon. The pressure locking evaluation criteria is comprised of the hydraulic locking and/or boiler effect evaluation criteria delineated in Attachment 1.

No.	MPL Number	Active Safety Function	PL/TB	Comments
13)	1E12-F0610	Close	PL (N,T)	No open safety function
14)	1E21-F0001	None	PL (N)	Normally open, no position change for Design Basis Event
15)	1E22-F0001	Close	PL (A,N)	Normally open with safety function to close only
16)	1E51-F0010	Close	PL (A,N)	Normally open with safety function to close only
17)	1E51-F0059	Close	PL (N,T)	Normally closed, no open safety function
18)	1E51-F0063	Close	TB (N,T)	Normally open with safety function to close only
19)	1E51-F0064	Close	TB (N,T)	Normally open with safety function to close only
20)	1E51-F0068	Close	TB (N,T)	Normally open with safety function to close only
21)	1G33-F0001	Close	TB/PL (N)	Normally open with safety function to close only
22)	1G33-F0004	Close	TB/PL (N)	Normally open with safety function to close only
23)	1G33-F0028	Close	PL (N,T)	Normally closed, no open safety function
24)	1G33-F0034	Close	PL (N,T)	Normally closed, no open safety function

Table 2 : Safety-Related Power-Operated Gate Valves which have been evaluated to have a susceptibility to Pressure Locking (PL) and/or Thermal Binding (TB) (cont.)

Note that the valves designated to PL or TB are further delineated as to the condition(s) Accident (A), Normal (N), or Testing (T), in which the valve is susceptible to the phenomenon. The pressure locking evaluation criteria is comprised of the hydraulic locking and/or boiler effect evaluation criteria delineated in Attachment 1.

No.	MPL Number	Active Safety Function	PL/TB	Comments
25)	1G33-F0039	Close	PL/TB (N)	Normally open with safety function to close only
26)	1G33-F0040	Close	PL/TB (N)	Normally open with safety function to close only
27)	1G33-F0053	Close	PL/TB (N)	Normally open with safety function to close only
28)	1G33-F0054	Close	PL/TB (N)	Normally open with safety function to close only
29)	1G33-F0100	None	PL/TB (N,T)	No active safety function to open or close
30)	1G33-F0106	None	PL/TB (N,T)	No active safety function to open or close
31)	1G50-F0272	Close	PL (N)	Normally open with safety function to close only
32)	1G50-F0277	Close	PL (N)	Normally open with safety function to close only

CORRECTIVE ACTIONS/DISPOSITIONS

PNPP has previously addressed the issues discussed in GL 95-07 through implementing the guidance contained in Supplement 6 to GL 89-10 or through implementing equivalent industry methods, including the PNPP corrective action program. During the revisitation of the issues as part of the evaluation and respective review for GL 95-07, no safety-related hydraulically or pneumatically operated gate valves were identified for which an additional review would be necessary.

None of the valves which have been evaluated to be susceptible to pressure locking/thermal binding (Attachment 2, Table 2, Nos. 1 through 32) require modification. Of the valves that were determined not to be susceptible to Pressure Locking or Thermal Binding (Attachment 2, Table 1, Nos. 33 through 91), the table below lists valves which have been previously modified to eliminate susceptibility.

Safety-Related Power-Operated Gate Valves Previously Modified to Eliminate Susceptibility to Pressure Locking/Thermal Binding

No.	MPL Number	Modification Description
40)	1E12-F0009	Drilled internals of valve
45)	1E12-F0028A	Drilled seat ring
46)	1E12-F0028B	Drilled seat ring
47)	1E12-F0042A	Drilled seat ring
48)	1E12-F0042B	Drilled seat ring
49)	1E12-F0042C	Drilled seat ring
55)	1E21-F0005	Drilled seat ring
57)	1E22-F0004	Drilled disc
58)	1E22-F0012	Drilled disc
59)	1E22-F0015	Insulated valve body
74)	1E51-F0013	Drilled seat ring
75)	1E51-F0031	Insulated valve body
76)	1G33-F0101	Drilled valve internals

CORRECTIVE ACTIONS/DISPOSITIONS

A review of valves which are normally open and required to be open but do not have an active function to open, were reviewed for situations where the valve is closed or surveillance testing is performed. A review of surveillance test instructions identified that the affected systems are considered inoperable during the surveillance (when the valve is closed). The following valves are in this category.

1E12-F0105 Residual Heat Removal C Suppression Pool Suction Valve
1E21-F0001 Low Pressure Core Spray Suppression Pool Suction Valve

Valves which are stroked closed and open for testing are not considered to be subject to the boiler effect pressure locking phenomenon since the time involved in actual testing is not sufficient to allow significant pressure from temperature increases to build up in the bonnet.

At the PNPP, the Residual Heat Removal (RHR) system is considered inoperable for Low Pressure Coolant Injection when lined up in a secondary mode of operation (i.e., Suppression Pool Cooling, Containment Spray, etc.). Reference RHR System Operation Instruction (SOI)-E12, "Residual Heat Removal System (Unit 1)." Similarly, Low Pressure Core Spray and High Pressure Core Spray are declared inoperable whenever it is in a secondary mode of operation. Reference SOI-E21, "Low Pressure Core Spray System (Unit 1)" and SOI-E22A, "High Pressure Core Spray System (Unit 1)."

As a result of previous corrective actions to pressure locking/thermal binding issues, the Operations Unit has issued a Plant Data Book (PDB)-C0007, "Valves Potentially Susceptible to Pressure Locking or Thermal Binding." The Plant Data Book provides a quick, convenient reference listing, outside of the engineering organization, of valves which were identified as possessing the susceptibility for thermal binding or pressure locking. Based on the need to provide clear, concise procedures, the Plant Data Book was formed rather than to place steps, notes, or cautions in individual System Operating Instructions, Integrated Operating Instructions, Alarm Response Instructions, or Off-Normal Instructions. In addition, valves which are known to have a history of thermal binding have had procedural enhancements which were implemented prior to issuance of GL 95-07. The Plant Data Book provides a method by which the concerns of thermal binding and pressure locking may be conveyed to work planners and corrective action investigators.

Technical Specification Surveillance Instructions (SVIs) were also reviewed in order to determine if enhancements could be made to alleviate the concerns with thermal binding. However, no instances were found where the SVIs needed to be revised to minimize the potential for thermal binding as the valves are either left open after the test or tested during Cold Shutdown which already minimizes the potential for thermal binding. SVIs also typically cycle the valve for operability and do not leave the valve in a closed position for extended periods of time such that the thermal binding phenomenon could take place.

CORRECTIVE ACTIONS/DISPOSITIONS

The valves identified as being susceptible to pressure locking/thermal binding have been determined to be capable of performing their required safety functions under the required modes of plant operation, including test configurations. Further corrective actions are not planned as a result of this review.