Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

February 13, 1996
LIC-96-0012

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555-0001

References: 1. Docket No. 50-285
2. NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," dated August 17, 1995
3. Letter from OPPD (T. L. Patterson) to NRC (Document Control Desk) dated October 13, 1995 (LIC-95-0190)

SUBJECT: Response to NRC Generic Letter 95-07 (TAC No. 93465)

Reference 2 requests licensees to complete certain actions to address the issue of pressure locking and thermal binding of safety-related power-operated gate valves. NRC Generic Letter (GL) 95-07 requires, in part, that within 180 days of the date of the GL, a written response be submitted providing a summary description of certain requested information regarding a susceptibility evaluation, further analyses and corrective actions or other dispositioning of susceptible valves. The Omaha Public Power District (OPPD) provides the requested information in response to GL 95-07 in Attachment 2. This response to GL 95-07 is submitted under oath as required.

If you should have any questions, please contact me.

Sincerely,

T. L. Patterson
Division Manager
Nuclear Operations

Attachments

c: Winston & Strawn
L. J. Callan, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector

A056
1/1

LIC-96-0012
Attachment 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Omaha Public Power District	)	Docket No. 50-285
(Fort Calhoun Station	)	
Unit No. 1)	)	

AFFIDAVIT

T. L. Patterson, being duly sworn, hereby deposes and says that he is the Division Manager - Nuclear Operations of the Omaha Public Power District; that as such he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached information concerning response to the requirements of NRC Generic Letter 95-07; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

T. L. Patterson
Division Manager
Nuclear Operations

STATE OF NEBRASKA)
) ss
COUNTY OF DOUGLAS)

Subscribed and sworn to before me, a Notary Public in and for the State of Nebraska on this 13th day of February, 1996.

Notary Public

GENERAL NOTARY-State of Nebraska
THERESA PETERSEN
My Comm. Exp. Febr. 17, 1997

OMAHA PUBLIC POWER DISTRICT

180-DAY WRITTEN RESPONSE TO GENERIC LETTER 95-07

INTRODUCTION

NRC Generic Letter (GL) 95-07 requested addressees to perform the following actions within 180 days of the date of the generic letter:

"1. Evaluate the operational configurations of safety-related power-operated (i.e., motor-operated, air-operated, and hydraulically operated) gate valves in its plant to identify valves that are susceptible to pressure locking or thermal binding;

2. Perform further analyses as appropriate, and take needed corrective actions (or justify longer schedules), to ensure that the susceptible valves identified in 1 are capable of performing their intended safety function(s) under all modes of operation, including test configuration."

In addition, GL 95-07 requested addressees to provide a summary description of the following (within 180 days of the date of the GL):

"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;

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

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."

In response to these requested actions, the Omaha Public Power District (OPPD) developed a project plan to identify objectives, tasks, anticipated support requirements and associated schedules. A multi-disciplined project team was then formed to implement the project plan. The team members represented Special Services Engineering, System Engineering, Design Engineering, Operations and the Probabilistic Risk Assessment (PRA) group.

SCREENING EVALUATION

The evaluations requested by GL 95-07 were performed in two phases. The first phase involved performance of a screening evaluation to identify valves that would be classified as "potentially susceptible" to pressure locking or thermal binding. The term "potentially susceptible" was broadly interpreted to include any valve that appeared to be potentially within the scope of GL 95-07. As a result, classification of a valve as "potentially susceptible" did not indicate that the valve would be expected to actually experience pressure or temperature conditions that would lead to pressure locking or thermal binding; or indicate that a failure of the valve to open could prevent fulfillment of a safety function.

The screening evaluation involved initially performing searches and reviews of data available in the Fort Calhoun Station (FCS) computerized history and maintenance planning system (CHAMPS) database, the FCS Inservice Inspection (ISI) Program Plan, and selected plant drawings and vendor manuals. The multi-disciplined project team then reviewed this information to verify that no known non-manual gate valves were omitted from the screening process. Based on these sources of information, an initial list of valves was identified. This initial list was intended to broadly encompass valves that might be within the scope of GL 95-07.

A set of screening criteria was then developed in order to refine the initial list of valves. Application of these screening criteria eliminated a significant number of valves that, upon review, were determined not to be safety-related power-operated gate valves. The remaining 44 valves were classified as "potentially susceptible" to pressure locking or thermal binding. Of these 44 valves,

- 20 valves were identified as flexible wedge gate valves and were classified as "potentially susceptible" to both pressure locking and thermal binding (Both PL & TB),

- 20 valves were identified as solid wedge gate valves and were classified as "potentially susceptible" to thermal binding only (TB Only), and

- 4 valves were identified as double-disk parallel-seat gate valves and were classified as "potentially susceptible" to pressure locking only (PL Only).

The operability of each "potentially susceptible" valve was then assessed in order to determine whether the valve should be considered inoperable based on available information. It was concluded that all 44 of the "potentially susceptible" valves were operable, and this conclusion was documented in an operability evaluation dated November 13, 1995. This completed the "90-day" requested actions specified in GL 95-07.

SUSCEPTIBILITY EVALUATION

A susceptibility evaluation was initiated to determine which, if any, of the "potentially susceptible" valves should be classified as "susceptible" to pressure locking and/or thermal binding. As previously indicated, the screening process did not address whether a failure of a valve to open could prevent fulfillment of a safety function. The screening process also did not address whether a valve could potentially experience pressure or temperature conditions that could result in pressure locking or thermal binding. These issues were addressed in the susceptibility evaluation.

Prior to performing the evaluation, the 44 "potentially susceptible" valves were organized into 23 functional valve groups. Each valve group consists of one or more valves that serve essentially the same function in different trains of a system. These valve groups were categorized as follows:

Group 1 - Boric Acid Storage Tank (BAST) Outlet Isolation Valves: HCV-258 and HCV-265

Group 2 - Boric Acid Pump to Charging Suction Isolation Valve: HCV-268

Group 3 - Charging Suction Header Safety Injection & Boric Acid Supply Valve: LCV-218-3

Group 4 - High Pressure Safety Injection (HPSI) Header/Charging Header Cross-Tie Valve: HCV-308

Group 5 - Shutdown Cooling Inboard Suction Isolation Valve: HCV-348

Group 6 - Shutdown Cooling Outboard Suction Isolation Valve: HCV-347

Group 7 - Main/Auxiliary Feedwater Cross-Connect Valve: HCV-1384

Group 8 - Volume Control Tank (VCT) Outlet Isolation Valve: LCV-218-2

Group 9 - Steam Generator Feedwater Isolation Valves: HCV-1385 and HCV-1386

Group 10 - Feedwater Regulating Valve Outlet Isolation Valves: HCV-1103 and HCV-1104

Group 11 - Feedwater Pump Discharge Isolation Valves: HCV-1150A, HCV-1150B and HCV-1150C

Group 12 - Power Operated Relief Valve (PORV) Block Valves: HCV-150 and HCV-151

Group 13 - Safety Injection Tank (SIT) Outlet Isolation Valves: HCV-2914, HCV-2934, HCV-2954 and HCV-2974

Group 14 - 6th Stage Extraction Steam Radiation Control Valve: RCV-978

Group 15 - HPSI Alternate Header Isolation Valve: HCV-2987

Group 16 - HPSI Pump Discharge Isolation Valves: HCV-2908, HCV-2918 and HCV-2928

Group 17 - HPSI Pump Discharge Crossconnect Valves: HCV-304 and HCV-305

Group 18 - HPSI Header Isolation Valves: HCV-306 and HCV-307

Group 19 - HPSI Pump Suction Isolation Valves: HCV-2907, HCV-2917 and HCV-2927

Group 20 - Low Pressure Safety Injection (LPSI) Pump Discharge Isolation Valves: HCV-2938 and HCV-2948

Group 21 - LPSI Pump Suction Isolation Valves: HCV-2937 and HCV-2947

Group 22 - Containment Spray (CS) Pump Discharge Isolation Valves: HCV-2958, HCV-2968 and HCV-2978

Group 23 - CS Pump Suction Isolation Valves: HCV-2957, HCV-2967 and HCV-2977

Five evaluation criteria were then established for evaluating these valve groups for susceptibility to pressure locking and/or thermal binding.

The first evaluation criterion was:

Criterion 1: Valves that do not have a safety function in the open position can be eliminated from further evaluation under the scope of GL 95-07.

A definition for the term "safety function in the open position" was established based on the definitions of "safety related" and "design basis events" that were provided in GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." Application of Criterion 1 to each valve group resulted in the elimination of several valve groups from further evaluation. Specifically, it was concluded that the valves in Groups 5, 6, 8, 10, 11 and 14 did not have a "safety function in the open position" based on the established definitions.

The second evaluation criterion was:

> Criterion 2: Valves that remain open during conditions in which they are relied on to be open or capable of opening can be eliminated from further evaluation under the scope of GL 95-07.

The basis for this criterion was essentially that an open valve is not subject to pressure locking or thermal binding while it remains open, and a valve that is considered inoperable when closed (i.e., is not being "relied on" to function) is adequately addressed by any applicable Technical Specification Limiting Conditions for Operation (LCOs). This allowed elimination of certain valves that either remain open, or are treated as inoperable when closed. Based on this criterion, valve groups 13 and 15-23 were eliminated from further evaluation. This left seven valve groups to be further evaluated (Groups 1-4, 7, 9 and 12).

The third and fourth evaluation criteria were:

> Criterion 3: The valve will be considered to be "susceptible" to system pressure induced pressure locking if a mechanism is identified that could result in a bonnet pressure substantially greater than both the upstream and downstream line pressures.
>
> Criterion 4: The valve will be considered to be "susceptible" to temperature induced pressure locking if a heat source is identified that has the potential to cause a substantial thermally-induced increase in the valve's bonnet pressure following valve closure.

Criterion 3 was intended to address the potential for pressure locking to be associated with system pressure changes (e.g., a significant depressurization just before the valve is required to open). Criterion 4 was intended to address the potential for pressure locking to be associated with a thermally-induced increase in bonnet pressure (e.g., the valve is exposed to elevated system or ambient temperatures following closure). Together, these two criteria were used to assess susceptibility of applicable valve groups to pressure locking.

Of the seven remaining valve groups, three consisted of flexible wedge gate valves and four consisted of solid wedge gate valves. Since solid wedge gate valves had previously been determined not to be susceptible to pressure locking (see screening evaluation), Criteria 3 and 4 were applied only to the three flexible wedge valve groups (i.e., valve groups 2, 7 and 9).

With respect to Criterion 3, the evaluation concluded that all three of these valve groups should be classified as "susceptible" to system pressure-induced pressure locking. With respect to Criterion 4, it was concluded that valve group 2 was not susceptible to temperature induced pressure locking. This was based on there being no identified heat source with the potential to substantially increase the bonnet temperature of the valve while the valve is closed. A potential heat source was identified for valve groups 7 and 9 (i.e., steam from a postulated Main Steam Line Break (MSLB) in Room 81).

The fifth and last evaluation criterion was:

> Criterion 5: The valve will be considered to be "susceptible" to thermal binding if anticipated operating conditions could result in the valve being closed at a temperature above the typical ambient temperature range, followed by conditions that could result in a substantial reduction in the temperature of the closed valve prior to an attempt to open the valve.

Criterion 5 was intended to address the potential for a valve that is closed while "hot" to thermally bind if allowed to cool substantially before the valve is required to open. Of the seven valve groups not eliminated by Criteria 1 and 2, all seven had been previously identified as "potentially susceptible" to thermal binding based on valve type. This criterion was therefore applied to all seven valve groups (i.e., valve groups 1-4, 7, 9 and 12).

Of the seven valve groups, it was concluded that all but one (i.e., valve group 7) should be classified as "susceptible" to thermal binding. Valve group 7 was not found to be susceptible in that no anticipated operating conditions were identified that would result in this valve being closed at a temperature above the typical temperature to which the valve is exposed during normal operation.

A summary of the screening/evaluation results is provided in Attachment 3. This summary lists all of the "potentially susceptible" valves in their associated valve groups. The "Screening Results" column indicates whether the valve group was identified as "potentially susceptible" to pressure locking only (PL only), thermal binding only (TB only) or both (Both PL & TB). A "Positive" entry in the "Evaluation Result" column indicates that the valve group was identified as "susceptible" to pressure locking and/or thermal binding based on the five evaluation criteria.

In summary, valve groups 1, 3, 4 and 12 were determined to be susceptible to thermal binding only. Valve group 7 was determined to be susceptible to pressure locking only. Valve groups 2 and 9 were determined to be susceptible to both pressure locking and thermal binding. (see Attachment 3)

ANALYSIS OF SUSCEPTIBLE VALVES

Further analysis was performed to determine whether corrective action(s) should be taken or scheduled to ensure that the "susceptible" valves would be capable of performing their intended safety function(s). The following susceptibility concerns were analyzed:

Valve Group 1 (HCV-258/265):

These are motor-operated, 3-inch, solid wedge gate valves. They are normally closed and receive a Safety Injection Actuation Signal (SIAS) to open. The thermal binding susceptibility concern is potential exposure to heated flow from a BAST prior to closure, followed by cooling to approximately ambient temperature.

Valve Group 2 (HCV-268):

This is a motor-operated, 3-inch, flexible wedge gate valve. It is normally closed and receives an SIAS to open. The pressure locking susceptibility concern is potential exposure to elevated upstream pressure (i.e., a running boric acid pump) followed by reduction in upstream pressure. The thermal binding susceptibility concern is potential exposure to heated flow from a BAST prior to closure, followed by cooling to approximately ambient temperature.

Valve Group 3 (LCV-218-3):

This is a motor-operated, 3-inch, solid wedge gate valve. It is normally closed but may be opened to provide a boric acid flow path from the Safety Injection and Refueling Water Tank (SIRWT) to the Reactor Coolant System (RCS). The thermal binding susceptibility concern is potential exposure to heated flow from a BAST prior to closure, followed by cooling to approximately ambient temperature.

Valve Group 4 (HCV-308):

This is a motor-operated, 2-inch, solid wedge gate valve. It is normally closed but may be opened to provide hot leg injection to the RCS for long term core cooling. The thermal binding susceptibility concern is potential exposure to heated flow from the shutdown cooling suction header prior to closure, followed by cooling to approximately ambient temperature.

Valve Group 7 (HCV-1384):

This is a motor-operated, 4-inch, flexible wedge gate valve. It is normally closed during full power operation but may be opened to provide an alternate flow path for auxiliary feedwater via the main feedwater header. The pressure locking susceptibility concern is potential exposure to elevated upstream (i.e., a running auxiliary feedwater pump) and/or downstream pressure (i.e., running feedwater pumps) followed by reduction in upstream and/or downstream pressure. An additional concern is the potential for bonnet heating in the event of a MSLB in Room 81.

Valve Group 9 (HCV-1385/1386):

These are motor-operated, 16-inch, flexible wedge gate valves. They are normally open during startup and power operation but close upon receipt of a Steam Generator Isolation Signal (SGIS). Following closure on SGIS, these valves may be reopened to provide an alternate flow path for auxiliary feedwater via the main feedwater header. The pressure locking susceptibility concern is potential exposure to elevated pressure while closing on SGIS, followed by reduction in upstream and/or downstream pressure. An additional concern is the potential for bonnet heating in the event of a MSLB in Room 81 during plant startup (when these valves are initially exposed to relatively cool auxiliary feedwater flow). The thermal binding susceptibility concern is potential exposure to high system temperature (i.e., preheated feedwater) at the time of closure on SGIS, and subsequent cooling to approximately ambient temperature.

Valve Group 12 (HCV-150/151):

These are motor-operated, 2.5-inch, solid wedge gate valves. They are normally open during power operation, but may be closed to isolate a leaking Power Operated Relief Valve (PORV). If closed to isolate a leaking PORV, a block valve may be reopened to allow the PORV to be used to control RCS pressure. The thermal binding susceptibility concern is potential closure while exposed to high system temperature (i.e., pressurizer steam), followed by cooling, especially upon initiation of a plant cool down.

The analysis resulted in identification of one or more potential corrective action options for each "susceptible" valve group. In addition, a new operability evaluation was prepared in accordance with existing procedures to address the evaluation findings and establish whether the valves should continue to be considered operable based on available information. This operability evaluation addressed each valve group individually and was reviewed by Operations and the Plant Review Committee, and independently reviewed by Engineering. It was concluded that the applicable valves were operable based on assessment of the current status of the valves and assessment of the significance/severity of postulated conditions.

CORRECTIVE ACTIONS

Although the "susceptible" valves were determined to be operable as-is, in order to provide additional long-term assurance that pressure locking and thermal binding would not occur, corrective actions were selected as enhancements from the identified options for each "susceptible" valve group. The Fort Calhoun Station Probabilistic Risk Assessment (PRA) model was used to evaluate the beyond design basis risk significance of these valves. The evaluation focused on two aspects of risk ranking. Valve failures were analyzed individually and in combination (to assess common cause susceptibility). It was determined that neither individual valve failures nor group failures posed significant risk. These conclusions regarding operability and risk significance were determined to provide adequate justification for the corrective action schedules specified below.

The following corrective actions have been or will be completed to address susceptibility to pressure locking:

Valve Group 2:

A modification request will be initiated to modify HCV-268 to prevent pressure locking. This modification may involve drilling the upstream disk of this flexible wedge gate valve. This action will be completed by the end of the 1996 refueling outage.

Valve Group 7:

Selected procedures will be reviewed and revised as appropriate to ensure that adequate guidance is provided for alternatives to opening HCV-1384 if the main feedwater header is to be used as an alternate flow path for auxiliary feedwater. Specifically, this will include review of guidance on the use of manual valves FW-744 and FW-745 and on the use of auxiliary feedwater pump FW-54. The need for testing to demonstrate the ability to open manual valves FW-744 and FW-745 will also be reviewed. These actions will be completed by November 30, 1996.

Valve Group 9:

A modification request will be initiated to modify HCV-1385 and HCV-1386 to prevent pressure locking. This modification may involve drilling the downstream disks of these flexible wedge gate valves or installing bonnet bypass or relief lines. In addition, testing will be performed to demonstrate the ability of these valves to open under differential pressure conditions. These actions are scheduled to be completed by the end of the 1996 refueling outage.

In addition, an evaluation is in progress regarding the use of the main feedwater header as an alternate flow path for auxiliary feedwater. If this evaluation concludes that this alternate flow path does not serve a safety function, the planned modification and testing may be canceled.

The following corrective actions have been or will be completed to address susceptibility to thermal binding:

Valve Groups 1, 2, 3 and 4:

Selected procedures will be reviewed and revised as appropriate to minimize the potential for thermal binding of these valves (i.e., HCV-258, HCV-265, HCV-268, LCV-218-3 and HCV-308). Specifically, this review will focus on anticipated operating conditions that could expose these valves to heated flow, and appropriate procedure revisions will be implemented, if necessary, to address unseating/reseating the valves to prevent thermal binding. This action will be completed by September 30, 1996.

Valve Group 9:

Selected procedures will be reviewed and revised as appropriate to minimize the potential for thermal binding of these valves (i.e., HCV-1385 and HCV-1386). Specifically, this review will focus on ensuring that adequate guidance is provided in Emergency Operating Procedures (EOPs) with respect to reopening these valves following closure on a Steam Generator Isolation Signal (SGIS). This action will be completed by November 30, 1996.

Valve Group 12:

Selected procedures will be reviewed and revised as appropriate to minimize the potential for thermal binding of these valves (i.e., HCV-150 and HCV-151). Specifically, this review will focus on Abnormal Operating Procedure AOP-22, "Reactor Coolant Leak," which addresses closing the block valve to isolate PORV leakage. This action will be completed by November 30, 1996.

CONCLUSION

With the completion of the evaluation to identify "susceptible" valves, the further analysis of "susceptible" valves, the completion of the operability evaluations for the "susceptible" valves, and the selection and scheduling of appropriate corrective actions, the "180-day" Requested Actions of GL 95-07 are considered to be complete.

Generic Letter 95-07 Pressure Locking and Thermal Binding Project
Screening/Evaluation Results Summary Matrix
Sorted by Valve Group Number

Group Number	Valve Group Description & Valve Tag Numbers	Operator Type	System	CQE	Room	Size	Valve Type	Screening Result	Evaluation Criteria					Evaluation Result
									Crit. 1	Crit. 2	Crit. 3	Crit. 4	Crit. 5	
1	Boric Acid Storage Tank (BAST) Outlet Isolation Valves - HCV-258 and HCV-265	Motor	CH	Y	26	3 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Pos.	N/A	N/A	Pos.	Positive (TB Only)
2	Boric Acid Pump to Charging Suction Isolation Valve - HCV-268	Motor	CH	Y	26	3 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Pos.	Pos.	Neg.	Pos.	Positive (Both PL & TB)
3	Charging Suction Header Safety Injection & Boric Acid Supply Valve - LCV-218-3	Motor	CH	Y	7	3 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Pos.	N/A	N/A	Pos.	Positive (TB Only)
4	High Pressure Safety Injection (HPSI)/Charging Cross-Tie Valve - HCV-308	Motor	SI-HP	Y	13	2 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Pos.	N/A	N/A	Pos.	Positive (TB Only)
5	Shutdown Cooling Inboard Suction Isolation Valve - HCV-340	Motor	SI-LP	Y	CONT	12 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Neg.	N/A	N/A	N/A	N/A	Negative
6	Shutdown Cooling Outboard Suction Isolation Valve - HCV-347	Motor	SI-LP	Y	13	10 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Neg.	N/A	N/A	N/A	N/A	Negative
7	Main/Auxiliary Feedwater Cross-Connect Valve - HCV-1384	Motor	FW-AFW	Y	81	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Pos.	Pos.	Pos.	Neg.	Positive (PL Only)
8	Volume Control Tank (VCT) Outlet Isolation Valve - LCV-218-2	Motor	CH	Y	29	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Neg.	N/A	N/A	N/A	N/A	Negative
9	Steam Generator Feedwater Isolation Valves - HCV-1385 and HCV-1386	Motor	FW	Y	81	16 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Pos.	Pos.	Pos.	Pos.	Positive (Both PL & TB)
10	Feedwater Regulating Valve Outlet Isolation Valves - HCV-1103 and HCV-1104	Motor	FW	N	81	16 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Neg.	N/A	N/A	N/A	N/A	Negative
11	Feedwater Pump Discharge Isolation Valves - HCV-1150A, HCV-1150B and HCV-1150C	Motor	FW	N	TURB	14 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Neg.	N/A	N/A	N/A	N/A	Negative
12	Power Operated Relief Valve (PORV) Block Valves - HCV-150 and HCV-151	Motor	RC	Y	CONT	2.5 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Pos.	N/A	N/A	Pos.	Positive (TB Only)
13	Safety Injection Tank (SIT) Outlet Isolation Valves - HCV-2914, HCV-2934, HCV-2954 and HCV-2974	Motor	SI-LP	Y	CONT	12 in.	Gate - Double Disk	Positive (PL Only)	Pos.	Neg.	N/A	N/A	N/A	Negative
14	6th Stage Extraction Steam Radiation Control Valve - RCV-978	Motor	MS	N	TURB	10 in.	Gate - Solid Wedge	Positive (TB Only)	Neg.	N/A	N/A	N/A	N/A	Negative
15	HPSI Alternate Header Isolation Valve - HCV-2987	Air	SI-HP	Y	13	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Neg.	N/A	N/A	N/A	Negative
16	HPSI Pump Discharge Isolation Valves - HCV-2908, HCV-2918 and HCV-2928	Air	SI-HP	Y	21 & 22	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Neg.	N/A	N/A	N/A	Negative
17	HPSI Pump Discharge Crossconnect Valves - HCV-304 and HCV-305	Air	SI-HP	Y	21	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Neg.	N/A	N/A	N/A	Negative
18	HPSI Header Isolation Valves - HCV-306 and HCV-307	Air	SI-HP	Y	13	4 in.	Gate - Flex Wedge	Positive (Both PL & TB)	Pos.	Neg.	N/A	N/A	N/A	Negative
19	HPSI Pump Suction Isolation Valves - HCV-2907, HCV-2917 and HCV-2927	Air	SI-HP	Y	21 & 22	6 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Neg.	N/A	N/A	N/A	Negative
20	Low Pressure Safety Injection (LPSI) Pump Discharge Isolation Valves - HCV-2938 and HCV-2948	Air	SI-LP	Y	21 & 22	8 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Neg.	N/A	N/A	N/A	Negative
21	LPSI Pump Suction Isolation Valves - HCV-2937 and HCV-2947	Air	SI-LP	Y	21 & 22	14 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Neg.	N/A	N/A	N/A	Negative
22	Containment Spray (CS) Pump Discharge Isolation Valves - HCV-2958, HCV-2968 and HCV-2978	Air	SI-CS	Y	21 & 22	8 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Neg.	N/A	N/A	N/A	Negative
23	CS Pump Suction Isolation Valves - HCV-2957, HCV-2967 and HCV-2977	Air	SI-CS	Y	21 & 22	12 in.	Gate - Solid Wedge	Positive (TB Only)	Pos.	Neg.	N/A	N/A	N/A	Negative