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ComEd

February 13, 1996
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Subject: LaSalle County Station Units 1 and 2
180 Day Response to NRC Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves"
NRC Docket Numbers 50-373 and 50-374.

References:

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

2. Commonwealth Edison Company (ComEd) 60 day Response to NRC Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves" dated October 13, 1995.

The enclosed attachments contain LaSalle County Station's 180 day response to GL 95-07 (Reference 1). Attachment A provides the susceptibility evaluation criteria. Attachment B provides a summary of the susceptibility evaluation based on the criteria in Attachment A. Attachment C provides further analysis of safety related valves that did not meet the pressure locking screening criteria in Attachment A. Attachment D provides a listing of the safety related valves determined susceptible to pressure locking and the corrective actions taken or planned. Attachment E provides further analysis of safety related valves that did not meet the thermal binding screening criteria in Attachment A. There were no safety related valves determined susceptible to thermal binding.

If there are any questions or comments concerning this letter, please refer them to me at (815) 357-6761, extension 3600.

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Respectfully,

R. E. Querio
Site Vice President
LaSalle County Station

cc: H. J. Miller, Regional Administrator, Region III
M. D. Lynch, Project Manager, NRR
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Central file

ATTACHMENT A

SUSCEPTIBILITY EVALUATION CRITERIA

Thermal Binding/Pressure Locking Conditions

Evaluation Exclusion Criteria:

1. With the exception of gate valves, all of the remaining valve designs have been excluded from the evaluation of thermal binding and pressure locking conditions.

2. All Non-Safety Related gate valves have been excluded with the exception of those non-safety related gate valves in systems maintained as Safety Related.

3. Valves which have a Passive Safety Classification.

4. Valves that only have a safety function to close.

Thermal Binding Exclusion Criteria:

1. Valves that are placed in the full closed position, with the valve at or below normal room temperature.

2. Valves that have double-disc or parallel-seat design.

Part A: Thermal Binding Evaluation

1. Is the required Safety Function of the valve to open from the full closed position under normal or accident conditions: (YES/NO)

2. Is the valve placed in the full closed position with temperatures above normal room temperature? (YES/NO)

3. Is the valve disc a wedge design (solid, split, flexible)? (YES/NO)

NOTE: If the answers to question one, two and three in Part A are yes, the valve should be considered susceptible to thermal binding.

ATTACHMENT A

SUSCEPTIBILITY EVALUATION CRITERIA

Thermal Binding/Pressure Locking Conditions

Pressure Locking Exclusion Criteria:

1. Valves that have been installed in systems with a process media containing compressible gases or fluid/gas mixtures other than steam providing the system is not initially filled with water.

Part B: Pressure Locking

1. Is the required Safety Function of the valve to open from the full closed position under normal or accident conditions? (YES/NO)

2. Is the valve susceptible to allowing fluid to enter the bonnet cavity including the area between the disc halves during valve cycling or due to differential pressure across the valve seats in the closed position? (YES/NO)

NOTE: Steam systems with isolated flow may condense allowing fluid to enter the bonnet cavity depending on the system and valve configuration.

3. Is the valve bonnet cavity susceptible to pressurization greater than system pressure due to temperature increases or instantaneous system pressure drops in the upstream and/or downstream piping? (YES/NO)

NOTE: If the answers to question one, two and three in Part B are yes, the valve should be considered susceptible to pressure locking.

ATTACHMENT A

SCREENING CRITERIA BASIS

1. UFSAR 1.2.4.1 Definitions:

   a. Active Component: A safety related component characterized by an automatically initiated change of state or discernible mechanical action in response to an imposed demand.

   b. Passive Component: A safety related component characterized by no change of state nor mechanical motion.

2. Environmental Qualification List Definitions: (Sargent & Lundy Project Instruction PI-LSNS-44, Rev. 7)

   a. Active Component: Component must perform a mechanical motion or change of state in order to accomplish its safety-related function(s).

   b. Passive Component: Component must retain its structural and pressure integrity but is not required to remain functional (i.e., component is not required to perform a mechanical motion or to change state in order to accomplish its safety function.

ATTACHMENT B

SAFETY RELATED GATE VALVE LIST

EPN	ACTIVE PASSIVE	THERMAL BINDING 1	2	3	PRESSURE LOCKING 1	2	3	**ENVIR ZONE
1(2)B21-F011A/B	P							
1(2)B21-F016	A	N	Y	Y	N	Y	Y	H2A
1(2)B21-F019	A	N	Y	Y	N	Y	Y	H5C
1(2)B21-F065A/B	A	N	Y	Y	N	Y	Y	H5C
1(2)B21-F067A/B/C/D	A	N	Y	N	N	Y	Y	H5C
1(2)B21-F508A/B	P							
1(2)B33-F023A/B	*P	N	Y	Y	N	Y	Y	H2A
1(2)B33-F067A/B	*P	N	Y	N	N	Y	Y	H2A
1(2)CB007	*P	N	Y	Y	N	Y	Y	
1(2)C11D001101	P							
1(2)C11D001102	P							
1(2)C11D001112	P							
0(1,2)DG001	P							
0(1,2)DG003	P							
0(1,2)DG004	P							
0(1,2)DG005	P							
0(1,2)DG007	P							
1(2)DG008	P							
0DG009	P							
1(2)DG011	P							
1(2)DG017	P							
1(2)DG019	P							
1(2)DG023	P							
1(2)DG032	P							
0(1,2)DO009	P							
1(2)DO016	P							
1(2)DG017	P							
1(2)DG019	P							
0DO021	P							
1(2)E12-F003A/B	A	N	N	Y	N	Y	Y	H6
1(2)E12-F004A/B/C	A	N	N	Y	N	Y	Y	H5E
1(2)E12-F006A/B	#A	Y	Y	Y	Y	Y	Y	H6
1(2)E12-F007	P							
1(2)E12-F008	#A	Y	Y	Y	Y	Y	Y	H5B
1(2)E12-F009	#A	Y	Y	Y	Y	Y	Y	H2A
1(2)E12-F011A/B	*P	N	Y	Y	N	Y	Y	H6
1(2)E12-F014A/B	P							
1(2)E12-F016A/B	#A	Y	N	Y	Y	Y	Y	H4A
1(2)E12-F017A/B	#A	Y	N	Y	Y	Y	Y	H4A
1(2)E12-F018A/B/C	P							
1(2)E12-F020	P							
1(2)E12-F026A/B	*P	N	N	Y	N	Y	Y	H6

ATTACHMENT B

SAFETY RELATED GATE VALVE LIST

EPN	ACTIVE PASSIVE	THERMAL BINDING 1	2	3	PRESSURE LOCKING** 1	2	3	ENVIR ZONE
1(2)E12-F027A/B	A	Y	N	Y	Y	Y	Y	H6
1(2)E12-F042A/B/C	A	Y	N	Y	Y	Y	Y	H4A
1(2)E12-F047A/B	A	N	N	Y	N	Y	Y	H6
1(2)E12-F049A/B	A	N	Y	Y	N	Y	Y	H6
1(2)E12-F063A/B/C	P							
1(2)E12-F064A/B/C	A	N	Y	Y	N	Y	Y	H6
1(2)E12-F067	P							
1(2)E12-F068A/B	A	Y	N	Y	Y	Y	Y	H5E
1(2)E12-F071A/B	P							
1(2)E12-F072A/B/C	P							
1(2)E12-F086	P							
1(2)E12-F090A/B	P							
1(2)E12-F092A/B/C	P							
1(2)E12-F093	A	N	N	Y	N	Y	Y	H6
1(2)E12-F094	A	N	N	Y	N	Y	Y	H6
1(2)E12-F098A/B/C	P							
1(2)E12-F302	P							
1(2)E12-F303	P							
1E12-F328B	P							
1(2)E12-F330A/B/C/D	P							
1(2)E12-F332A/B/C/D	P							
1(2)E12-F336A/B	P							
1(2)E12-F341	P							
1(2)E12-F402	P							
2E12-F428A/B	P							
2E12-F429A/B	P							
1(2)E21-F001	A	N	N	Y	N	Y	Y	H5E
1(2)E21-F004	P							
1(2)E21-F005	A	Y	N	Y	Y	Y	Y	H4A
1(2)E21-F008	P							
1(2)E21-F011	A	N	Y	Y	N	Y	Y	H5A
1(2)E21-F051	P							
1(2)E21-F052	P							
1(2)E22-F003	P							
1(2)E22-F004	A	Y	N	N	Y	Y	Y	H4A
1(2)E22-F012	A	Y	Y	N	Y	Y	Y	H6
1(2)E22-F015	A	N	N	N	N	Y	Y	H5E
1(2)E22-F019	P							
1(2)E22-F026	P							
1(2)E22-F031	P							
1(2)E22-F038	P							
1(2)E22-F310	P							

ATTACHMENT B

SAFETY RELATED GATE VALVE LIST

EPN	ACTIVE PASSIVE	THERMAL BINDING 1	2	3	PRESSURE LOCKING 1	2	3	**ENVIR ZONE
1(2)E22-F311	P							
1(2)E22-F312	P							
1(2)E22-F313	P							
1(2)E22-F315	P							
1(2)E22-F316	P							
1(2)E22-F319	P							
1(2)E22-F325	P							
1(2)E32-F001A/E/J/N	A	Y	N	Y	Y	Y	Y	H5C
1(2)E32-F002A/E/J/N	A	Y	N	Y	Y	Y	Y	H5C
1(2)E32-F006	A	Y	N	Y	Y	Y	Y	H5C
1(2)E32-F007	A	Y	N	Y	Y	Y	Y	H5C
1(2)E32-F008	A	Y	N	N	Y	N	Y	H5C
1(2)E32-F009	A	Y	N	N	Y	N	Y	H5C
1(2)E51-F008	A	N	Y	N	N	Y	Y	H5B
1(2)E51-F009	P							
1(2)E51-F010	A	N	N	Y	N	Y	Y	H5A
1(2)E51-F012	P							
1(2)E51-F013	A	Y	N	Y	Y	Y	Y	H4A
1(2)E51-F016	P							
1(2)E51-F031	A	Y	N	Y	Y	Y	Y	H5E
1(2)E51-F059	A	N	N	Y	N	Y	Y	H5A
1(2)E51-F063	A	N	Y	N	N	Y	Y	H2A
1(2)E51-F064	*P	N	Y	Y	N	Y	Y	H5B
1(2)E51-F068	A	N	Y	Y	N	N	Y	H5E
1(2)E51-F356	P							
2E51-F357	P							
1(2)E51-F362	P							
1(2)E51-F363	P							
1(2)FC040A/B	P							
1(2)FC042A/B	P							
1(2)FC045A/B	P							
1(2)FC047A/B	P							
1(2)FC086	P							
1(2)FC115	P							
1(2)FC139A/B	P							
1(2)FC140	P							
1(2)FW013	*P	N	Y	Y	N	Y	Y	
1(2)G33-F001	A	N	Y	N	N	Y	Y	H2A
1(2)G33-F004	A	N	Y	N	N	Y	Y	H5D
1(2)G33-F040	A	N	Y	Y	N	Y	Y	H5C
1(2)G33-F100	P							
1(2)G33-F101	*P	N	Y	Y	N	Y	Y	H2A
1(2)G33-F106	P							
1(2)HG001A/B	A	Y	N	Y	Y	N	Y	H4A

ATTACHMENT B

SAFETY RELATED GATE VALVE LIST

EPN	ACTIVE PASSIVE	THERMAL BINDING 1	2	3	PRESSURE LOCKING 1	2	3	**ENVIR ZONE
1(2)HG003	A	N	N	Y	N	N	Y	H4A
1(2)HG005A/B	A	Y	N	Y	Y	N	Y	H5E
1(2)HG006A/B	A	Y	N	Y	Y	N	Y	H5E
1(2)HG009	A	Y	N	Y	Y	N	Y	H4A
1(2)MC027	P							
1(2)MC033	P							
1(2)SA042	P							
1(2)SA046	P							
0VC025A/B/C/D	P							
1(2)VG008	P							
1(2)VG009	P							
1(2)VG010	P							
1(2)VG011	P							
1(2)VG012	P							
1(2)VG013	P							
1(2)VG014	P							
1(2)VG015	P							
1(2)VP053A/B	A	N	N	Y	N	Y	Y	H4A
1(2)VP063A/B	A	N	N	Y	N	Y	Y	H4A
1(2)WR029	A	N	N	Y	N	Y	Y	H4A
1(2)WR040	A	N	N	Y	N	Y	Y	H4A
1(2)WR179	A	N	N	Y	N	Y	Y	H2A
1(2)WR180	A	N	N	Y	N	Y	Y	H2A

*NOTE: These valves were evaluated as identified by previous reviews for Thermal Binding or Hydraulic Locking and/or SIL 368.

#NOTE: These valves were included due to the primary Emergency Operating Procedures (EOP) functions to open even though they have no safety function to open.

** Environmental zones are as defined in the UFSAR and specific temperatures ranges were extracted from the UFSAR.

Summary of Attachment B Screening
for Hydraulic Locking

The following valves screened as potentially susceptible to hydraulic locking and required further analysis as documented in Attachment C:

1(2)E12-F006 A/B
1(2)E12-F008
1(2)E12-F009
1(2)E12-F016 A/B
1(2)E12-F017 A/B
1(2)E12-F027 A/B
1(2)E12-F068 A/B
1(2)E22-F012
1(2)E32-F001 A/E/J/N
1(2) E32-F002 A/E/J/N
1(2)E32-F003N
1(2)E32-F006
1(2)E32-F007
1(2)E32-F031
1(2)E12-F042 A/B/C
1(2)E21-F005
1(2)E22-F004
1(2)E51-F013

Summary of Attachment B Screening
for Thermal Binding

The following valves screened as potenitally susceptible to thermal binding and required further analysis as documented in Attachment E:

1(2)E12-F006 A/B
1(2)E12-F009
1(2)E12-F008

ATTACHMENT C

HYDRAULIC LOCKING VALVE FINAL REVIEW

1(2)E12-F006A/B

If either valve 1(2)E12-F006A or B does not open the associated loop of shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The analysis concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

Valves 1(2)E12-F006A/B are the shutdown cooling suction valves for each RHR loop. The valves are located in the associated RHR pump corner room in EQ zone H6. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance or when securing shutdown cooling and the time the valves use is demanded post accident. The expected lowest cycling temperature would be 65°F and the maximum UFSAR accident ambient temperature for the zone would be 148°F. There are no high energy lines in the pump rooms. The areas are served by independent safety related ventilation cooling systems. A single event is unlikely to effect both areas ambient temperature significantly. The method for heatup of the area is operation of the RHR pump with high water temperatures (either shutdown cooling or suppression pool cooling). The most limiting case (higher water temperatures) is shutdown cooling. However the 1(2)E12-F006A/B valve is already open when this mode is initiated. Therefore a significant ambient temperature rise would not occur until the valve is already open and pressure locking is not a concern.

ATTACHMENT C

1(2)E12-F008

If Valve 1(2)E12-F008 does not open the entire shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The UFSAR concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

Valve 1(2)E12-F008 is the common shutdown cooling suction outboard containment isolation valve. 1(2)E12-F0C8 valve is located in the reactor building outside the drywell in EQ zone H5. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance or when securing shutdown cooling and the time the valves use is demanded. The expected lowest cycling temperature would be 90°F and the maximum accident ambient temperature would be 212°F per the UFSAR. The method of heating this area is a HELB; the RCIC steam line. A break of this RCIC line is limited by automatic redundant isolation valves, therefore limiting the heatup. Operation of this valve to initiate shutdown cooling would however occur after the reactor pressure vessel pressure is reduced and cooled down. This would occur at some later time after the initial external heatup allowing for temperature equalization. reducing the likelihood of pressure locking.

ATTACHMENT C

1(2)E12-F009

If Valve 1(2)E12-F009 does not open the entire shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The UFSAR concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

Valve 1(2)E12-F009 is the common shutdown cooling suction inboard containment isolation valve. Valve 1(2)E12-F009 is located in the drywell in EQ zone H2. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance or when securing shutdown cooling and the time the valves use is demanded. Pressure locking may also occur due to rapid RPV depressurization. The expected lowest cycling temperature would be 90°F and the maximum accident ambient temperature would be 340°F per the UFSAR. The method of heating this area is a LOCA. Operation of this valve to initiate shutdown cooling would however occur after the reactor pressure vessel pressure is reduced and cooled down. This would occur at some later time after the initial external heatup allowing for temperature equalization. The 1(2)E12-F009 valve has been modified with a larger operator.

ATTACHMENT C

1(2)E12-F016A/B and 1(2)E12-F017A/B

If either 1(2)E12-F016A/B or 1(2)E12-F017A/B valve does not open, the drywell spray mode of RHR will not function. The drywell spray function is described in the UFSAR, however no credit is taken for the function (DBA i.e., LOCA, Etc.) in the analysis. The analysis includes both the containment design pressure which will not be exceeded without drywell spray and the offsite doses (10CFR100) which will not be exceeded without the use of drywell spray. The containment leakage pressure (Pa of 39.6 psig) assumes that drywell spray is not used. Therefore, as stated in the UFSAR, the design of the containment will not be exceeded for all design basis accidents. There is no safety design basis for drywell spray.

Valves 1(2)E12-F016A/B and 1(2)E12-F017A/B which are the drywell spray valves are located in the reactor building outside the drywell in EQ zone H4 The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance testing. The expected lowest cycling temperature would be 65°F and the maximum accident ambient temperature would be 145°F per UFSAR Table 3.11-6. The method of heating this area is a HELB. The same design conditions exist for both sets of valves, therefore effecting both drywell spray loops. However, the valves are physically separated on different sides of the drywell and would actually have different conditions. In any case there would be a delay between a HELB close to one set of valves effecting the second set. The high energy lines in the area are the RCIC steam line, CRD insert and withdrawal lines, RPV instrument lines and the RWCU suction line. The closest lines are small (CRD and instrument) and leakage from a failed line is not expected to increase the ambient temperature greatly due to the large air volume in the vicinity of the spray valves. The RCIC and RWCU lines would automatically isolate on a line break limiting the amount of steam leaked into the area. In addition a line break outside the drywell is not credible concurrent with a large LOCA inside the drywell which is the mechanism for the potential need for drywell spray (i.e. containment pressure exceeding the design basis). Therefore pressure locking of these valves when required is not credible.

ATTACHMENT C

1(2)E12-F027A/B

Valve 1(2)E12-F027A/B is the wetwell spray valve for each RHR loop. The wetwell spray function is described in the UFSAR, and with the drywell floor bypass leakage less than the design value of 0.03 ft^2 (A/ÖK) there is no need to use wetwell spray for break sizes greater than 0.4 ft^2. The transient for small breaks proceeds slowly and the operator has time to react. The Tech. Spec. surveillance limit is 10% of the 0.03 ft^2 (A/ÖK) limit further lengthening the reaction time. The valves are located in the associated RHR heat exchanger room in EQ zone H6. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance and the time the valve use is demanded. The expected lowest cycling temperature would be 65°F and the maximum accident ambient temperature would be 148°F per the UFSAR. There are no high energy lines in the heat exchanger room. The method for heatup of the area is operation of the RHR pump with high water temperatures (either shutdown cooling or suppression pool cooling). The only scenario in which wetwell spray is required to operate is a small line break inside the drywell which slowly pressurizes the drywell and suppression chamber. In this case the suppression pool temperature will not rise significantly before the operator initiates wetwell spray per the EOPs. In this case the ambient temperature near the 1(2)E12-F027A/B valves will not increase prior to opening the valves and therefore pressure locking is not a concern. The areas are served by independent safety related ventilation cooling systems. A single event is unlikely to effect both areas ambient temperature significantly.

Due to the relative importance of these valves in the station's emergency operating procedures they will be modified to ensure pressure locking can not occur. The modification of these valves has been scheduled to be implemented during L1R08 and L2R08.

ATTACHMENT C

1(2)E12-F068A

If 1(2)E12-F068A valves do not open the A RHR service water containment cooling and shutdown cooling modes of RHR will not function. The containment cooling function is considered a safety design basis for RHR. Valve 1(2)E12-F068A is the A RHR service water heat exchanger outlet valve. The valve is normally closed. Valve 1(2)E12-F0068A is located in the reactor building raceway basement in EQ zone H5. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance or when securing RHR service water and the time the valves use is demanded. The expected lowest cycling temperature would be 50°F and the maximum accident ambient temperature would be 212°F per the UFSAR. The method of heating this area is a HELB. The only HE line in the area is the RCIC steam line. A break of this RCIC line is limited by automatic redundant isolation valves. The 1(2)E12-F068A valve is located in the low point of a 20 inch pipe with long pipe runs on both sides. The downstream side pipe goes underground. Any steam in the area will be provided a large heat sink for absorbing the steam leaked into the area. Steam impingement directly on the valve is unlikely. Therefore significant temperature rise of the valve bonnet is not credible.

The existing LaSalle Line Break Analysis shows that the temperature in this room increases from 104 to 208°F within a few minutes. The line is also isolated within a few minutes. Based on Engineering Judgment the room would take about twenty five minutes to drop to 163F and then condensation of the steam in the room would drop the temperature to 120°F in another 5 minutes. From this we would judge that the room would go from 104 degrees to 208 and back down to about 120°F within an hour.

Valve E12-F068A would be filled with service water at a temperature of not more than 104°F. Since water transfers heat better than air does, the temperature in the valve bonnet would tend to remain at the 104°F water temperature rather than the transient air temperature. Because of the relatively short time that the room would be at elevated temperatures, the fact that the peak temperature difference in the room would be about 100°F and the fact that the valve bonnet would tend to remain at the water temperature anyway, we do not believe that this valve would experience pressure locking due to the room temperature transient from a HELB outside containment.

Due to the importance of this valve it will be modified to prevent it from being pressure locked. The modification of this valve has been scheduled to be implemented during L1R07 and L2R07.

ATTACHMENT C

1(2)E12-F068B

If 1(2)E12-F068B valve does not open the B RHR service water containment cooling and shutdown cooling modes of RHR will not function. The containment cooling function is considered a safety design basis for RHR. Valve 1(2)E12-F068B is the B RHR service water heat exchanger outlet valve. The valve is normally closed. Valve 1(2)E12-F0068B is located in the reactor RHR pump corner room in EQ zone H6. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance or when securing RHR service water and the time the valves use is demanded. The expected lowest cycling temperature would be 50°F and the maximum accident ambient temperature would be 148°F per the UFSAR. There are no high energy lines in the area. The method for heatup of the area is operation of the B RHR pump with high water temperatures (either shutdown cooling or suppression pool cooling). Prior to initiation of either of these modes the RHR service water system is started, opening valve 1(2)E12-F068B. Therefore significant temperature rise of the valve bonnet is not credible prior to the valve being opened.

Due to the importance of this valve it will be modified to prevent it from being pressure locked. The modification of this valve has been scheduled to be implemented during L1R07 and L2R07.

ATTACHMENT C

1(2)E22-F012

Valve 1(2)E22-F012 is the HPCS pump minimum flow valve. The valve is normally closed. Valve 1(2)E22-F012 is located in the reactor building HPCS pump corner room in EQ zone H6. The postulated method of pressure locking is external heating due to ambient temperature increases from the time of valve cycling for surveillance and the time the valve's use is demanded. The expected lowest cycling temperature would be 65°F and the maximum accident ambient temperature would be 148°F per the UFSAR. There are no high energy lines in the area. The method for heatup of the area is operation of the HPCS pump with high water temperatures. The valve opens when the HPCS pump starts and the pump flow does not increase above 1000 gpm. This would occur only with high reactor pressures which would indicate that suppression pool temperature has not increased significantly. The valve would also open when the injection valve closed on high RPV level. In this case the safety function of HPCS has been accomplished and the operators are trained to secure ECCS pumps which are on min. flow. Therefore significant temperature rise of the valve bonnet is not credible prior to the valve being opened.

1(2)E32-F001A/E/J/N

The Inboard MSIV-LCS Inboard Inlet Stop Valves are closed during unit operations and are required to open to place MSIV-LCS on line. The Inboard MSIV-LCS Inboard Inlet Stop Valves were field walked to determine if water could collect in the valves and eventually cause a hydraulic lock. This walkdown determined that there is no possibility that water can condense and collect in the valves. The valves are in a relative high point in the system and any water condensation would drain away from the valves back into the Main Steam Lines.

MSIV-LCS is only used following a LOCA. Per FSAR 15.6.5.5.b, MSIV-LCS is estimated to be required 2 hours after the accident. Additionally, room temperature should be near the normal operating temperature(~ 100°F) or less since a LOCA has occurred in the DW and all high energy systems have been isolated. Steam trapped in the bonnet will condense prior to system demand and these valves will not be susceptible to pressure locking. Chron # 215865 supports this conclusion.

Also, the MSIV-LCS is scheduled to be deleted during the upcoming refuel outages on Unit 1 (Jan. '96) and Unit 2 (Sept. '96).

ATTACHMENT C

1(2)E32-F002A/E/J/N

The Inboard MSIV-LCS Outboard Inlet Stop Valves are closed during unit operations and are required to open to place MSIV-LCS on line. The Inboard MSIV-LCS Outboard Inlet Stop Valves were field walked to determine if water could collect in the valves and eventually cause a hydraulic lock. This walkdown determined that there is no possibility that water can condense and collect in the valves. The Inboard MSIV-LCS Outboard Inlet Stop valves are downstream of the Inboard MSIV-LCS Inboard Inlet Stop valves and therefore water will not condense and fill the valves. The valves are isolated from reactor pressure and even if small leakage did collect in the valves since they don't experience high pressure they can not lock do to a rapid depressurization of the system. Ambient temperature increase will not cause them to lock since the area would cool when these valves are called upon to operate after a MSIV Isolation. Pressure locking of these valves is not a credible event.

MSIV-LCS is only used following a LOCA. Per FSAR 15.6.5.5.b, MSIV-LCS is estimated to be required 2 hours after the accident. Additionally, room temperature should be near the normal operating temperature(~ 100°F) or less since a LOCA has occurred in the DW and all high energy systems have been isolated. Steam trapped in the bonnet will condense prior to system demand and these valves will not be susceptible to pressure locking. Chron # 215865 supports this conclusion. Also, the MSIV-LCS is scheduled to be deleted during the upcoming refuel outages on Unit 1 (Jan. '96) and Unit 2 (Sept. '96).

ATTACHMENT C

1(2)E32-F003N

The Inboard MSIV-LCS Blowdown to the Main Steam Tunnel (MST) Stop Valve is closed during unit operations and is required to open to place MSIV-LC on line. The Inboard MSIV-LCS Blowdown to the MST Stop Valve was field walked to determine if water could collect in the valve and eventually cause a hydraulic lock. This walkdown determined that there is no possibility that water can condense and collect in the valve. The valve is in a relative high point in the system and any water condensation would drain away from the valve back into the Main Steam Lines.

MSIV-LCS is only used following a LOCA. Per FSAR 15.6.5.5.b, MSIV-LCS is estimated to be required 2 hours after the accident. Additionally, room temperature should be near the normal operating temperature(~ 100°F) or less since a LOCA has occurred in the DW and all high energy systems have been isolated. Steam trapped in the bonnet will condense prior to system demand and these valves will not be susceptible to pressure locking. Chron # 215865 supports this conclusion. Also, the MSIV-LCS is scheduled to be deleted during the upcoming refuel outages on Unit 1 (Jan. '96) and Unit 2 (Sept. '96).

ATTACHMENT C

1(2)E32-F006

The Outboard MSIV-LCS Inboard Inlet Stop Valve is closed during unit operations and is required to open to place MSIV-LCS on line. The Outboard MSIV-LCS Inboard Inlet Stop Valve is susceptible to having water enter the bonnet cavity based on the Steam Valve Screening performed on the valve.

A calculation (NED-M-MSD-194) was performed to show there was adequate motor gearing capacity (MGC) to open these valves. The MGC to required thrust margin was 70% for the 1E32-F006 and 30% for the 2E32-F006. MSIV-LCS is only used following a LOCA. Per FSAR 15.6.5.5b, MSIV-LCS is estimated to be required 2 hours after the accident. Additionally, room temperature should be near the normal operating temperature (~ 100°F) or less since a LOCA has occurred in the DW and all high energy systems have been isolated. Therefore, any water trapped in the bonnet will not expand due to high area temperature. In fact, the bonnet pressure will be less than the pressure assumed in the calculation because some cooling will have occurred during the 2 hrs. following the LOCA.

In summary, even though the 1(2)E32-F006 is susceptible to pressure locking, this phenomena, will not prevent valve operation. Additionally, the MSIV-LCS will be deleted during the upcoming outages.

ATTACHMENT C

1(2)E32-F007

The Outboard MSIV-LCS Outboard Inlet Stop Valve is closed during unit operations and is required to open to place MSIV-LCS on line. The Outboard MSIV-LCS Outboard Inlet Stop Valve was field walked to determine if water could collect in the valve and eventually cause a hydraulic lock. This walkdown determined that there is no possibility that water can condense and collect in the valve. The Outboard MSIV-LCS Outboard Inlet Stop valve is downstream of the Outboard MSIV-LCS Inboard Inlet Stop valve and therefore water will not condense and fill the valve. The valve is isolated from reactor pressure and even if small leakage did collect in the valve since it doesn't experience high pressure it can not lock due to a rapid depressurization of the system. Ambient temperature increase will not cause it to lock since the area would cool when the valve is called upon to operate after a MSIV Isolation. Pressure locking of this valve is not a credible event.

MSIV-LCS is only used following a LOCA. Per FSAR 15.6.5.5.b, MSIV-LCS is estimated to be required 2 hours after the accident. Additionally, room temperature should be near the normal operating temperature(~ 100°F) or less since a LOCA has occurred in the DW and all high energy systems have been isolated. Steam trapped in the bonnet will condense prior to system demand and these valves will not be susceptible to pressure locking. Chron # 215865 supports this conclusion. Also, the MSIV-LCS is scheduled to be deleted during the upcoming refuel outages on Unit 1 (Jan. '96) and Unit 2 (Sept. '96).

ATTACHMENT C

1(2)E51-F031

Valve 1(2)E51-F031 is the RCIC pump suppression pool suction valve. The valve is normally closed, but opens when the CY tank level becomes low. Valve 1(2)E51-F031 is located in the reactor raceway basement in EQ zone H5. The postulated method of external heating due to ambient temperature increases from the time of valve cycling for surveillance and the time the valve's use is demanded. The expected lowest cycling temperature would be 65°F and the maximum accident ambient temperature would be 212°F per the UFSAR. The method of heating this area is a HELB. The only HE line in the area is the RCIC steam line. If the RCIC steam line fails, the RCIC system will not function and therefore this valve is not required to open.

Hydraulic locking of this valve due to normal RCIC operation and heat up of the Suppression Pool is not credible because the piping configuration does not allow the valve to be heated significantly. The RCIC Pool suction piping flows downward away from a potentially hot suppression pool source. Convective heat transfer will not occur under these conditions. This leaves conductive heat transfer as the primary mechanism and the volume of water in the piping system will absorb the heat without significant temperature rise.

Due to the importance of this valve it will be modified to prevent it from being pressure locked. The modification of this valve has been scheduled to be implemented during L1R08 and L2R08.

ATTACHMENT C

1(2)E12-F042 A/B/C

The safety function of these valves is to open from the full closed position. All six valves have been modified by drilling small holes in the reactor side disc to prevent hydraulic locking.

1(2)E21-F005

The safety function of this valve is to open from the full closed position. Units 1 & 2 valves have been modified by drilling small holes in the reactor side disc to prevent hydraulic locking.

1(2)E22-F004

The safety function of this valve is to open from the full closed position. Units 1 & 2 valves have been modified by drilling small holes in the reactor side disc to prevent hydraulic locking.

1(2)E51-F013

The safety function of these valves is to open from the full closed position. Units 1 & 2 valves have been modified by drilling small holes in the reactor side disc to prevent hydraulic locking.

ATTACHMENT D

VALVES SUSCEPTIBLE TO HYDRAULIC LOCKING AND THEIR DISPOSITION

The following safety related gate valves were determined to be susceptible to becoming Hydraulically Locked when required to open to complete their safety function:

1. 1(2)E12-F042A/B/C LPCI Injection Valve

2. 1(2)E21-F005 LPCS Injection Valve

3. 1(2)E22-F004 HPCS Injection Valve

4. 1(2)E51-F013 RCIC Injection Valve

The above mentioned valves have all been modified by drilling holes in the reactor side disc's to prevent the possibility of them becoming Hydraulically Locked.

The following are susceptible to hydraulic lock but will not be modified. An analysis has shown these valves will perform their function if a hydraulic lock occurs. Also, this system is scheduled to be deleted in the L1RO7 (January, 1996) and L2RO7 (September, 1996) refuel outages.

1. 1(2)E32-F006 Outboard MSIV-LCS Inboard Inlet Stop Valve.

The following valves have been determined not to be susceptible to becoming Hydraulically Locked however, they will be modified to prevent the possibility due to their relative safety importance:

1. 1(2)E12-F027A/B Suppression Pool Spray Isolation Valve (L1R08 and L2R08)

2. 1(2)E12-F068A/B RHR HX Service Water Isolation Valve (L1R07 and L2R07)

3. 1(2)E51-F031 RCIC Suppression Pool Suction Isolation Valve (L1R08 and L2R08)

ATTACHMENT E

THERMAL BINDING VALVE FINAL REVIEW

1(2)E12-F006A/B

If either valve 1(2)E12-F006A or B does not open the associated loop of shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The analysis concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

The postulated method of thermally binding valves 1(2)E12-F006A/B is internal cooling due to system temperature decreases from the time of valve closure for surveillance testing or when securing shutdown cooling and the time the valves use is demanded. The expected highest closure temperature would be 340°F (if shutdown cooling was secured immediately after startup while in hot shutdown). The system temperature would be approximately 100°F when the 1(2)E12-F006A/B valves were required to be opened. The conditions of the system during startup would not be more severe during accidents than during normal shutdown. 1(2)E12-F006A/B valves could be opened at a temperature significantly below that where they were last closed. This is not the usual method of securing shutdown cooling. Shutdown cooling is usually secured at approximately 150°F. Historically the 1(2)E12-F006A/B valves have not thermally bound even when shutdown cooling was secured from hot shutdown conditions. Access to the reactor building is required to initia_e shutdown cooling due to the power being off for valve 1(2)E12-F008. If either valve did thermally bind local actions could be taken to open the valve manually.

ATTACHMENT E

1(2)E12-F009

If valve 1(2)E12-F009 does not open the entire shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The analysis concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

The postulated method of thermally binding valve 1(2)E12-F009 is internal cooling due to system temperature decreases from the time of valve closure for surveillance testing or when securing shutdown cooling and the time the valves use is demanded. The expected highest closure temperature would be 340°F (if shutdown cooling was secured immediately after startup while in hot shutdown). The system temperature would be approximately 350°F when the 1(2)E12-F009 valve was required to be opened. The conditions of the system during startup would not be more severe during accidents than during normal shutdown conditions (i.e. RPV water temperature would be the same). The 1(2)E12-F009 valve would not be opened at a temperature significantly below that where they were last closed. This is not the usual method of securing shutdown cooling. Shutdown cooling is usually secured at approximately 150°F. The 1(2)E12-F009 valve has been modified with a larger operator due to previous thermal binding events. This valve is not expected to thermally bind and has not thermally Bound since the new operator was installed.

ATTACHMENT E

1(2)E12-F008

If valve 1(2)E12-F008 does not open the entire shutdown cooling mode of RHR will not function. The shutdown cooling function is described in the UFSAR, however the function is not considered a safety design basis for RHR. The analysis concluded that alternative long term decay heat removal methods provided the safety design. The method of using ADS valves and the ECCS injection path is single failure proof and independent of these valves. Therefore, as stated in the UFSAR, for all design basis accidents decay heat can be removed without RHR shutdown cooling. There is no safety design basis for RHR shutdown cooling.

The postulated method of thermally binding valve 1(2)E12-F008 is internal cooling due to system temperature decreases from the time of valve closure for surveillance testing or when securing shutdown cooling and the time the valves use is demanded. The system temperature would be approximately 100°F when the 1(2)E12-F008 valve was required to be opened. The conditions of the system during startup would not be more severe during accidents than during normal shutdown. The 1(2)E12-F008 valve could be opened at a temperature significantly below that where they were last closed. This is not the usual method of securing shutdown cooling. Shutdown cooling is usually secured at approximately 150°F. Historically the 1(2)E12-F008 has not thermally bound even when shutdown cooling was secured from hot shutdown conditions. Access to the reactor building is required to initiate shutdown cooling due to the power being off for valve 1(2)E12-F008. If the 1(2)E12-F008 valve did thermally bind local actions could be taken to open the valve manually.

ATTACHMENT F

Valves Susceptible To Thermal Binding And Their Disposition

There were no safety related gate valves determined to be susceptible to becoming Thermally Bound when required to open to complete their safety function