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Detroit Edison

Nuclear Operations

November 15, 1995
NRC-95-0128

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

References:
1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-related Power Operated Gate Valves," dated August 17, 1995

3) Detroit Edison letter to NRC, "Detroit Edison Initiatives on Pressure Locking and Thermal Binding of Gate Valves at Fermi 2," NRC-93-0127, dated October 13, 1993

4) Detroit Edison letter to NRC, "Status of Detroit Edison Initiatives on Pressure Locking and Thermal Binding of Gate Valves," NRC-94-0102, dated November 2, 1994

5) Detroit Edison Letter to NRC, "Detroit Edison Response to NRC Generic Letter 95-07," NRC-95-0106, dated October 13, 1995

6) NRC Letter to Detroit Edison, "60-Day Response to Generic Letter 95-07 (TAC No. M93463)," dated November 8, 1995

Subject: Detroit Edison Supplemental Response to NRC Generic Letter 95-07

This letter provides Detroit Edison's amended response to Generic Letter (GL) 95-07. A more detailed safety basis was requested in Reference 6 to substantiate Detroit Edison's request for additional time to perform the actions in GL 95-07. This

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Generic Letter requests that licensees perform, or confirm that they previously performed, evaluations of operational configurations of safety-related power-operated (including motor-, air-, and hydraulically operated) gate valves for susceptibility to pressure locking and thermal binding (PL & TB). The GL also requests that further analyses be performed and any needed corrective actions be implemented to ensure that safety-related power-operated gate valves that are susceptible to pressure locking or thermal binding are capable of performing the safety functions within the current licensing bases of the facility.

The enclosure to this letter includes a summary of a preliminary screening of safety-related power-operated gate valves. This review is based on information provided in GL 95-07; in recently issued NRC Information Notices, IN 94-14, IN 95-18, IN 95-18, Supplement 1, and IN 95-30; and on other recent industry experiences, as well as Detroit Edison's actions in response to Supplement 6 to GL 89-10. Detroit Edison has completed a preliminary screening, confirmed the operability of the subject valves, and is completing the documentation and review of this screening. Therefore, Detroit Edison plans to fully complete the documentation and have available on file the requested 90 Day Action described below within 30 days from the date of this letter.

In this screening, the valves reviewed by Detroit Edison represent a preliminary list of Fermi 2 safety-related power-operated gate valves subject to GL 95-07 review. The scope of the review includes valves considered to be significant to the systems whose operability is necessary for the plant to continue safe operation and to perform a safe shutdown in accordance with the licensed design bases of the plant. Some system interface valves and boundary valves that are designed to automatically close and remain closed have been screened from this review and are considered to be operable without a specific PL & TB review. This preliminary screening does not specifically evaluate whether or not these valves are susceptible to PL or TB, but rather the rationale for operability even if these concerns were to be present.

The enclosure to this letter includes the plant identification of the valve under consideration, its function, and a brief evaluation of its impact on the safety-related system function for each valve or valve group. Based on results of the preliminary screening of the significant valves, Detroit Edison concludes the Fermi 2 plant can continue to safely operate and that the reactor can be safely shutdown. Thus, the results included in the enclosure to this letter, support the extension request for the 90 Day Action described below. Detroit Edison will complete the 180 Day Action and provide a written response including the GL 95-07 requested information by February 13, 1996.

Additionally, Detroit Edison has previously addressed the PL & TB issue applying, as appropriate, the guidance in Supplement 6 to GL 89-10 and in INPO SOER 84-7. The consideration of these issues was discussed in References 3 and 4 and resulted in the modification of three valves during the fourth refueling outage. Two additional valves are currently scheduled to be modified as a result of PL & TB considerations during the forthcoming fifth refueling outage, currently scheduled for September 1996. An operability determination for these two valves has been completed and is documented in an Engineering Functional Analysis (EFA). A summary of the subject valves is also included in the enclosure to this letter.

Also, some valves have previously been identified as susceptible to thermal binding during certain plant or system evolutions. Appropriate corrective actions have already been taken to address the issue of thermal binding for these valves.

The following constitute new commitments which replace all previous commitments included in Reference 5.

Requested 90 Day Action

1. Perform a screening evaluation of the operational configurations of all safety-related power-operated (i.e., motor-operated, air-operated, and hydraulically operated) gate valves to identify those valves that are potentially susceptible to pressure locking or thermal binding; and

2. Document a basis for the operability of the potentially susceptible valves or, where operability cannot be supported, take action in accordance with individual plant Technical Specifications.

Detroit Edison has completed a preliminary screening, confirmed the operability of the subject valves, and is completing the documentation and review of this screening. Detroit Edison will complete the requested 90 Day Action described above by December 15, 1995.

Requested 180 Day Action

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

2. Perform additional 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 plant operation, including test configuration.

Detroit Edison will complete the actions described above and provide a written response including the GL 95-07 requested information by February 13, 1996.

If you have any questions, please contact Ms. Mari Jaworsky at (313) 586-1427.

Sincerely,

Wayne D Bailey

Enclosure

cc: T. G. Colburn
M. J. Jordan
H. J. Miller
A. Vegel

I, WAYNE D. ROMBERG, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

Wayne D Romberg

WAYNE D. ROMBERG
Assistant Vice President and
Manager, Technical

On this 15th day of November, 1995 before me personally appeared Wayne D. Romberg, being first duly sworn and says that he executed the foregoing as his free act and deed.

Sharon K Buckley

Notary Public

SHARON K. BUCKLEY
NOTARY PUBLIC - MONROE COUNTY, MICH.
MY COMMISSION EXPIRES 06-11-96

DETROIT EDISON SUPPLEMENTAL RESPONSE TO NRC GENERIC LETTER 95-07

Review of Selected Fermi 2 Power-Operated Gate Valves Based Upon Industry Operating Experience

In this screening, the valves reviewed by Detroit Edison represent a preliminary list of Fermi 2 safety-related power-operated gate valves subject to Generic Letter (GL) 95-07 review. The review is based on past operating experience reports, and responses to these reports which assessed Fermi 2 applicability. The scope of the review includes valves considered to be significant to the systems whose operability is necessary for the plant to continue safe operation and to perform a safe shutdown in accordance with the licensed design bases of the plant. Some system interface valves and boundary valves that are designed to automatically close and remain closed have been screened from this review. These valves are considered to be operable without a specific review. This preliminary screening does not specifically evaluate whether or not these valves are susceptible to pressure locking or thermal binding, but rather the rationale for operability even if these concerns were to be present.

The evaluations provided here are qualitatively based on best current knowledge. Detroit Edison has qualitatively evaluated the effects of external heating on the pressure locking of valves and concluded no plant safety concerns exist.

It is noted that pressure locking and thermal binding (PL & TB) are not causes of common-mode failures in a manner that result in multiple simultaneous component failures. However, the occurrence of the phenomenon requires that the valves be exposed to certain process and environmental conditions when closed. Since different subsystems and systems may not be aligned the same or have the same conditions present, simultaneous failure due to the same phenomenon is not likely.

B2103F016 & B2103F019 - Main Steam Drain Line Primary Containment (PC) Isolation:
[Ref: SOER 84-07 response]

The drain line isolation valves are closed during startup to assure primary containment (PC) isolation and are not required to re-open for any safe

shutdown function. Both valves have SMB-000-5 motor-operators. Inservice stroke testing is performed quarterly after which the valves are returned to their closed position. Re-opening is not a required safety action, so the potential pressure locking or thermal binding of either valve does not affect safe operation of the plant or safe shutdown capability.

Therefore, potential pressure locking or thermal binding is not a concern pending completion of the GL 95-07 response.

B3105F031A&B - Reactor Recirculation Pump Discharge Isolation:
[Ref: SOER 84-07 response; GE-SIL No. 368]

The pump discharge valves are closed to facilitate recirculation pump startup, are opened by a "jogging" control logic during pump start, and remain open during plant operation. B3105F031A has an SB-2-80 motor-operator while B3105F031B has an SB-2-60 motor-operator. Inservice stroke testing is performed only with the plant in Cold Shutdown. The system operating procedure includes instruction for the recirculation pump discharge valves to prevent thermal binding in the event that a recirculation pump is shutdown during power operation. Closure is required for the pump discharge valve in the recirculation pump loop selected by the low pressure coolant injection control logic to direct emergency makeup flow into the reactor vessel to cool the core, which is the only safety action for these valves. Closure is also used to direct flow from the selected residual heat removal division into the reactor core for shutdown cooling operation. Re-opening is not required for any safe shutdown function. Potential pressure locking or thermal binding of either valve does not affect safe operation of the plant or safe shutdown capability, and is not a concern pending completion of the GL 95-07 response.

E1150F003A&B - Residual Heat Removal (RHR) Heat Exchanger Outlet Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

RHR low pressure coolant injection (LPCI) mode is part of the Emergency Core Cooling Systems (ECCS) design for Fermi 2. These valves are normally open and are manually throttled closed prior to piping warm-up for initiating RHR shutdown cooling (SDC) mode. Only one division of RHR is placed into SDC mode at a time. The potential concern is pressure locking by heat conduction to the valve. The valve is well removed from the piping path of the warm-up flow, and thus, sees little heating. The motor-operators (SMB-2-60) were originally sized for 500 psid although in actual operation the opening

differential is nearly zero psid. The motor control logic includes a bypass of the torque switch until the valve is unseated, allowing the operator to apply maximum available torque to opening the valve. A review of the motor-operator capacity shows greater than 100,000 LB_f available to unseat the valve. This is twice the calculated pressure locking load of the LPCI inlet valve E1150F015B, which is similar in size and style to these valves. By this comparison, the motor-operators are adequate to assure valve opening to initiate shutdown cooling.

Additionally, keylock-switch logic is installed to prevent inadvertent valve closure. Inadvertent closure is considered a single-failure under the design basis for RHR. Inservice stroke testing is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. The valves have throttle control logic for temperature control in conjunction with regulating heat exchanger bypass flow with the respective RHR heat exchanger bypass line isolation valve (E1150F048A/B) which is a throttling globe valve.

Thus, the active function of these valves is assured during design base events for which the plant is to achieve safe shutdown. Potential pressure locking or thermal binding is not a concern pending completion of the GL 95-07 response.

E1150F004A-D - RHR Pump Torus Suction Line Isolation:
[Refs: SOER 84-07 response; Info Notices 95-14 & 95-18]

These valves are normally open to support RHR/LPCI function and containment cooling functions. Each valve is closed and its opening control circuitry is interlocked to a corresponding shutdown cooling supply header branch isolation valve (E1150F006A-D) to prevent reactor-to-torus drainage when RHR is placed into SDC mode. Only one division of RHR is used in the SDC mode to achieve Cold Shutdown when the SDC pressure interlock has cleared. These valves are also controlled by a keylock-switch logic installed to prevent inadvertent valve operation. Inadvertent closure is considered a single-failure under the design basis for RHR. Inservice stroke testing is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications.

The motor-operators are SMB-2-40 with maximum thrust capacity ten times the required opening thrust.

When entering SDC mode, the valves of the selected division are closed to perform the pre-warming of the piping prior to establishing SDC flow. Water in these valves would be the same temperature as the suppression pool, or nominally 85°F. A potential pressure locking condition has been identified by another BWR plant based upon conduction heating since these valves are within three feet of the warm-up flow. Warm-up is performed when the plant is shutdown and has depressurized below 105 psia and 332°F, compared to rated operating conditions of nominally 1,045 psia and 550°F. The warm-up flow is limited to 500 gpm, with approximately half passing through each of two SDC suction branch headers. This is a very low flow rate compared to the typical 10,000-14,000 gpm per pump flow. The warming experienced by these valves is very limited and occurs gradually. If required, the valves are to be re-aligned for LPCI by manual operator action.

Since the valves are normally open and closed cold, they are unlikely to experience thermal binding. Since the amount of warming experienced when entering SDC mode is limited, the motor-operators are considered to have adequate margin to re-open the valves. In SDC, only one valve is affected since only one pump is operated by procedure. This condition will last only about 2 hours, depending on the rate of cooldown. Thus, even in the worst case at least 3 of 4 LPCI pump suction lines would be available. Even if both valves of an RHR division were to become pressure locked in SDC mode, there is sufficient ECCS to cool the core should a LOCA (though improbable) occur.

Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F006A-D - RHR Shutdown Cooling Header Branch Isolation -
[Ref: SOER 84-07 response]

The valves are closed when cold and remain normally closed during plant operation. The valves are opened only to provide a flow path from the reactor vessel (via Recirc Loop B) to the RHR pumps for the SDC mode. One RHR division's valves are opened to provide a supply flow path to its respective pumps when RHR is placed into SDC mode. Inservice stroke testing is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications.

RHR/SDC mode is not a safety-related function of the RHR system. Instead, the UFSAR and SER credit an alternate shutdown cooling method, since the

postulated DBA-LOCA break is in recirculation loop-B and there would be no supply flow for RHR/SDC mode. Use of the RHR/SDC mode following a DBA-LOCA is not likely, and following a DBA-Small Break LOCA would only occur well after the event has occurred and the reactor conditions have been stabilized in a depressurized state.

Thermal binding is not a concern since the valves are closed cold. The motor-operators are SMB-80, originally sized for a line pressure and differential of 375 psi. The maximum upstream pressure is limited to approximately 140 psig by a relief valve. Thus, the actuator margin is considered adequate for these valves. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F007A&B - RHR Pump Minimum Flow Line Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

The subject valves are normally open in RHR standby mode and close/re-open from system flow instrumentation signals. For any postulated accident they only close after the necessary flow has been established through the RHR system. Based on the type of accident, it could be several minutes before the pipe pressure drops to allow injection of the low pressure water. Therefore, for a postulated LOCA, these valves would protect the pumps that are started on LOCA signal and wait until the pressure in the system drops to permit injection. It is not expected that these valves would require subsequent re-opening once closed, as frequent operation of the RHR system following a postulated LOCA is not expected. However, should the pumps require a manual restart, the system pressure would be low enough that the minimum flow valve function is essentially not needed. The valves are routinely required to function against pump head during scheduled surveillances. The motor-operators are SMB-000-5 with a design opening thrust required at $< 4{,}000$ LB_f and a maximum design thrust $> 14{,}000$ LB_f. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F008, E1150F009 & E1150F608 - RHR Shutdown Cooling Supply PC Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

These valves are closed in cold shutdown conditions and remain closed during power operation. They are not part of the RHR emergency makeup or containment cooling functions required to respond to design basis accidents.

The motor-operators of all three valves are oversized due to being originally sized for active isolation against high system pressure. The outboard E1150F008 motor-operator has the greatest capacity (>300,000 LB_f) because of its specific actuator gear ratio and DC-powered motor. The inboard isolation valves are AC-powered, but still have operator capacities exceeding ten times the required thrust for the maximum pressure differential upon opening. These valves, like the E1150F003A&B, are similar in size and style to the E1150F015B valve, and are exposed to the same upstream pressure as the E1150F015B.

As discussed above for the E1150F006A-D valves, the UFSAR and SER credit an alternate shutdown cooling method. The valves are opened only to provide a flow path from the reactor vessel (via Recirc Loop B) to the RHR pumps for the SDC mode, which is not a safety-related mode of RHR operation. The E1150F008 is a single outboard PC isolation, and the E1150F009 and E1150F608 are parallel flow path inboard PC isolation. Inservice stroke testing is performed only with the plant in Cold Shutdown.

Pressure locking has been postulated at other plants due to the interface with the primary coolant pressure boundary. The margins of the actuators, subtracting for differential pressure loading, are still at least twice the pressure locking load calculated for E1150F015B. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F010 - RHR Crosstie Header Isolation:
[Ref: SOER 84-07 response]

This valve is aligned open during all modes of plant operation, with the exception of being closed as a pressure boundary during RHR Division 2 maintenance in a refueling outage. Inservice testing is performed only with the plant in Cold Shutdown. Otherwise, closure of this valve is strictly controlled by the Technical Specifications since it is part of the required LPCI flow path. Keylock-switch control logic prevents inadvertent operation of the valve in the control room. The valve has no active function during a postulated DBA-LOCA for any break size. Therefore, the potential pressure locking or thermal binding of this valve is not a concern pending completion of the GL 95-07 response.

E1150F015A&B - RHR/Low Pressure Coolant Injection PC Outboard Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response; Info. Notice 95-30]

These valves are normally closed during plant operation and are closed under cold conditions, whereas a LPCI initiation would be under "hot" conditions when one valve is required to open depending on the LPCI Loop-Selection logic signal. Also, one division is used at a time for cooled RHR return flow in SDC mode. E1150F015A was modified during the fourth refueling outage (RFO4) to install an external pressure relief tube to vent pressure from the bonnet based upon previous evaluation of its potential capability to overcome pressure locking. Valve E1150F015B has been evaluated to have sufficient motor-operator capacity to overcome a postulated pressure locking condition during a design LPCI response. Both valves are closed under cold shutdown conditions prior to restart of the plant and would not be subject to thermal binding conditions. Inservice stroke testing cycling is performed only with the plant in Cold Shutdown. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F028A&B - RHR Suppression Pool Return Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

These valves are closed in cold conditions and normally closed. They are used for the RHR suppression pool cooling function and for RHR pump surveillances. These valves are of similar style to, but slightly smaller than, E1150F015B, and are exposed to a pressurizing force of only about one-fourth that experienced by E1150F015B. Therefore, the potential pressure locking force from RHR pump head pressurization would only be about one-fourth (about 12,000 Lb_f) that calculated for E1150F015B. This is roughly the same as the maximum opening thrust requirement. However, the motor operators have approximately four times the opening thrust requirement capacity, and so have sufficient margin to assure valve opening.

Inservice test stroke cycling is conducted quarterly during the scheduled system surveillances which are administratively controlled under the Technical Specifications. When operated in test mode, the valves are routinely opened against pump head at minimum flow, and closed after the running pump is shut down (system pressure is dissipated). This is similar to the manner in which they would be expected to be operated in a DBA response, except that these

valves are prepositioned open before starting the pumps for RHR/Torus Cooling mode. Alternatively, continued recirculation of suppression pool water through the reactor vessel with an RHR heat exchanger in the flow path also provides this cooling in the post-LOCA environment.

Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F047A&B - RHR Heat Exchanger Inlet Isolation:
[Refs: SOER 84-07 response, GE-SIL No. 368, Rev. 1, Supp. 1 response]

These valves are normally open and are passive in response to activating RHR in any of its safety-related or non safety-related modes. The valves are aligned open prior to plant startup and remain open throughout plant operation except briefly during testing. Inservice stroke test cycling is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E1150F073 & E1150F075 - RHR Service Water Cross Tie Isolation
[Ref: SOER 84-07 response]

These valves are part of the GL 89-10 motor-operated valve program and do not otherwise have any inservice testing routinely performed. The motor-operators are SMB-00-15, with a maximum thrust capacity about three times the required opening thrust. The valves are normally closed and remain closed during plant operation. The valves do not serve any function for the safety-related modes of RHR or the RHR service water system. The cross tie was incorporated into the Fermi 2 design to provide a means of containment flooding during the long-term response to a DBA-LOCA and does not serve any safe shutdown function. This flooding capability is in excess of the design bases for ECCS. In addition, flooding the containment is not a requirement for ultimate heat sink design as expressed in the General Design Criteria, in Regulatory Guide 1.27, or in Standard Review Plan 9.2.5. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E2150F005A&B - Low-Pressure Core Spray (LPCS) PC Outboard Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response; Info. Notice 95-30]

These valves are closed in cold conditions and remain normally closed during plant operation. These valves must open for LPCS injection, when the plant is at "hot" conditions. Inservice testing is performed only with the plant in Cold Shutdown. Both of these valves were modified to install external bonnet pressure relief lines during RFO4. This was done based upon previous evaluations. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E2150F031A&B - LPCS Pump Minimum Flow Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

These valves are normally aligned open in LPCS standby mode and close/re-open from LPCS flow switch signals. For any postulated accident they only close after the necessary flow has been established through LPCS. Based on the type of accident, it could be several minutes before the pipe pressure drops to allow injection of the low pressure spray water. Therefore, for a postulated LOCA, these valves would protect the pumps that are started on a LOCA signal and wait until the pressure drops in the system to permit injection. It is not expected that these valves would require subsequent re-opening once closed, as frequent operation of LPCS following a postulated LOCA is not expected. However, should the pumps require a manual restart, the system pressure would be low enough that the minimum flow valve function is essentially not needed.

The valves routinely operate against pump head during scheduled surveillances. The motor operators are SMB-000-5, and have a maximum thrust capacity about five times the required opening thrust. Inservice stroke testing is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E2150F036A&B - LPCS Torus Suction Line Isolation:
[Refs: SOER 84-07 response; Info Notices 95-14 & 95-18]

These valves are normally open during plant operation and are required to remain open for the LPCS to perform its safety function. Inservice test stroke

cycling is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. The motor operators are SMB-0-40, and have a maximum thrust capacity of about three times the required operating thrust. Since the LPCS system does not have multiple functions like the RHR system, these valves are not exposed to conditions similar to the E1150F004A-D valves. These valves, should they need to be manually closed, post-LOCA are highly unlikely to be re-opened. This would be done with the awareness that a LPCS division would lose its suction supply from the suppression pool; the LPCS system has a backup suction supply from the condensate storage tank. Therefore, the potential pressure locking or thermal binding of these valves is not a concern pending completion of the GL 95-07 response.

E4150F001 - High Pressure Coolant Injection (HPCI) Turbine Steam Admission:
[Ref: SOER 84-07 response]

This valve is normally closed and is opened from the control room to initiate the HPCI during surveillance testing. Inservice stroke testing is conducted quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. The valve will auto-open on a HPCI initiation signal (Rx Level 2 and High Drywell Pressure). In the closed position, the valve has reactor pressure on its upstream side and 0 psig nominally on the downstream side. Steam heating is only briefly suspended during the stroke testing of the steam line valves; this duration is not sufficient to cause thermal binding and the HPCI system surveillance remains under Technical Specification administrative controls during this interval. The valve is installed in the normal upright position in horizontal piping. Thus, steam condensation in the between-disks void is unlikely to flood the bonnet and induce a pressure locked condition. The motor operator is an SMB-1-60, and has a maximum thrust capacity more than three times the required opening thrust. Therefore, the potential pressure locking or thermal binding of this valve is not a concern pending completion of the GL 95-07 response.

E4150F002 & E4150F003 - HPCI Steam Line PC Isolation:
[Ref: SOER 84-07 response]

E4150F002 is a normally open valve that does not change position during either normal system initiation or surveillance testing. This valve is inservice stroke tested in modes 4 and 5 only (cold shutdown conditions). It has an

SB-2-80 (DC) motor with a maximum thrust capacity greater than three times the required opening thrust.

E4150F003 is normally closed, but is opened for HPCI testing during startup low- and high-pressure surveillances and quarterly testing. Inservice stroke testing is conducted on the E4150F003 valve quarterly during scheduled system surveillances which are administratively controlled under the Technical Specifications. The valve is installed in the normal upright position in horizontal piping. Valve E4150F600, the E4150F003 Bypass valve, is normally open to provide a steam warm-up path around the closed valve to ensure the line is warm and free of water up to the E4150F001, HPCI Turbine Steam Admission valve. Therefore, this valve has reactor pressure on its upstream and downstream side, and steam condensation in the between-disks void is not a concern. The motor-operator is a SBD-3-100 (DC) with a maximum thrust capacity greater than four times the required opening thrust.

The valves will auto-isolate only upon a leak detection signal; and would not be re-opened until confirmation that the no leakage is present. This is indicative of high area temperature, high steam line flow, high turbine exhaust diaphragm pressure, or low HPCI steam supply pressure. Each of these conditions is indicative of a possible steam release into the reactor building. This is considered a loss of HPCI; Fermi 2 is analyzed for a loss of HPCI event.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

E4150F006 - HPCI Discharge to Feedwater Line Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response; Info. Notice 95-30]

During normal plant operation, this valve is closed and remains closed during Inservice testing. This valve is stroke tested every 18 months during its scheduled system surveillance in modes 3, 4 or 5 with steam dome pressure $\leq$ 150 psig. This valve normally sees feedwater discharge pressure on its downstream side. An evaluation previously performed determined that the valve may be susceptible to pressure locking due to the exposure to feedwater pressure and a modification is planned to provide bonnet pressure relief during RFO5. An engineering functional analysis (EFA) is on file for interim operability assessment of this valve.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

E4150F041 & E4150F042 - HPCI Torus Suction Line Isolation:
[Refs: SOER 84-07 response; Info Notices 95-14 & 95-18]

These valves are closed under cold conditions and remain normally closed when the system is in standby, surveillance testing and normal system initiation. Inservice stroke testing is conducted quarterly during schedule system surveillances which are administratively controlled under the Technical Specifications. These valves are required to go open upon an initiation signal of low Condensate Storage Tank level or high Suppression Pool (SP) level. These valves normally see SP head pressure (~ 6.5 psig) on the upstream side and CST head pressure on the downstream side ($\leq$ 33.8 psig). The motor operators are SB-0-25, with maximum thrust capacity of about three times the required opening thrust.

Slow heating of the bonnet might occur during the design Small Break LOCA event, since heat is added to the containment and by the HPCI turbine exhaust to the suppression pool. This gradual heatup would be offset by use of RHR in suppression pool cooling mode. Therefore, significant bonnet pressurization is not likely to occur.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

E5150F007 & E5150F008 - Reactor Core Isolation Cooling Steam Line PC Isolation:
[Ref: SOER 84-07 response]

The RCIC system is not required for safe shutdown of Fermi 2 and is not part of the ECCS design. Both valves are normally open when the system is in standby. Inservice stroke testing is conducted quarterly for E5150F008 only during scheduled system surveillances which are administratively controlled under the Technical Specifications. During this quarterly surveillance test both the E5150F007 & E5150F008 are closed from the control room and then slowly throttled open to rewarm the steam line up to the Steam Admission valve, E5150F045. Both valves are inservice stroke tested in modes 4 and 5

(cold shutdown conditions) at an 18 month interval. E5150F007 has an SMB-00-75 motor-operator and E5150F008 has an SMB-00-10 motor operator. Maximum thrust capacities are greater than three times, and greater than five times, the required thrust, respectively.

The valves will auto-isolate only upon a leak detection signal; and would not be re-opened until confirmation that the no leakage is present. Closure would make the RCIC system inoperable and this is anticipated in the design of the system.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

E5150F013 - RCIC Discharge to Feedwater Line Isolation:
[Refs: SOER 84-07 response; GE-SIL No. 368, Rev. 1, Supp. 1 response]

The RCIC system is not required for safe shutdown of Fermi 2 and is not part of the ECCS design. This valve is normally closed and remain closed during system inservice testing. This valve is stroke tested every 18 months during its scheduled system surveillance in modes 3, 4 or 5 with steam dome pressure $\leq$ 150 psig. This valve normally sees feedwater discharge pressure on its downstream side. An evaluation previously performed determined that the valve may be susceptible to pressure locking due to the exposure to feedwater pressure and a modification is planned to provide bonnet pressure relief during RFO5. An engineering functional analysis (EFA) is on file for interim operability assessment of this valve.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

E5150F029 & E5150F031 - RCIC Torus Suction Line Isolation:
[Refs: SOER 84-07 response; Info Notices 95-14 & 95-18]

The RCIC system is not required for safe shutdown of Fermi 2 and is not part of the ECCS design. These valves are closed in cold conditions and remain normally closed when the system is in standby, surveillance testing and normal system initiation. Inservice stroke testing is conducted quarterly for E5150F031 only during scheduled system surveillances which are administratively controlled under the Technical Specifications. Stroke testing

is not required for E5150F029 under the IST Program. The motor operators are SMB-000-5, and have maximum thrust capacities greater than six times the required opening thrust. These valves are required to go open upon an initiation signal of low Condensate Storage Tank level or high Suppression Pool (SP) level. These valves normally see SP head pressure (~ 6.7 psig) on the upstream side and CST head pressure on the downstream side ($\leq$ 34 psig).

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

G3352F001, G3352F004 & G3352F220 - Reactor Water Cleanup (RWCU) PC Isolation:
(Refs: SOER 84-07 response; GE SIL No 368 Rev 1, Supp. 1 response)

G3352F001 & G3352F004 are inboard and outboard Primary Containment Isolation Valves on the RWCU suction line. These are normally open motor operated valves to provide suction for the RWCU pumps. Both of these valves have an active safety related function to automatically close on a LOCA signal or isolate in the event of a high energy RWCU line break. In addition to the above isolation signal, G3352F004 will also isolate RWCU on standby liquid control (SLC) system initiation. There is no automatic opening logic associated with these valves and these valves are not used to mitigate the consequences of a design base LOCA.

G3352F220 is an outboard Primary Containment Isolation Valves on the RWCU return line. This valve is remote manually operated from the Control Room and automatically closes upon receipt of a LOCA signal, SLC system initiation signal or high energy RWCU line break. There is no automatic opening logic associated with this valve and this valve is not used to mitigate the consequences of a design base LOCA.

Since the above valves are not required to open on a design base LOCA, and pressure locking and thermal binding only affect the operation of valves in the opening direction only, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability.

Therefore, potential pressure locking or thermal binding is not a concern pending completion of the GL 95-07 response.

P4400F602A&B Emergency Equipment Cooling Water (EECW) Makeup Tank Isolation:
(Ref: SOER 84-07 response)

The EECW system is a closed loop system with makeup being supplied by the EECW Makeup Tank. The EECW Makeup Tank performs the following functions:

1. It ensures that sufficient head pressure is available to preclude cavitation in the EECW system (i.e., maintains adequate NPSH to the EECW pumps).
2. It provides a surge volume for EECW return water.
3. It provides a source of makeup water.

These valves are closed in cold condition and normally closed. They open on an EECW initiation after the RBCCW boundary valves have closed. This occurs in about one minute from the initiation signal. The valves will remain open during EECW operation.

The valves are normally closed against normal makeup tank pressure and RBCCW operation. The motor operators are SMB-000-5, and have maximum thrust capacities greater than twelve times the required opening thrust. Inservice stroke testing is routinely performed under these conditions demonstrating the valves can open.

Based on the above discussion, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

P4400F606A&B - EECW Drywell Supply Outboard PC Isolation:
[Ref: SOER 84-07 response]

P4400F606A&B are Primary Containment Isolation Valves. They are part of the two divisions of EECW piping supply flow paths for RBCCW or EECW cooling water supplied to the following components inside the drywell:

1. Pump and motor cooling for the Reactor Recirculation Pumps (B3101COO1A&B).
2. Drywell coolers T4700B001 through T4700B014.
3. Drywell penetration cooling.
4. Drywell sump heat exchanger G1101B001.

In normal operation P4400F606A&B are open to supply cooling water for the above components and remain open on EECW manual initiation and initiation on a loss of off-site power. However, none of the above drywell components supplied EECW cooling is essential for safe shutdown. The P4400F606A&B valves will only automatically isolate on a design base LOCA signal since EECW is not designed or required to remove drywell LOCA heat loads. Since the above valves are closed and not required to re-open in a design base LOCA, and pressure locking or thermal binding affect the operation of gate valves in the opening direction only, potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

P4400F607A&B, P4400F615 & P4400F616 - EECW Drywell Return PC Isolation:
[Ref: SOER 84-07 response]

P4400F607A&B, P4400F615 and P4400F616 are Primary Containment Isolation valves. They are part of the return flow path of the two EECW divisions of piping that supply RBCCW or EECW cooling water to the following components:

1. Pump and motor cooling for the Reactor Recirculation Pumps (B3101COO1A&B).
2. Drywell coolers T4700B001 through T4700B014.
3. Drywell penetration cooling.
4. Drywell sump heat exchanger G1101B001.

In normal operation P4400F607A&B/F615/F616 are open to supply cooling water to the above components and remain open on EECW initiation. P4400F607A&B/F615/F616 may be manually isolated during a design base LOCA, but are designed to remain open to relieve EECW drywell piping and component pressure due to LOCA heating. But if manually isolated, they are not required to be re-opened. Therefore, closing or opening these valves under post-LOCA conditions does not impact the safety-related function of EECW. Potential pressure locking or thermal binding will not affect safe operation of the plant or safe shutdown capability and is not a concern pending completion of the GL 95-07 response.

B2100F433/F434/F437/F438 - Main Steam Isolation Valve - Leak Control System (MSIV-LCS) Isolation (Div. 1 & 2):
[Ref.: GL 95-07]

These are air-operated, solid-wedge gate valves which are closed cold and remain normally closed during power operation. The actuators receive air from the non-interruptible instrument air system (NIAS) at a nominal 100 psig. The minimum air pressure for operation is 70 psig. These valves will experience thermal expansion during plant operation due to both ambient conditions in the steam tunnel and steam line heatup. Since the stem assembly is mounted to a piston set against a spring, stem expansion is offset primarily by the spring reaction (compression under load). Seat thermal growth due to heating may allow the wedges to seat deeper. However, on cooldown the stem will contract more rapidly due to its contact with air, tending to pull the wedge back to its original position. In addition, post-LOCA activation of MSIV-LCS begins approximately 30 minutes after the event initiation. The steam piping and tunnel will have only cooled slightly before these valves are opened. Thus, thermal binding is not likely to occur. B2100F434 & F437 are the two divisions' inboard isolation valves and are inservice stroke tested only during plant cold shutdown conditions. The B2100F433 & F438 are the outboard isolation valves and are inservice stroke tested quarterly during plant operation. The MSIV-LCS is designed to be initiated by the control room operators for leakage control only following the initial response to an in-containment LOCA. The MSIV-LCS does not perform any safety function for line breaks outside of the primary containment.

Therefore, the potential pressure locking or thermal binding concerns for these valves do not affect the continued safe operation or safe shutdown of the plant and is not a concern pending completion of the GL 95-07 response.