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

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information
Regarding Generic Letter 95-07,
Pressure Locking and Thermal Binding of
Safety Related Power Operated Gate Valves

Gentlemen:

In response to your letter dated May 23, 1996, Request for Additional Information regarding Generic Letter 95-07, "Pressure Locking and Thermal Binding of Power Operated Gate Valves," Georgia Power Company (GPC) submits the enclosed responses.

Should you have any questions in this regard, please contact this office.

Sincerely,

J. T. Beckham, Jr.

OCV/eb

Enclosure: Response to Request for Additional Information
Regarding Generic Letter 95-07

cc: *Georgia Power Company*
Mr. H. L. Sumner, Nuclear Plant General Manager
NORMS

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. K. Jabbour, Licensing Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. S. D. Ebneter, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

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Enclosure

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information
Regarding Generic Letter 95-07,
Pressure Locking and Thermal Binding of
Safety Related Power Operated Gate Valves

The following are the responses to your letter of May 23, 1996 requesting additional information regarding our 180 day response to Generic Letter 95-07.

A transcription of each question precedes the responses:

NRC Request:

Regarding valves 1/2E41-F042, HPCI Pump Suction from Suppression Pool, and 1/2E51-F031, RCIC Pump Suction from Suppression Pool, the licensee states that, although the torus water temperature could go over 200°F after an accident, it is concluded that this temperature will not have a significant effect on the valve due to physical distance from the torus and piping between the valve and the torus. Has the licensee completed any heat transfer analysis or testing and associated actuator thrust requirement/capability calculations to verify these assertions? The NRC staff believes that additional justification is needed to provide assurance that these valves are acceptable.

GPC Response:

We have not completed a heat transfer analysis, or test, for the HPCI and RCIC torus suction valves in this situation. We do not believe such a test is necessary for the following reason:

The 1/2E41-F042 and 1/2E51-F031 are normally closed valves which isolate the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) pump suctions from their alternate suction source, the suppression pool. Therefore, there is a stagnant leg of water in the upstream piping isolating these valves from the suppression pool. There is over 66 feet of piping between the 1E41-F042 valve and the torus connection and over 36 feet of piping separating the 2E41-F042 valve from the torus. For the RCIC valves, there is over 34 feet and 31 feet of piping between the valve and the torus connections for 1E51-F031 and 2E51-F031, respectively. It is reasonable to assume, therefore, that the valves will remain at ambient temperatures.

An infrared temperature reading of valve 1E51-F013 was taken during power operation. The RCIC injection valve was determined to be at ambient temperature even though the valve was separated from a 436°F heat source (the reactor) by less than 20 feet of stagnant pipe. Based on this it is logical to conclude that the HPCI and RCIC suction valves would also be at ambient temperature since they are further away from a lesser heat source.

As a point of clarification, the evaluation sheets provided with our 180 day response to GL 95-07 for these valves stated that the torus suction for HPCI and RCIC is limited to 140°F torus water temperature. As discussed in section 6.2.2.4 of the Hatch Unit 2 FSAR, the 140°F is the expected short term maximum temperature post DBA LOCA. HPCI and RCIC can not operate after vessel depressurization which occurs in less than one minute. Long term suppression pool temperatures are predicted to be as high as approximately 200°F. No anticipated pressure locking is expected even at the 200°F temperature.

NRC Request:

Regarding 2E41-F001, HPCI Turbine Steam Inlet/Isolation, the licensee states that the valve has been closed hot and opened after cooling for testing at ambient conditions, and therefore thermal binding of this valve is not a concern. Has this testing been performed using diagnostic testing equipment? If so, has the testing indicated a higher thrust requirement on the initial opening stroke following the cooldown? Has this thrust requirement been compared analytically to the valve actuator's thrust capability?

GPC Response:

Diagnostic testing of this valve was performed as part of GL 89-10 but that testing did not include verification of thrust capabilities during an attempt to open the valve following a cooldown.

As described in our 180-day response, information obtained from the valve manufacturer (Powell) indicates that for a flex wedge gate valve of this type, thermal binding does not occur at temperatures less than 700°F, well within the range of temperatures we would expect this valve to encounter.

It is possible that this valve may be re-opened following its closure at high temperature. Such a situation could occur if the valve were to be opened automatically following a HPCI initiation, and the operator then secured HPCI from operation and closed the valve. Later in the event, with the reactor depressurized to near the lower limit of steam pressure for HPCI operation (150 psig), an operator may choose to restart the system. In this scenario, the valve would close at approximately 546°F and be re-opened at 350°F. Even in this condition, the RCIC system would be available to supply make-up to the reactor vessel, as would the Low Pressure Coolant Injection (LPCI) system and the Core Spray system. At this low pressure, the HPCI system would not be the primary system used to inject water to the reactor vessel. Thus, even if the valve failed to open, ample water supply exists from RCIC, Core Spray and or LPCI.

Therefore, although such a test could be performed, we do not believe this particular diagnostic test is necessary or desirable.

NRC Request:

In Attachment 1 of GL 95-07, the NRC staff requested that licensees include consideration of the potential for gate valves to undergo pressure locking or thermal binding during surveillance testing. During workshops on GL 95-07 in each region, the NRC staff stated that, if closing a safety related power operated gate valve for test or surveillance defeats the capability of the safety system or train, the licensee should perform one of the following within the scope of GL 95-07:

1.) Verify that the valve is not susceptible to pressure locking and thermal binding while closed.

2.) Follow plant Technical Specifications for the train/system while the valve is closed.

3.) Demonstrate that the actuator has sufficient capacity to overcome these phenomena, or

4.) Make appropriate hardware and/or procedure modifications to prevent pressure locking and thermal binding.

The staff stated that normally open, safety related power operated gate valves which are closed for test or surveillance but must return to the open position should be evaluated within the scope of GL 95-07. Please discuss if valves that meet this criteria were included in your review, and how the potential pressure locking or thermal binding concerns were addressed.

GPC Response:

Postulating that a valve(s) must change position from a test mode to an accident mode due to an accident occurring when in test is beyond the design basis of the plant. The RHR system design specification for Plant Hatch contains the following statement:

> "It shall not be necessary that the closing speeds of the valves in the system test lines be greater than manufacturer's standard speed (12/min). This shall be based on the philosophy that the Emergency Core Cooling System (ECCS) are not designed to recover from secondary modes of operation, such as testing, because the period of time that the Emergency Core Cooling System (ECCS) are in these secondary modes of operation is so short that the effect on overall reliability is insignificant."

Declaring the systems "inoperable" during testing has no added value since the systems are not required to return to their accident configuration when in the test mode.

Nonetheless, at the present time, the HPCI and Core Spray systems are declared inoperable during the Technical Specification Operability surveillance (test mode). Therefore, the test valves were not evaluated for potential pressure locking or thermal binding concerns.

The RCIC and LPCI systems are not declared inoperable during testing but there are no normally open safety related power operated gate valves in these systems which are closed in the test mode.

Concerning valves which are tested for stroke time verification, these valves were not evaluated for pressure locking or thermal binding for the following reasons:

During testing of these valves, the operator opens or closes the valve, as the case may be, times the stroke and immediately returns the valve to its correct position. The operator remains at the valve switch during the entire evolution; thus, the valve is not left out of its normal position for extended periods of time.

If an initiation signal occurs during the brief period of time of the test, the operator is there to insure the valve opens, or closes, as required. Following the test, if the valve fails to stroke in the required time, or if the valve does not return to its correct position, it is declared inoperable per the appropriate Technical Specifications, and the required actions taken. Declaring the valve inoperable and initiating the associated paperwork during the test is impractical due to the brief period of time the valve is out of its normal position.

Since the valve is closed for a brief period of time, from 11 seconds in some cases to 120 seconds in others (for example), the chances of a pressure locking or thermal binding event is very remote. Additionally, instances of pressure locking or thermal binding have not occurred at Hatch during this type of stroke time testing of safety related power operated gate valves.

NRC Request:

Through review of operational experience feedback, the staff is aware of instances where the licensees have completed design or procedural modifications to preclude pressure locking or thermal binding which may have had an adverse impact on plant safety due to incomplete or incorrect evaluation of the potential effects of these modifications. Please describe evaluations and training for plant personnel that have been conducted for each design or procedural modification completed to address potential pressure locking or thermal binding concerns.

GPC Response:

No modifications have been completed, or are planned, to address potential thermal binding. Modifications have been done to address potential pressure locking concerns. Those valves which have been modified are listed in our 180 day response to GL 95-07. Our response stated that there were six Unit 1 valves yet to be modified. Those modifications were completed during our Spring, 1996, refueling outage.

All modifications involved drilling an approximately 1/8" hole on the high pressure side of the valve disc. This hole provides a path to relieve internal bonnet pressure. These modifications were performed on the Unit 1 and 2 HPCI and RCIC injections valves and the Unit 1 and 2 RHR and Core Spray system injection valves, as well as the Unit 2 Plant Service Water valves to the Low Pressure Coolant Injection system Inverter Room coolers.

These modifications will not degrade valve performance for design basis events such as LOCA and other analyzed conditions such as High Energy Line Break. Since no instrument settings were affected by these modifications, their LOCA and/or design basis transient responses remain unaffected. A potential problem concerns pump operability testing of the HPCI and RCIC systems. During this testing, it is possible that there may be leakage past the valve disc due to pump pressure being higher than reactor pressure. However, the pump leakage was determined to be negligible and to have no impact on radiological calculations.

The modifications were performed via the normal design change process which requires that a 10 CFR 50.59 evaluation be performed. The effect of each change has been evaluated to ensure that safety is not adversely affected. Furthermore, our procedures ensure that individuals preparing and reviewing the 10 CFR 50.59 evaluations have received the necessary training on their preparation.

Training on design changes with a potential to affect plant operations is conducted by the Hatch Training department after each refueling outage. The training following the 1996 Spring refueling included the pressure locking modifications for all the valves modified and was given to all licensed personnel. The Hatch Training Department also provides continuing training on pressure locking and thermal binding phenomenons to all licensed, as well as non-licensed, Operations personnel.