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SUBJECT: Forwards response to RAI re GL "Pressure Locking & Thermal Binding of Safety-Related Power-Operated Gate Valves."

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**Carolina Power & Light Company**

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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261/LICENSE NO. DPR-23  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING GENERIC  
LETTER 95-07, "PRESSURE LOCKING AND THERMAL BINDING  
OF SAFETY-RELATED POWER-OPERATED GATE VALVES"

Gentlemen:

By letter dated July 3, 1996, the NRC transmitted a request for additional information regarding Generic Letter (GL) 95-07, "Pressure Locking And Thermal Binding Of Safety-Related Power-Operated Gate Valves," for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2. The letter requested a response within 30 days of receipt of the request. Our letter dated August 12, 1996 confirmed an agreement with the NRC Project Manager that our response will be deferred until November 22, 1996. Our response is contained in the enclosure to this letter.

Questions regarding this matter may be referred to me at (803) 857-1437.

Very truly yours,

H. K. Chernoff

Supervisor - Licensing/Regulatory Programs

JSK/klb

Enclosure

c: Mr. S. D. Ebnetter, Regional Administrator, USNRC, Region II  
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING  
GENERIC LETTER 95-07, "PRESSURE LOCKING AND THERMAL BINDING  
OF SAFETY-RELATED POWER-OPERATED GATE VALVES"

Question 1

"Address the potential susceptibility of valves SI-867A/B, boron injection tank inlet isolation valves, to depressurization induced pressure locking during a design basis event."

Response 1

The SI-867A/B valves are normally open and stay open during any design basis event. Since they are not required to close, and then open during a design basis event, the requirements of Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-operated Gate Valves," are not applicable to these valves since valve travel is not required, and pressure locking and thermal binding is a concern only when it could prevent a valve from performing its safety function.

Question 2

"The submittal dated February 13, 1996, discusses the potential susceptibility of valves RC-535 and RC-536, pressurizer power operated relief valves (PORVs) to thermal binding. You state that these valves have Limitorque SB-00 actuators, which have spring compensators. Discuss any diagnostic test data you have to show that these spring compensators will avoid excessive closing forces.

You also describe the potential of these valves to pressure locking during a steam generator tube rupture (SGTR) accident. The submittal, further, indicated that the PORV block valves are considered operable since the use of PORV block valves to control reactor coolant system pressure is not a primary function for the mitigation of a SGTR accident and if these valves fail to open the reactor coolant pressure boundary will not be affected. If available, provide thrust requirement and actuator capability calculations to support your position."

Response 2

As discussed in our letter dated February 13, 1996, RC-535 & RC-536 (the PORV block valves) are not susceptible to thermal binding. These valves are fitted with SB-00 actuators with spring compensators. The spring compensators were selected and set up in accordance with the valve manufacturer's recommendations. We have collected static test diagnostic data, but can not perform differential pressure tests because these tests would involve blowing down the reactor coolant system. The static test maximum closing thrust values are within the valve and actuator capability.

The February 13, 1996, letter also indicated these block valves could have a potential pressure locking condition during a steam generator tube rupture; mitigation of this event is not the safety function of these valves. However, a recent evaluation indicates that the required thrust under pressure locking conditions is within the actuator capability. We intend to use the equations from NUREG/CR-5807, "Improvements in Motor Operated Gate Valve Design and Prediction Model for Nuclear Power Plant Systems," dated May 19, 1992, for a final evaluation which will be completed by January 20, 1997. We will inform you of the results within 30 days after completion of the final evaluation.

### Question 3

"In Attachment 1 to Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-operated Gate Valves," the NRC staff requested that licensees include considerations 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 of 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 or 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 the phenomena, or,
4. Make appropriate hardware and/or procedural modifications to prevent pressure locking and thermal binding.

The staff stated that normally open, safety-related power-operated gate valves that 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 criterion were included in your review, and how potential pressure locking or thermal binding concerns were addressed."

### Response 3

During our evaluation of safety-related gate valves, we considered the potential for pressure locking or thermal binding during surveillance testing. Attachment 2 of our letter dated February 13, 1996, provides a list of valves that are potentially susceptible to pressure locking or thermal binding. These valves, except the PORV block valves, are normally closed. The PORV block valves are normally open. The block valves are stroked quarterly for surveillance testing in accordance with Technical Specifications (TS) Section 4.2.4.2. During testing, plant TS for the system are followed while a block valve is closed. Complete block valve stem

travel, closed and open, is verified as part of the testing.

Our February 13, 1996, letter also identified the block valves are susceptible to potential pressure locking. Since the safety function of the block valves is to maintain the reactor coolant system pressure boundary, their potential for pressure locking was not quantitatively evaluated at that time. The status of that evaluation is reported in the response to Question 2, above.

#### Question 4

“Through review of operational experience feedback, the staff is aware of instances where 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 concern.”

#### Response 4

Pressure locking concerns identified prior to the issuance of GL 95-07 were resolved by drilling holes in the high pressure side of valve discs. Valves RHR-750 and SI-862B were supplied with holes by Westinghouse Electric Corporation as original plant equipment. Other valves had holes added by plant modifications ten years ago or longer. There have been no operational concerns with these valves as a result of the modifications. These modifications were done in accordance with plant procedures and 10CFR50.59 safety evaluations were done. Maintenance procedures were created or revised to assure proper valve assembly. Training for each modification or procedure change was done as required based on a case by case evaluation.

Thermal binding concerns identified prior to the issuance of GL 95-07 were resolved by a revision to General Procedure (GP) - 007, “Plant Cooldown From Hot Shutdown To Cold Shutdown,” approximately seven years ago. There have been no operational concerns due to the implementation of this procedure change. The revision was done according to plant procedures and received a 10CFR50.59 evaluation. Training for the procedure change was evaluated and deemed not to be necessary.