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DUKE POWER COMPANY
POWER BUILDING
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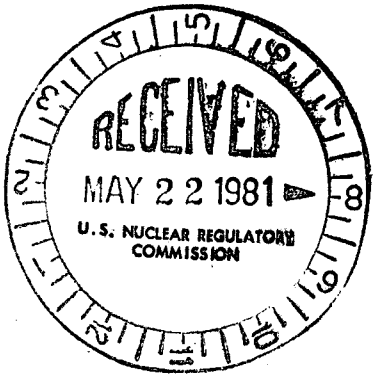
81 MAY 15 P2:49

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

May 11, 1981

TELEPHONE: AREA 704
373-4083

Mr James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303



Re: R II: JPO
50-269, 50-270, 50-287
IE Bulletin 81-02

Dear Mr. O'Reilly:

Please find attached Duke Power Company's response to IE Bulletin 81-02 for Oconee Nuclear Station.

I declare under penalty of perjury that the statements set forth herein are true and correct to the best of my knowledge, executed on May 11, 1981.

Very truly yours,

W. O. Parker, Jr.

FTP/djs
Attachment

cc: Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

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DUKE POWER COMPANY

OCONEE NUCLEAR STATION

Response to IE Bulletin 81-02
May 11, 1981

A search of station valve lists for the Oconee Nuclear Station (ONS) has identified two functional applications using the specific manufacturer/ valve model numbers referenced in the Bulletin:

a) The ONS Reactor Coolant System (RCS) presently has three(3), three-inch, Westinghouse motor operated gate valves, Valve Identification Number 03000GM88, installed in 1977 as PORV block valves. Oconee has one block valve per unit; and,

b) The High Pressure Injection (HPI) System has six (6), four-inch Westinghouse motor operated gate valves, Valve Identification Number 04000GM88, installed in 1980 as HPI cross connect valves. Oconee has two (2) cross connect valves per unit.

In addition, the HPI System has twelve (12), four-inch Westinghouse manually operated gate valves, Valve Identification Number 04000GM78, installed as Reactor Coolant Pump Seal Injection Filter isolation valves. Oconee has four (4) filter isolation valves per unit. These valves are not considered to be included in the reporting requirements of IEB 81-02 since they are manually operated.

PORV Block Valves

The Maximum differential pressure at which the PORV block valves will be required to close is 2500 psi.

The consequences of incomplete closure of the block valve have been reviewed for Oconee. PORV block valve closure was not a design requirement and is not a safety-related function. The unit can be safely shut down with the failure of both the PORV and the block valve to close. However, Oconee emergency procedures do state that the block valve is available to close if the PORV is stuck open.

Several significant actions have been taken at Oconee to minimize the probability of the PORV being challenged, to reduce the likelihood that a failed open valve will go unnoticed by the Control Room Operator, and to minimize the probability that the block valve will fail to close upon demand. The following are brief descriptions of these significant actions:

1. Emergency Feedwater System Modifications - The major contributor of challenges to the relief valves is the loss of heat sink due to such incidents as overpressure transients due to undercooling events. The recent modifications to the Emergency Feedwater System, which included the addition of two safety grade motor driven emergency feedwater pumps per unit at Oconee and the installation of improved initiation and control circuitry, and installation of anticipatory Rx trip on turbine trip and loss of MFW have significantly reduced the number of overpressure transients due to undercooling events.

This plant change, as well as the following, have eliminated all challenges to the relief valves since the implementation of the changes.

2. RPS/PORV Setpoint Reversal - Overpressure transients will cause the Reactor Protective System to trip prior to challenging the relief valves. This causes a roll-over of reactor coolant system pressure earlier in the transient due to the removal of core power as a heat source and this, coupled with the other plant changes discussed herein, have eliminated all challenges to the Oconee relief system since the changes were implemented.

3. Direct Indication of Relief Valve Flow - In the extremely unlikely event that the relief system was challenged, several actions have been completed that improve the capabilities of the operator to effectively respond to a failed open relief valve. Direct indication of PORV and safety valve position is provided at each Oconee unit. Valve position is monitored by a reliable, single channel system powered from a battery-backed vital bus. The indications are seismically and environmentally qualified as appropriate for conditions applicable to their location. Valve position is indicated and alarmed in the Control Room. Backup valve position indication is provided by temperature sensors located downstream of the valves and by quench tank level, temperature, and pressure indicators, also located in the Control Room.

4. Diverse Power Supplies for PORV and Block Valve - If through some electrical fault the PORV failed in an open condition, the independently powered block valve would be capable of being closed by the operator. The PORV is a DC solenoid-operated pilot valve. The block valve is an AC motor-operated valve. The power supplies for the PORV's and their associated block valves are, therefore, independent and diverse. Power is available to the PORV's solenoids from the 125-volt DC instrument and control battery power system. Battery chargers are provided and are powered from safety-grade MCC's which are capable of being powered from both the offsite power system and the onsite emergency power system. Power is available to the block valves through non-load-shed load centers which are capable of being powered from both the offsite power system and the onsite emergency power system. No manual transfer of motive or control power for these valves is required. These power systems are further described in Section 8 of the Oconee FSAR.

NUREG 0737, items II.K.3.2 and II.K.3.7 requested operational data regarding safety valve failures and a probability analysis to determine whether modifications already implemented have reduced the probability of a small break LOCA due to a stuck-open PORV or safety valve to less than 10^{-3} per reactor year. A report addressing these items are submitted to the Staff (W.O. Parker (DPC) letter to H. R. Denton (NRC) dated January 2, 1981) and concluded that based on analytical prediction and independently by historical data, the probability of a stuck-open PORV from all causes is 4.7×10^{-4} per reactor year. In arriving at this result, no credit was given for the operator closing the block valve,

given an open PORV. Futhermore, given proper EFW response, analytical predictions result in a value less than .01% of PORV opening for over-pressure transients and historical data shows the frequency to be less than 1.6%. Both results clearly satisfying the NRC acceptance criteria expressed in Item II.D.3.7 (less than 5%).

In addition to the above plant hardware modifications, increased guidance has been provided to the operator in the form of improved training and procedures for handling small break LOCA's, regardless of cause.

Additionally, conservative analyses have been performed that confirm that adequate mitigation features exist in the form of ECC systems, assured means of secondary system heat removal capability and proper operator guidance to provide the necessary assurance that the core will remain covered and adequately cooled even if the PORV and block valve remain open. Further, during a LOCA, HPI is not automatically initiated until RCS pressure has decreased to 1500 psi. Testing of the block valve has demonstrated that the valve will close at 1500 psi differential across the wedge without any modification to the valve. Thus, in the actual plant situation, depressurization of the plant would be terminated and, most likely, automatic initiation of the ECCS would not occur due to the pressure decrease.

To ensure complete valve shutoff during the closing operation when the valve is subjected to the maximum differential pressure conditions, the Oconee Unit 3 and Unit 2 PORV block valves were modified on February 19, 1981 and March 19, 1981, respectively, per Westinghouse Specification Number 730RP486. The Unit 1 block valve is scheduled to be modified during the upcoming refueling ontage in mid-June, 1981. Presently, Unit 1 is operating with the PORV block valve in the closed position.

HPI Cross Connect Valves

The maximum differential pressure at which the HPI cross connect valves will be required to close is 2500 psi.

The four-inch HPI cross connect valves, HP-409 and HP-410, are required to be operable when reactor power is greater than 60 percent of full power per Technical Specification 3.3.1d. These valves are normally in the closed position and are required to open during the failure of one of two HPI flowpath trains during a small break LOCA. The HPI cross connect modification was added in 1979 and 1980 so that operator action within ten minutes outside of the Control Room would not be a requirement for small break LOCA's.

Closure of the opened cross-connect valve would be required under a small break LOCA in which repressurization occurs. Normal procedures would require closing of the one opened HPI cross connect valve (HP-409 or HP-410) and throttling of the normal flowpath HPI valve (HP-26 or HP-27). If the cross connect valve fails to reclose and HPI pump operation continues, the Reactor Coolant System (RCS) could become solid and exceed pressure/temperature limits during cooldown. However, two options are available to the operator in the event that a cross-connect valve fails to close:

1) Termination of HPI pump operation when the RCS is adequately subcooled. This action would remove the high differential pressure across the valve and allow valve closure.

2) Manual operation of the valves to the closed position.

Furthermore, to verify that valves HP-409 and HP-410 will close under such conditions, the valves were tested after initial installation in 1979 and 1980 on all units. The results of these tests indicate that the valves operate to the closed position with the RCS at approximately 600 psi and HPI pump discharge pressure at approximately 2900 psi. These pressure drop conditions across the valve are more severe than any conditions expected under a small break LOCA with repressurization. Because of these test results, Duke Power considers the HPI cross connect valves capable of closure and, therefore, fully operable.

However, even though the valves are considered operable, they will be modified to meet original design specifications when a suitable fix is available from the valve vendor. Training and procedural changes have been implemented by site personnel to warn the operators of possible failure of these valves to close and to provide alternate means of achieving valve closure.