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May 31, 1988

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

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
NRC Request for Additional Information on
Performance Testing of Relief and Safety Valves

Gentlemen:

Dr. K. N. Jabbour's letter of July 31, 1987 transmitted a request for additional information regarding the performance testing of relief and safety valves (Item II.D.1 of NUREG-0737). These questions were based on Duke Power Company submittals dated October 26, 1983 and February 3, 1984. Duke Power provided responses to all questions other than Question No. 8 per my April 29, 1988 letter. Please find attached Duke Power's response to Question No. 8 regarding block valve operator torque.

Very truly yours,

H. B. Tucker JGT

Hal B. Tucker

JGT/30/sbn

xc: Dr. J. Nelson Grace. Regional Administration
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Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

A046
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Question 8. Block Valve Operator Torque

The Rockwell valve in the EPRI tests was shown to open and close completely with a motor operator torque output as low as 95 ft-lbs. To ensure that the plant block valve operators provide sufficient torque to open and close the valve at Catawba 1 & 2, provide the torque supplied by the motor operator at the plant. If the torque output of the plant operators is less than 95 ft-lbs, justify that they provide sufficient torque to close the valve under all expected inlet fluid conditions. This justification should be supported by test data.

Purpose

The EPRI test was a qualitative test that only demonstrated the specific test valve-operator combination could isolate flow. The test did not establish a minimum torque or thrust limit to isolate flow or provide quantitative operator data.

Success or failure in the EPRI test was determined by closing the valve to a predetermined "zero position", not by whether or not the valve completely isolated flow. The "zero" position was established by torquing the disc into the seat (at a torque setting of 2.125) with no differential pressure. A linear variable differential transformer (LVDT) was then initialized at this point. This fully closed or zero point is one of many that could be established depending on how much thrust is used to close the valve. A true closed or zero position occurs when the disc initially seats in the seat wedge. (This is the same disc position that would occur if the disc was merely dropped and allowed to fall a short distance into the seats.) Increasing stem force will continue to drive the disc lower into the seats by flexing the disc faces (on flex wedge gates). For the EPRI tests, the valve was considered to not have closed completely when this flexed zero point was no longer reached, whether or not there was also no flow indication. For the EPRI tests with torque switch setting of 1.5 & 1.6, all flow was closed off.

It is also important to note that gate valves will also close off all flow even prior to fully seating the disc. Cessation of flow will occur when the downstream disc face first covers the downstream seat face prior to the upstream disc-seat making contact. Differential Pressure (DP) will force the disc to the downstream side. For high differential pressure-applications such as PORV blocks, DP is the primary disc seat sealing force, not the mechanically induced wedging action of the seat. The valve is seated sufficiently before mechanical wedging begins. At the instant mechanical wedging begins, the required thrust (and therefore, torque) escalates rapidly and the actuator will quickly torque-out.

Rockwell calculated the torque required and set up the operators at Catawba to 51 ft-lbs. Rockwell has used this calculation procedure for over 10 years and has experienced no field operational problems in that time. The torque switch setting for 51 ft-lbs was established by a Rockwell in-house test technique of calibrating the spring pack to handwheel torque.

Duke will be MOVATS testing these valves at the next refueling outage under the guidelines of IEB 85-03. Duke believes the proper set-point is 51 ft-lbs and no further justification or testing is required at this time.