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

Subject: Docket Nos. 50-413, -414
NRC Bulletin 89-02
SCC of High Hardness Type SS
Bolting Material

Gentlemen:

In further support of our position stated in our letter of May 23, 1990 concerning check valve 1NB-800, we are providing the attached information to supplement our justification for not inspecting the valve internals.

This attached summary also serves to document discussions and subsequent responses to questions which were raised by members of your staff at a meeting on December 6, 1990.

We consider this information sufficient to establish that there is no probability of the failure of this valve affecting reactor safety and very low probability of valve failure contributing to an uncontained release.

Sincerely,

M. S. Tuckman by RGF

M. S. Tuckman

LTB/31/lcs

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ATTACHMENT

In a meeting at McGuire on December 6, 1990, Mr. Tom McLellan of the NRC had several additional questions about this check valve, 1NB-800 and our position that it does not warrant an internals inspection.

1) the valve configuration,
2) the location of the valve in the system,
3) any feedback the manufacturer could supply about the quality of these fasteners, and
4) the safety significance of possible valve failure.

To document this discussion, we've included the following summary on the above topics:

1) The valve configuration was discussed and a copy of the manufacturer's drawing was provided (CNM 1205.25-0001-001). It was pointed out that this Atwood-Morrill design is very similar to the Anchor Darling design, utilizing 410 SS cap screws to secure the bracket/disc assembly to the valve body.

2) A copy of the flow diagram was provided (CN 1556-1.1) showing the common Unit 1 and Unit 2 relief valve header and discussions centered on the inability to take this header out of service during almost any mode of operation (except coincident refueling of Unit 1 and Unit 2). The close proximity of the valve to the header prevented any type of freeze seal or hot-tap plugging method of isolation.

3) The manufacturer has no documentation on the physical (hardness, heat treat) characteristics of these fasteners. The vendor has specified an alternate material (ASTM F 593 - GR. 630) but this has been rejected by Duke since it is also susceptible to stress corrosion cracking. If the vendor cannot suggest an improved material, Duke will recommend that the ASTM A 193 - B6X material, originally proposed in the Bulletin, be used if an opportunity to inspect this valve should occur.

Mr. McLellan inferred that later vintage valves (post 1974) may not be as susceptible to stress corrosion cracking. Although ASTM did upgrade their A-193 specification in 1974 and our valve, 1NB-800 was manufactured after 1974, our fasteners were made to A-193, B6 requirements which still doesn't specify any maximum tempering temperature or maximum hardness like the A-193, B6X requirements. We therefore, do not feel that a later vintage valve is necessarily less susceptible to this problem.

The vendor stated he was not aware of incidents of stress corrosion cracking of 410 SS internal check valve fasteners.

Also, we are not aware of any incidents of stress corrosion cracking of the 410 SS internal fasteners on any of our other non safety-related Atwood and Morrill check valves.

4) In answering Mr. McLellan's last question about the safety significance of a possible fastener failure, we provided several reasons why fastener failure was not probable:

a) maintenance history - we are aware of no failures of 410 SS fasteners in check valve internal applications on valve designs that Duke utilizes.

b) preload values - Atwood and Morrill specifies a torque value of 17 foot-lbs. Since this is a rather small value (less than 35% of yield) the susceptibility to stress corrosion cracking is minimal.

c) dynamic load - Fasteners used in this valve are designed to handle dynamic loading. This application, however, is unlikely to experience any significant dynamic loading. Valve 1NB-800 is located in the Boric Acid Tank (BAT) and Reactor Makeup Water Storage Tank (RMWST) overflow line that ties into the common Unit 1/Unit 2 relief valve header. Its purpose is to allow tank overflow into the header yet prevent relief valves in the NI, NS, NV, and ND system from discharging back to the BAT and RMWST. This valve is normally closed (no tank overflow condition has occurred in at least the last three years) and, therefore, remains in its preferred position.

It is not susceptible to cyclic fatigue type failures from unstable valve operation, violent openings, or wear related failure mechanisms. The only significant dynamic load would occur when the valve was opened from a tank overflow condition and a relief valve lifted concurrently pressurizing the discharge header and slamming the valve closed. The likelihood of these events occurring at the same time is extremely low.

If valve 1NB-800 should fail, no reactor safety concerns would exist. A redundant upstream check valve in each line to the BAT's and the RMWST's would prevent back flow. If multiple failures are assumed, including the failure of this upstream, redundant QA condition 2 check valve, potential dilution of the BAT boron concentration could occur and this could affect the capability of the BAT to maintain the 4.0 to 4.4 percent by weight of boric acid necessary to achieve cold shutdown (CN 1554-1.4). Since the redundant valve is a Pacific swing check that utilizes a different internal design, the assumption of multiple failures of these two components would be unrealistic.

Back flow to the RMWST would not create a reactor safety concern since the RMWST is not safety-related (CN 1556-2.0).

Another scenario resulting from the failure of 1NB-800 would not involve any reactor safety concerns but would involve potential radiological releases to the Auxiliary Building or the RMWST curbed area. For this to occur, a relief valve(s) must stick in the open position to pressurize the discharge header, concurrent with a seismic event that ruptures the non-seismic piping upstream of 1NB-800. Since the discharge header has adequate over pressurization protection including an open 4 inch line off of the Boron Recycle holdup Tanks (CN 1556-1.3), pressurization is highly unlikely and would require multiple stuck open relief valves. We regard multiple failures of this nature to be highly improbable.

In summary, we see no probability of the failure of 1NB-800 affecting reactor safety and a very low probability of valve failure contributing to an uncontained radiological release.