UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

July 31, 1992

Docket Nos. 50-259, 50-260,
and 50-296

Posted
Bases change to DPR-52

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Nuclear Assurance, Licensing and Fuels
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: SECTION 4.2 TECHNICAL SPECIFICATIONS BASES CHANGE - BROWNS FERRY NUCLEAR POWER PLANT (TAC NOS. M82650, M82651, AND 82652) (MPA-B072)

By letter dated January 14, 1992, the Tennessee Valley Authority (TVA) submitted an application to amend the Technical Specifications (TS) of the Browns Ferry Nuclear Plant (BFN). A part of this TS amendment request included proposed changes to Bases Section 4.2 regarding logic system functional tests of the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems. More specifically, TVA's proposed Bases changes would clarify that the automatic restart feature of HPCI and RCIC is to be tested during the performance of their initiating logic system functional surveillance tests. The capability to restart automatically was an inherent feature of the HPCI system design, whereas for RCIC it was required by NUREG-0737, Item II.K.3.13, as a post-TMI action.

Generic Letter (GL) 83-02, dated January 10, 1983, requested Boiling Water Reactor (BWR) licensees to submit license amendment applications as necessary to incorporate specific post-TMI action items into their TS. TVA's request to revise Bases Section 4.2 of the BFN TS to clarify that surveillance testing of the HPCI and RCIC systems must include a demonstration of the automatic restart design feature constitutes the last outstanding TS item of GL 83-02 that TVA was requested to incorporate. All other TS items of GL 83-02 were either previously incorporated into the BFN TS, determined to be unnecessary, or not applicable.

The staff concludes that the changes to TS Bases Section 4.2, as proposed by TVA letter dated January 14, 1992 for BFN, Units 1, 2, and 3, are acceptable. Therefore, these changes to the TS of Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 are approved and enclosed herein. Furthermore, approval of these TS changes fulfill TVA's responsibilities regarding GL 83-02.

It should be noted, that the remainder of the TS changes proposed by TVA's TS amendment application dated January 14, 1992 are still under staff review and will be addressed by separate correspondence at a later date.

Sincerely,

Thierry M. Ross, Senior Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Revised TS pages-
3.2/4.2-73 and 3.2/4.2-73a (Unit 1)
3.2/4.2-73 and 3.2/4.2-73a (Unit 2)
3.2/4.2-72 and 3.2/4.2-72a (Unit 3)

cc w/enclosure:
See next page

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UNIT 1
EFFECTIVE PAGE LIST

REMOVE	INSERT
3.2/4.2-73	3.2/4.2-73
--	3.2/4.2-73a

The conclusions to be drawn are these:

1. A 1-out-of-n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in two 1-out-of-2 logic systems. The bases given for the rod blocks apply here also and were used to arrive at the functional testing frequency. The off-gas post treatment monitors are connected in a 2-out-of-2 logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

The automatic pressure relief instrumentation can be considered to be a 1-out-of-2 logic system and the discussion above applies also.

The criteria for ensuring the reliability and accuracy of the radioactive gaseous effluent instrumentation is listed in Table 4.2.K.

The criteria for ensuring the reliability and accuracy of the radioactive liquid effluent instrumentation is listed in Table 4.2.D.

The RCIC and HPCI system logic tests required by Table 4.2.B contain provisions to demonstrate that these systems will automatically restart on a RPV low water level signal received subsequent to a RPV high water level trip.

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UNIT 2
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3.2/4.2-73	3.2/4.2-73*
3.2/4.2-73a	3.2/4.2-73a

*Overleaf page

If two similar channels are used in a 1-out-of-2 configuration, the test interval for minimum unavailability changes as a function of the rules for testing. The simplest case is to test each one independent of the other. In this case, there is assumed to be a finite probability that both may be bypassed at one time. This case is shown by Curve No. 2. Note that the unavailability is lower as expected for a redundant system and the minimum occurs at the same test interval. Thus, if the two channels are tested independently, the equation above yields the test interval for minimum unavailability.

A more usual case is that the testing is not done independently. If both channels are bypassed and tested at the same time, the result is shown in Curve No. 3. Note that the minimum occurs at about 40,000 hours, much longer than for cases 1 and 2. Also, the minimum is not nearly as low as Case 2 which indicates that this method of testing does not take full advantage of the redundant channel. Bypassing both channels for simultaneous testing should be avoided.

The most likely case would be to stipulate that one channel be bypassed, tested, and restored, and then immediately following, the second channel be bypassed, tested, and restored. This is shown by Curve No. 4. Note that there is no true minimum. The curve does have a definite knee and very little reduction in system unavailability is achieved by testing at a shorter interval than computed by the equation for a single channel.

The best test procedure of all those examined is to perfectly stagger the tests. That is, if the test interval is four months, test one or the other channel every two months. This is shown in Curve No. 5. The difference between Cases 4 and 5 is negligible. There may be other arguments, however, that more strongly support the perfectly staggered tests, including reductions in human error.

The conclusions to be drawn are these:

1. A 1-out-of-n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in two 1-out-of-2 logic systems. The bases given for the rod blocks apply here also and were used to arrive at the functional testing frequency. The off-gas post treatment monitors are connected in a 2-out-of-2 logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

The automatic pressure relief instrumentation can be considered to be a 1-out-of-2 logic system and the discussion above applies also.

The criteria for ensuring the reliability and accuracy of the radioactive gaseous effluent instrumentation is listed in Table 4.2.K.

The criteria for ensuring the reliability and accuracy of the radioactive liquid effluent instrumentation is listed in Table 4.2.D.

The RCIC and HPCI system logic tests required by Table 4.2.B contain provisions to demonstrate that these systems will automatically restart on a RPV low water level signal received subsequent to a RPV high water level trip.

UNIT 3
EFFECTIVE PAGE LIST

REMOVE	INSERT
3.2/4.2-72	3.2/4.2-72
--	3.2/4.2-72a

The conclusions to be drawn are these:

1. A 1-out-of-n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in two 1-out-of-2 logic systems. The bases given for the rod blocks apply here also and were used to arrive at the functional testing frequency. The off-gas post treatment monitors are connected in a 2-out-of-2 logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

The automatic pressure relief instrumentation can be considered to be a 1-out-of-2 logic system and the discussion above applies also.

The criteria for ensuring the reliability and accuracy of the radioactive gaseous effluent instrumentation is listed in Table 4.2.K.

The criteria for ensuring the reliability and accuracy of the radioactive liquid effluent instrumentation is listed in Table 4.2.D.

The RCIC and HPCI system logic tests required by Table 4.2.B contain provisions to demonstrate that these systems will automatically restart on a RPV low water level signal received subsequent to a RPV high water level trip.

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