Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

October 20, 2000

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-260
Tennessee Valley Authority	)	50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING UNITS 2 AND 3 TECHNICAL SPECIFICATION (TS) CHANGE TS NO. 400 - REQUEST FOR LICENSE AMENDMENT RELAXATION OF EXCESS FLOW CHECK VALVE (EFCV) SURVEILLANCE TESTING FREQUENCY (TAC NOS. MA6407 AND MA6409)

This letter provides additional information requested by NRC in support of TS-400. On August 11, 2000, TVA provided TS-400, an amendment to Operating Licenses DPR-52 and DPR-68 that will relax the EFCV testing frequency by allowing a representative sample of EFCVs to be tested every 24 months, such that each EFCV is tested once every 120 months.

The enclosure provides TVA's response to the October 5, 2000, NRC RAI for the proposed TS change. This letter includes replies to each of the NRC requests.

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There are no commitments made in this letter. If you have any questions, please telephone me at (256) 729-2636.

Sincerely,

T. E. Abney
Manager of Licensing
and Industry Affairs

Subscribed and sworn to before me
on this 20th day of October 2000.

Barbara A. Blanton
Notary Public

My commission Expires 09/22/2002

Enclosure
cc (Enclosure):

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ENCLOSURE
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
UNITS 2 AND 3

BROWNS FERRY NUCLEAR PLANT (BFN) - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING UNITS 2 AND 3 TECHNICAL SPECIFICATION (TS) CHANGE TS NO. 400 - REQUEST FOR LICENSE AMENDMENT RELAXATION OF EXCESS FLOW CHECK VALVE (EFCV) SURVEILLANCE TESTING FREQUENCY

This enclosure provides the TVA response to the October 5, 2000, NRC request for additional information with the specific NRC request is restated for clarity followed by the TVA response.

NRC REQUEST 1

"The operating time used in the failure rate calculation is based on 67 valves but it appears that both unit 2 and 3 operating cycles were used to develop the operating time. Please clarify the number of excess flow check valves that are installed and tested, in each unit."

TVA REPLY

There are 67 EFCVs installed on each unit at BFN. The Current TS require that each EFCV be tested every operating cycle.

NRC REQUEST 2

"Section III.B of Enclosure 1 of your submittal states: "Any future excess flow check valve (EFCV) failure would be evaluated per the corrective action program. Additionally, as part of the implementation of this amendment, the 10 CFR 50.65 Maintenance Rule Program will be revised to include a specific EFCV performance acceptance criteria." Please provide a discussion of the current criteria and explain in general terms how the new acceptance criteria might differ from the current criteria."

TVA REPLY

No specific 10 CFR 50.65 Maintenance Rule Performance Criteria currently exist for EFCVs. Consequently, as part of the implementation of this amendment, a new performance criterion will be added to the program to monitor EFCV reliability. The performance criterion will be established in accordance with the requirements of the TVA Maintenance Rule Program that ensures the

basis for determining satisfactory performance and the need for goal setting is provided. While the performance criteria for the EFCVs have not been formally established, TVA expects the performance criteria to consist of a number of test failures over a specified time interval for each unit (e.g., two failures per two year rolling period). In this example, the criterion would be exceeded on the third failure.

NRC REQUEST 3

"The proposed bases do not include the following from Technical Specification Task Force Item #334 (TSTF-334); "In addition, the EFCVs in the sample are representative of the various plant configurations, models, sizes and operating environments. This ensures that any potentially common problem with a specific type or application of EFCV is detected at the earliest possible time..." Please explain why this part of TSTF-334's Insert 1 was not incorporated."

TVA REPLY

The above portion of the TSTF Bases is not applicable to the BFN change. As shown on the Design Information table in GE NEDO-32977-A, BFN currently utilizes a one inch Marotta Model FVL 16D EFCV in instrument lines connected to the reactor primary system which leave the primary containment. The operating environment and conditions experienced by any one EFCV is similar for all EFCVs tested.

NRC REQUEST 4

"Is credit taken for the ¼-inch flow restriction when evaluating the radiological dose assessment? Provide a discussion of the assumptions used in calculating the mass of fluid released in the postulated instrument line break used for the dose calculations."

TVA REPLY

When evaluating the radiological impact from an instrument line break, credit was taken for a ¼-inch flow restriction.

The postulated leak is modeled as flow from the reactor coolant system to either the sump (the non-flashed liquid fraction) or the reactor building (the flashed steam fraction). The leak flow rates and fluid pressure are taken from figure 8-1 on page 8-2, Total Mass Flow Rate From Instrument Line Break - ¼ inch Orifice, and figure 8-2 on page 8-3, Reactor Pressure During Normal Shutdown, of General Electric NEDO-21143-1, Radiological Accident Evaluation - The CONAC03 Code, dated December 1981. To establish

the flashing fraction the reactor pressure at a given time during a postulated line break is obtained from figure 8-2. Once the flashing fraction is established, using the steam tables, the enthalpy at saturation at the reactor pressure (1055 psia to 22 psia) is then calculated. Assuming constant enthalpy, the flashing fraction will be the quality of the reactor fluid at atmospheric pressure (14.4 psia for BFN). Once the mass release and fractions are established, the liquid and steam release is determined.

NRC REQUEST 5

"Browns Ferry Nuclear Power Plant Unit 2 and 3 experienced a larger number of EFCV failures than other plants in the Boiling Water Reactor Owners Group survey, mostly during restart of both units. Tennessee Valley Authority states that these failures are attributed to crud buildup and valve sticking, test methodology, lack of experience of the test personnel, and the failure of a valve spring. Since the extended outage intervals were essentially equivalent to the requested surveillance extension, provide a discussion of corrective actions, including maintenance, procedures, personnel training, valve characteristics and test methodology evaluations/revisions that were implemented to limit future EFCV failures."

TVA REPLY

During the extended shutdown of Units 2 and 3 (approximately 6 years for Unit 2 and 10 years for Unit 3), reactor water quality was maintained within cold shutdown requirements. These requirements were less stringent than during normal plant operation. This fact, combined with stagnant conditions present in the instrument lines during shutdown, contributed to the accumulation of oxide films on the check valve internals that caused the sticking of the EFCVs. During normal plant operation, reactor water is maintained at higher quality levels. Therefore, accumulation rates of oxides responsible for the sticking problems experienced and the dynamic high pressure conditions the valves experience during normal operation is significantly different than those conditions experiences by the valves during the extended cold shutdown period. This is substantiated by the significant reduction in EFCV failure rate since recovery of the units.

BFN utilizes only one type of EFCV (Marotta FVL 16D) in instrument lines connected to the reactor coolant pressure boundary. The operating environment and conditions experienced by any one valve are similar for all valves in the population.

The Marotta FVL 16D is a flow limiting valve designed to shutoff when downstream flow increases to a predetermined rate. The valve has a controlled leakage rate when in the shutoff position. This allows the poppet to return to the open position when flow through the valve is reduced to zero. These valves are self contained, not adjustable and under normal conditions no maintenance is required.

Since the restart of Unit 2, procedures for the testing of EFCVs have been significantly improved. Lessons learned from Unit 2 restart were incorporated into test procedures for both units. For Unit 3 restart, sense lines were flushed and EFCVs were inspected and replaced as necessary. Improvements in test methodology which include bench testing of valves following failure to determine if the valve failures were actual. On the job training (OJT) of personnel and task qualifications are documented and continuity of personnel involved with the tests has been maintained. Additionally, EFCV testing is handled as a complex infrequently performed test or evolution which ensures an appropriate level of management oversight.

The lessons learned from Unit 2 restart, as well as, the other improvements since Unit 2 restart, such as enhancements identified by test performers, OJT and task qualification and improved procedures have been effective in reducing the number of EFCV failures. This is supported by actual performance data. BFN has experienced only 3 EFCV failures over the past 7 refueling outages (four (4) Unit 2 outages and three(3) Unit 3 outages) since 1994.