

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

November 25, 1980

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

Dear Mr. O'Reilly:

OFFICE OF INSPECTION AND ENFORCEMENT BULLETIN 79-26, REVISION 1 -
RII:JPB 50-259, -260, -296 - BROWNS FERRY NUCLEAR PLANT

In response to your letter dated August 29, 1980, to H. G. Parris,
which transmitted IE Bulletin 79-26, Revision 1, we have updated our
January 4, 1980, response (enclosed).

The manpower extended to review this bulletin and prepare a response
is approximately 20 man hours. If you have any questions, please
call Jim Domer at FTS 857-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills
L. M. Mills, Manager
Nuclear Regulation and Safety

Subscribed and sworn to before
me this 25th day of Nov 1980.

Paula H. White
Notary Public

My Commission Expires 9-5-84

Enclosure

cc: Office of Inspection and Enforcement (Enclosure)
U.S. Nuclear Regulatory Commission
Division of Reactor Operations Inspection
Washington, DC 20555

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ENCLOSURE

RESPONSE TO IE BULLETIN 79-26, REV. 1
BROWNS FERRY NUCLEAR PLANT
(5C-259, -260, -296)

Item 1

The operating history of the reactor is to be reviewed to establish a record of the current B^{10} depletion averaged over the upper one-fourth of the blade for every control blade; the record is to be maintained on a continuing basis. This action is required on all reactors whether shutdown for refueling or operating.

Response to Item 1

At present, there exists within TVA a program to maintain and update a record of the B^{10} depletion averaged over the upper one-fourth of the blade for every blade. This record will be updated at least once every refueling outage.

Item 2

Identify any control blades predicted to have greater than 34 percent B^{10} depletion averaged over the upper one-fourth of the blade by the next refueling outage.

- a. Describe your plans for replacement of identified control blades.
- b. Describe measures which you plan to take justifying continued operations until the next refueling specifically addressing (1) any blade with greater than 42 percent depletion averaged over the upper one-fourth of the blade; and (2) the condition where you find greater than 26 percent of the control blades calculated to have greater than 34 percent depletion averaged over the upper one-fourth of the blade.

Response to Item 2

No control rod blades are predicted to have greater than 34-percent B^{10} depletion averaged over the upper one-fourth of the blade before the next refueling outage. Items 2a and 2b therefore do not apply.

Item 3

At the next cold shutdown or refueling outage, conduct shutdown margin verification that:

1. Withdrawal of any control blade from the cold xenon-free core does not result in criticality; and

2. The shutdown margin requirement is met in a manner that accounts for the boron loss phenomenon (i.e., by including a plant margin in the shutdown margin that takes the potential boron loss from control blades identified from evaluation of boron loss consideration).

ENCLOSURE

RESPONSE TO IE BULLETIN 79-26, REV. 1
BROWNS FERRY NUCLEAR PLANT
(50-259, -260, -296)

Item 1

The operating history of the reactor is to be reviewed to establish a record of the current B^{10} depletion averaged over the upper one-fourth of the blade for every control blade; the record is to be maintained on a continuing basis. This action is required on all reactors whether shutdown for refueling or operating.

Response to Item 1

At present, there exists within TVA a program to maintain and update a record of the B^{10} depletion averaged over the upper one-fourth of the blade for every blade. This record will be updated at least once every refueling outage.

Item 2

Identify any control blades predicted to have greater than 34 percent B^{10} depletion averaged over the upper one-fourth of the blade by the next refueling outage.

- a. Describe your plans for replacement of identified control blades.
- b. Describe measures which you plan to take justifying continued operations until the next refueling specifically addressing:
(1) any blade with greater than 42 percent depletion averaged over the upper one-fourth of the blade; and (2) the condition where you find greater than 26 percent of the control blades calculated to have greater than 34 percent depletion averaged over the upper one-fourth of the blade.

Response to Item 2

No control rod blades are predicted to have greater than 34-percent B^{10} depletion averaged over the upper one-fourth of the blade before the next refueling outage. Items 2a and 2b therefore do not apply.

Item 3

At the next cold shutdown or refueling outage, conduct shutdown margin tests to verify that:

- a. full withdrawal of any control blade from the cold xenon-free core will not result in criticality; and
- b. compliance with the shutdown margin requirement in a manner that accommodates the boron loss phenomenon (i.e., by including a plant specific increment in the shutdown margin that takes the potential loss of boron from control blades identified from evaluation of item 1 into consideration).

Response to Item 3a

Before startup following a refueling outage, each control rod is fully withdrawn and inserted to functionally test the control rod drive. No unusual count rates have been observed from the source range monitors during these tests. We shall continue to perform this test after each refueling outage and monitor the source range monitors for criticality. This testing is in addition to the normal shutdown margin test performed at the beginning of each cycle using General Electric Company provided control rod worth information.

Response to Item 3b

According to General Electric, no cracking of the B₄C tubes has been observed when the average exposure of the control blade is less than 25-percent B¹⁰ depleted. Because there are no control blades in any unit predicted to exceed 25-percent B¹⁰ depletion before the end of the next cycle, no additional increment is required for the shutdown margin. We will maintain contact with General Electric to determine if and when the shutdown margin requirements need to be adjusted to account for the boron loss phenomenon. When an adjustment is necessary, the additional increment will be included in the shutdown margin test.

Item 4

Perform a destructive examination of the most highly exposed control blade at the end of the next cycle and provide results of the examination within one calendar year after removal of the blade. The results to be reported should include:

- a. Tube number or identification.
- b. The elevation of each crack in the tubing.
- c. The calculated B¹⁰ depletion versus elevation for each tube.
- d. The measured B¹⁰ loss versus elevation for each tube.
- e. The maximum local depletion for tubes having no cracks.
- f. The maximum local depletion for tubes having no loss of boron.

Alternately, the results of a destructive examination of a blade of similar fabrication and operational history may be provided no later than April 15, 1981. If the highest local B¹⁰ depletion is less than 50 percent, this examination can be deferred until the next refueling and the examination results provided within one calendar year of the removal of the blade.

Response to Item 4

TVA is participating in General Electric's Proposal for Control Rod Tests and Analysis in Response to Item 4 of NRC Inspection and Enforcement Bulletin No. 79-26. The results of the destructive analysis of a blade of similar fabrication and operational history as those in Browns Ferry Nuclear Plant units 1, 2, and 3 will be provided as soon as TVA receives the results from General Electric.