UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENCLOSURE 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.208 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO.224TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO.181 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

DOCKET NOS. 50-259, 50-260, AND 50-296

1.0 INTRODUCTION

By letter dated July 19, 1993, the Tennessee Valley Authority (TVA), the licensee, requested that the Nuclear Regulatory Commission (NRC) approve a change to the Browns Ferry Nuclear Station (BFN) Units 1, 2 and 3 Technical Specification (TS) 3.6.B./4.6.B., "Coolant Chemistry." The amendment request involves a number of changes to the TS Limiting Conditions for Operation (LCO) and Surveillance Requirements (SR) in Section 3.6.B./4.6.B. for BFN Units 1, 2 and 3; and removes the reactor coolant chemistry limits and associated sampling (surveillance) requirements that are applicable when the reactor is defueled from the TS. The chemistry requirements that were applicable during defueled conditions have already been incorporated into a licensee-controlled procedure under the jurisdiction of the licensee's Chemistry Program. Because chemical procedures are procedures described in the BFN Updated Final Safety Analysis Report (UFSAR), the provisions of 10 CFR 50.59 apply, requiring that associated procedure changes be evaluated to determine whether they involve an unreviewed safety question. Any change involving an unreviewed safety question would require a license amendment and NRC review and approval prior to implementation.

The proposed changes to TS Section 3.6.B./4.6.B. for both BFN Unit 1 & Unit 2 are identical. These proposed changes are listed in Attachment 1 to this Safety Evaluation (SE).

The proposed changes to TS Section 3.6.B./4.6.B. for BFN Unit 3 are more numerous and detailed than those proposed for the respective TS section of either the BFN Unit 1 TS or BFN Unit 2 TS. The licensee's intent is to make TS Section 3.6.B./4.6.B. consistent for all three Units, upon approval of this license amendment. These proposed changes to the TS for BFN Unit 3 are listed in Attachment 2 to this SE.

The proposed changes also include editorial changes to the Units 1 and 2 TS Section 3.6.B./4.6.B. and corresponding changes to the TS Bases Section for BFN Units 1, 2 and 3.

2.0 EVALUATION

10 CFR 50.36(c) requires that TS include items in specific categories, including safety limits, LCOs, and SRs; however, the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (58 FR 39132), to determine which of the design conditions and associated surveillance provisions need to be located in the TS because they are "necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety." Briefly, those criteria are (1) detection of abnormal degradation of the reactor coolant pressure boundary, (2) boundary conditions for design basis accidents and transients, (3) primary success paths to prevent or mitigate design basis accidents and transients, and (4) functions determined by probablistic risk assessment or operating experience to be important to public health and safety.

The licensee's proposal would: (1) relocate the limits and SRs on reactor coolant chemistry applicable during defueled conditions from the TS to the licensee's chemistry program and (2) control changes to the chemistry program in accordance with the provisions of 10 CFR 50.59. Chemistry limits ensure that degradation of the reactor coolant pressure boundary (RCPB) is not exacerbated by poor chemistry conditions. However degradation of the RCPB is a long-term process; and there are other direct means, such as in-service inspection, to detect and correct degradation of the RCPB, which will continue to be required by regulations and TS. On the basis that the relocation of chemistry limits will be limited to defueled conditions only and that additional means for the detection of degradation of the RCPB will continue to be required by TS, the staff concludes that the proposed amendment is acceptable.

The reactor coolant chemistry requirements applicable during defueled conditions will be controlled by a licensee chemistry procedure, which is a procedure described in the Updated Final Safety Analysis Report. In accordance with 10 CFR 50.59, any changes to these chemistry requirements must be evaluated to determine if they involve an unreviewed safety question. If the changes involve an unreviewed safety question, the licensee must submit a license amendment to obtain NRC review and approval of the changes prior to implementation. The staff has concluded that control of these design conditions in the TS (a) is not specifically required by 10 CFR 50.36 or other regulations, (b) is not required to avert an immediate threat to the public health and safety, and (c) is not necessary because changes that are deemed to involve an unreviewed safety question will require prior NRC approval and a license amendment as provided by 10 CFR §50.59(c).

In addition to the foregoing changes, the amendment would retain the chemistry LCOs and SRs when there is fuel in the reactor vessel, with the following changes.

1. The licensee has proposed to amend the TS to require that iodine isotopic analyses be performed on all samples that are required to be taken during STARTUP, periods of high off-gas activity (> 10,000 μCi/s)

or after significant power changes have been made, not just at times when the dose equivalent iodine activity is above 0.32 for Units 1 and 2 (0.032 for Unit 3) μCi/gm as is currently required. These changes apply to Units 1, 2 and 3, and are conservative.

2. Another proposed change to the reactor coolant chemistry specifications would require the licensee to perform a pH analysis every 96 hours whenever the plant is in the hot standby or power operation condition. This change represents an addition to the TS for BFN Units 1, 2 & 3 and is conservative. The licensee has proposed a limit of $5.6 < pH < 8.6$ for Unit 3 whenever the reactor is operating at a steaming rate greater than 100,000 lb./hr. This pH range is acceptable.

3. The licensee has added a requirement for sampling and analysis of conductivity, chloride and pH during times when the Unit 3 reactor is depressurized, with fuel in the reactor (except during the startup condition). The licensee has set a limiting condition during these times which requires that the coolant pH be maintained in the 5.3 - 8.6 range. This pH range is reasonable. These changes are conservative and therefore acceptable.

4. The licensee has also lowered a number of the chemistry parameter limits (on conductivity and chloride content) and added a limitation on range of pH for Unit 3. These changes are all conservative with respect to the previous licensing basis, and therefore acceptable.

5. The licensee has also lowered the Unit 3 time limits (from 4 weeks/yr to 2 weeks/yr) which are applicable during times when the steaming rates are in excess of 100,000 lbs/hr. These time limits represent the collective amount of time during the year in which the licensee may exceed the normal conductivity or chloride limits (1.0 μmhos/cm and 0.2 ppm, respectively). The changes to the Unit 3 time limits are conservative, and therefore acceptable.

6. The licensee has opted to change, in regard to the Unit 3 TS, the maximum allowable dose equivalent iodine - 131 (I-131) activity [from 10 x equilibrium iodine activity] to a concrete specified value, set at 26 μCi/gm. This maximum allowable dose equivalent I-131 activity is included in the TS to place a ceiling on total I-131 activity during the period in which the dose equivalent I-131 activity may be out of specification with the normal 3.2 μCi/gm limit (the I-131 activity may be out of specification for a 48 hour period). This change has been previously approved for Units 1 and 2, and is acceptable.

The proposed changes to Section 3.6.B./4.6.B. described above will make the BFN Unit 3 LCOs and SRs on "Coolant Chemistry" consistent with those stated in the corresponding TS sections (TS LCOs and SRs in 3.6.B/4.6.B, "Coolant Chemistry,") for BFN Units 1 and 2. These changes are all conservative and will improve the quality of operations for Unit 3, and make operations of Unit 3 more consistent with the operations of Units 1 and 2.

The NRC staff has concluded that the licensee's proposed changes to the BFN Unit 3 TS will provide adequate control of the important parameters for the reactor coolant chemistry. The licensee has shown that all of the changes to reactor coolant chemistry parameters, surveillances, and activity requirements in Section 3.6.B./4.6.B. are conservative. These changes will make the BFN Unit 3 TS Section 3.6.B./4.6.B. consistent with the corresponding sections in the TS for Units 1 and 2, and are, therefore, acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes the Surveillance Requirements and Bases. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (58 FR 59756). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

The Commission has concluded, based upon the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Jim Medoff

Date: June 28, 1994

Attachments:
As stated

Attachment 1

Proposed Changes to Section 3.6.B/4.6.B

in the BFN Unit 1 and Unit 2 Technical Specifications

1. Amends SR 4.6.B.1. to state that continuous conductivity monitoring is no longer required when the reactor vessel is defueled.

2. Amends SR 4.6.B.1.a. to require a reactor coolant sample and conductivity analysis every 4 hours whenever the continuous conductivity monitor is inoperable, with the exception being that the sample and test will be conducted every 8 hours when the reactor is in a "cold shutdown" condition. This change removes any reference to the operational status of the condensate demineralizers from the surveillance requirement.

3. Adds a 96 hour surveillance requirement (SR 4.6.B.3.a.) on reactor coolant pH whenever the unit is in the operational or hot standby conditions.

4. Editorially changes SR 4.6.B.3.c.

5. Amends LCO 3.6.B.4 to state that the LCOs on conductivity, chloride and pH are only applicable when the reactor is not pressurized with fuel in the reactor (i.e, the LCOs do not apply when the reactor is defueled).

6. Amends SR 4.6.B.4. to change the applicability of the surveillance to periods when the reactor is pressurized with fuel in the reactor, and adds a conductivity analysis (once every 96 hours) to pH and chloride analyses required by the SR.

7. Changes SR 4.6.B.6. to require isotopic dose I-131 quantitative analyses whenever reactor operation is in the startup condition or involves a significant power change, or whenever an increase in the off-gas activity occurs which exceeds 10,000 μCi/sec in any 48 hour period or the maximum dose iodine equivalent activity of 3.2 μCi/gm is exceeded, not just when the iodine activity is above 0.32 μCi/gm.

7. Adds a provision to the LCO 3.6.B.7. which states that reactor chemistry coolant limits do not apply when the reactor is defueled.

8. Adds a provision to the SR 4.6.B.7. which states that reactor chemistry coolant sampling requirements do not apply when the reactor is defueled.

Attachment 2

Proposed Changes to Section 3.6.B/4.6.B

in the BFN Unit 3 Technical Specifications

1. Changes SR 4.6.B.1. to require continuous conductivity monitoring at all times except when the reactor is defueled. This changes surveillance of conductivity from a periodic sampling and analysis basis to an online monitoring basis.

2. Changes some of the existing conductivity surveillance requirements of SR 4.6.B.1. to SR 4.6.B.1.a., which requires that a conductivity sample and analysis be performed every 4 hours during periods when the continuous conductivity meter is inoperable, except when the continuous conductivity meter is inoperable, and the reactor is in the Cold Shutdown Condition, upon which the conductivity sample and analysis will be performed every 8 hours.

3. Adds SR 4.6.B.1.b. which requires that a weekly calibration of the continuous conductivity monitor be performed, with the exception being that this surveillance will be performed daily whenever the reactor coolant continuous conductivity is greater than 1.0 μmhos/cm.

4. Adds SR 4.6.B.2. to require reactor coolant measurements of conductivity and chloride during startup, prior to pressurization of the reactor above atmospheric pressure. The measurements specified by this SR will be performed to show conformance with the requirements of LCO 3.6.B.1.

5. Reduces the allowable coolant chemistry conductivity in LCO 3.6.B.2.a. during operation and steaming rates > 100,000 lb/hr from 2.0 μmhos/cm to 1.0 μmhos/cm.

6. Renumbers existing SR 4.6.B.3. to SR 4.6.B.6., and adds a new 96 hour surveillance requirement, SR 4.6.B.3, which requires that the reactor coolant chloride content and pH be measured, as follows, whenever the BFN Unit 3 is in the operational or hot standby condition:

   a) chloride ion content and pH to be measured, as a minimum, once every 96 hours, or

   b) chloride ion and pH measurements once every eight hours if the reactor coolant conductivity exceeds 1.0 μmhos/cm.

7. Amends the time limits and maximum limits (LCO 3.6.B.3, applicable at steaming rates greater than 100,000 lb/hr) in which a reactor coolant parameter (conductivity, chloride, and pH) may exceed the normal limit as follows:

   a) amends LCO 3.6.B.3.a. to lower the allowable, normal limit from 2.0 μmhos/cm to 1.0 μmhos/cm.

   b) amends LCO 3.6.B.3.a. to lower the time in which the Unit 3 conductivity may exceed 1.0 μmhos/cm from 4 weeks/yr to 2 weeks/yr.

c) amends LCO 3.6.B.3.b. to lower the time at which the Unit 3 chloride may exceed 0.2 ppm from 4 weeks/yr to 2 weeks/yr.

8. Adds an LCO 3.6.B.3.c. to require a shutdown of the reactor if the reactor coolant pH < 5.6 or > 8.6 for a 24 hour period.

9. Adds a LCO 3.6.B.4.c. which requires that the reactor coolant pH be maintained between 5.3 and 8.6 during periods when the reactor vessel is depressurized and fuel is in the reactor vessel.

10. Amends LCO 3.6.B.4. qualify that the limits on conductivity, chloride content and pH (in stated LCO 3.6.B.4.a., b. and c.) which are applicable at times when the reactor is depressurized, do not apply when the reactor vessel is defueled.

11. Amends SR 4.6.B.4. to require that a reactor coolant sample be taken and analyzed for conductivity, chloride and pH at least every 96 hours, whenever the reactor is depressurized with fuel inside the reactor vessel.

12. Adds LCO 3.6.B.5. which requires a commencement to cold shutdown (as rapidly as cooldown rate permits) whenever the time limits or maximum conductivity or chloride limits are exceeded.

13. Renumbers the old, existing LCO 3.6.B.5. as LCO 3.6.B.6., and for periods when the reactor is critical, changes the maximum iodine activity [from 10 x equilibrium iodine concentration] to a specified 26 μCi/gm limit. This maximum limit places a ceiling on activity during the period in which the licensee is allowed by specification to exceed the normal limit (3.2 μCi/gm), without having to shut down the reactor. This change was previously approved for Units 1 and 2.

14. Administratively changes the SR on I-131, I-132, I-133 and 1-134 isotopic analyses from 4.6.B.2. to 4.6.B.5. SRs for dose iodine equivalent activity are consistent with those proposed for Units 1 and 2.

15. New SR 4.6.B.6. (old SR 4.6.B.3.) is changed to reflect, with the reactor critical, that isotopic iodine equivalent analyses are required for all sample, not just when the total iodine activity is above 0.032 μCi/gm. This change is conservative by design.

16. Adds a LCO 3.6.B.7. which states that reactor chemistry coolant limits do not apply when the reactor is defueled.

17. Adds a SR 4.6.B.7. which states that reactor chemistry coolant sampling requirements do not apply when the reactor is defueled.