



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

ENCLOSURE 4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 181 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 191 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 153 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 letters dated January 31, March 20, May 14, and December 28, 1990, the Tennessee Valley Authority (TVA, or the licensee) requested changes to Sections 3.9 and 4.9, Auxiliary Electrical System, of the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, Technical Specifications (TSs). The changes would (1) clarify Limiting Condition for Operation (LCO) 3.9.A.1, (2) more accurately describe the 7-day fuel oil requirements for the diesel generators in LCO 3.9.A.6, (3) revise the requirements for sampling the diesel generator fuel oil in Surveillance Requirements (SR) 4.9.A.1.e, and (4) update the testing of diesel generators in SR 4.9.A.1.a. Changes were also proposed for the TS Bases of Section 3.9/4.9.

The licensee's March 20, 1990, letter provided the description, justification, and determination of no significant hazards consideration for the submittal dated January 31, 1990. The May 14, 1990, letter provided minor revisions to the proposed changes in the submittal dated January 31, 1990, as a result of the staff's review of this submittal. These minor revisions are the following: (1) LCO 3.9.A.1 is revised to capitalize "PRIOR TO STARTUP"; (2) Bases Section 4.9 and page 3 of the Description and Justification for the Proposed Change are revised to indicate that diesel generator fuel oil is tested in accordance with Table 1 of ASTM-D975-89; (3) Overleaf page 3.9/4.9-2 for Unit 1 is revised because the page originally submitted had Unit 3 information on it; and (4) Bases page 3.9/4.9-30 for Unit 3 is revised page number 3.9/4.9-20.

The December 28, 1990, letter provided a minor revision to the changes for SR 4.9.A.1.e proposed in the submittals dated January 31 and May 14, 1990. TVA proposed that ASTM-D975 specified in the SR be revised to indicate the applicable revision year, i.e., ASTM-D975-89. The letter also provided a new basis for the 7-day fuel oil requirement for the diesel generators in LCO 3.9.A.6 and agreed that the proposed TS changes proposed in this application for amendments may be made effective 30 days after issuance.

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The Notice of Consideration of Issuance of Amendments for the above proposed changes to the TSs in the Federal Register (55 FR 30313) was issued on July 25, 1990 listing only the first three submittals. In that notice, the proposed change to clarify LCO 3.9.A.1 and the minor revision to SR 4.9.A.1.e in the letter of December 28, 1990 were not listed in the description of the amendment request. The change and minor revision to LCO 3.9.A.1 and SR 4.9.A.1.e, respectively, are clearly described in the first three submittals and in TVA's proposed determination of no significant hazards consideration published in the notice. Therefore, the inclusion of these proposed changes for LCO 3.9.A.1 and SR 4.9.A.1.e does not change the staff's initial determination of no significant hazards consideration published in the Federal Register.

2.0 EVALUATION

The proposed changes to the TSs listed in Section 1.0 are evaluated separately in the following sections:

2.1 LCO 3.9.A.1 Clarification

TVA proposed changes to the TSs of all three units to state that "PRIOR TO STARTUP from a COLD CONDITION, the following must be satisfied." TVA stated that these changes are to clarify the existing LCO 3.9.A.1 and make the wording consistent with the approved BFN Amendment 158 for Unit 1, 154 for Unit 2, and 129 for Unit 3.

Amendments 158, 154, and 129 were issued on November 18, 1988, and January 13, 1989. The amendments modified the TS by (1) changing the definitions of Mode of Operation, Core Alteration, and Reactor Conditions in Section 1.0, Definitions, of the TSs and (2) incorporating these newly defined terms in LCOs throughout the TSs (e.g., the LCO for core spray system, residual heat removal system, high pressure coolant injection system). TVA is proposing to revise an LCO for auxiliary electrical systems to incorporate the new, defined terms in the LCO. "Prior to startup" and "cold shutdown" will be capitalized in the new LCO because they are terms defined in Section 1.0 of the TSs.

The proposed changes to LCO 3.9.A.1 will not allow any physical operating condition of the units to be different from those allowed by the current TSs. The proposed new wording for the LCO has the same meaning as the current LCO. Therefore, the staff concludes that this change is acceptable.

2.2 Seven Day Fuel Oil Storage

At BFN, there are two sets of four diesel generators. The four diesel generators for Units 1 and 2 are numbered 1/2A, 1/2B, 1/2C, and 1/2D and the four Unit 3 diesel generators are numbered 3A, 3B, 3C, and 3D. Some electrical loads from Units 1 and 2 are carried by the Unit 3 diesel generators, and vice versa. The diesel generators, 7-day fuel oil storage tank assemblies, the fuel oil transfer system, and the yard tanks, are shown in Figures 8.5.3a and 8.5.3b of the BFN Final Safety Analysis Report (FSAR).

Each diesel generator has its own 7-day fuel oil storage tank assembly of three separate tanks. The three tanks are embedded in concrete in the sub-structure of the diesel generator building and are in parallel with all the tanks sloped from one end to the other. There are two common lines connecting the tanks, one at the bottom of the lower end of the tanks and one at the top of the upper end of the tanks. The upper common line is a vent line. Fuel oil is added to the assembly through one of the outer tanks and is drawn from the middle tank into a diesel generator day tank. There are two separate lines to the day tank from the middle tank, each of which enter the top of the middle tank near the lower end of the tank and drop down within about two inches of the bottom of the middle tank. As such, a quantity of fuel oil will remain which cannot be drawn from the tanks. To draw a sample of fuel oil from the assembly, the fuel transfer pump recirculates oil into one of the outer tanks and from the middle tank for at least three minutes. The sample is taken from the fuel transfer pump. The diesel fuel oil transfer system has the capability to transfer fuel oil (1) from the yard tanks to the 7-day tank assemblies and (2) among the 7-day tank assemblies for a set of diesel generators; however, this transfer system is not seismically qualified. Therefore, each fuel oil storage tank assembly for a diesel generator is designed to contain sufficient fuel oil to operate the diesel generator for seven days. The staff concludes that the NRC Regulations do not require that the diesel fuel oil transfer system be seismically qualified. There is also a connection to add fuel oil to the 7-day tank assemblies directly from a fuel tanker truck.

TVA is proposing to increase the 7-day fuel oil supply for each diesel generator. The staff considers seven days an adequate fuel-oil storage supply for a diesel generator because it is consistent with the guidelines of Regulatory Guide 1.137, "Fuel-Oil Systems for Standby Diesel Generators." TVA presented its calculation of the 7-day supply in letters dated March 20, May 14, and December 28, 1990. The letter dated December 28, 1990 addressed the unusable volume of oil in the 7-day fuel tank assemblies and will be addressed in this evaluation.

Regulatory Guide 1.137 allows the calculation of the 7-day fuel oil storage requirement for a diesel generator assuming it operates continuously for seven days at its rated capacity. In calculating the fuel oil requirement, a 205 gallon per hour (gph) consumption rate was used by TVA for the entire 7-day period and the 640 gallons of fuel oil that cannot be drawn from a tank assembly was taken into account. TVA stated that the consumption rate of 205 gph corresponds to a load of 2850 KW and conservatively bounds the fuel consumption requirements for the maximum running load of 2778 KW documented in the BFN Diesel Generator Evaluation Report. The zero-to-two-hours and greater-than-two-hour ratings for the diesel generators are 2800 KW and 2550 KW, respectively, as stated in Section 2.4 below.

TVA stated that to supply 205 gph of diesel fuel oil to the diesel engine for seven days of operation, each 7-day tank assembly has to contain at least 35,280 gallons of diesel fuel oil. This required volume is less than the useable volume capacity for each 7-day tank assembly. Adequate level indication is available to verify that the required fuel oil level is maintained. In addition, TVA stated that an annunciator in the control room will indicate to the operator that the 7-day tank assembly level is low and plant procedures provide instructions on replenishing the fuel oil supply.

The current requirement in LCO 3.9.A.6 is that there shall be a minimum of 103,300 gallons of diesel fuel in the diesel generator fuel tanks. TVA stated that this implies that there is one large fuel storage tank for each set of diesel generators and that this tank is required to contain a minimum of 103,300 gallons of diesel fuel. This 103,300 gallons per diesel generator set would be 25,825 gallons per diesel generator.

To clarify LCO 3.9.A.6, TVA has proposed to state in the LCO that 35,280 gallons is the minimum quantity of diesel fuel in the 7-day fuel tank assembly for each diesel generator. Given the fact that each diesel generator has its own 7-day fuel tank assembly, the proposed rewriting of LCO 3.9.A.6 is clearer than the existing requirement. The proposed LCO 3.9.A.6 specifies the minimum amount of diesel fuel in each of the 7-day diesel generator fuel tank assemblies while the current LCO has a confusing reference to the diesel generator "fuel tanks."

TVA has proposed 35,280 gallons as the required minimum quantity of fuel oil in the 7-day tank assemblies based on the calculation described above. This calculation assumes the diesel generator may run continuously at 2850 KW for the seven days and accounts for the unusable quantity of oil in the tank assemblies. The 2850 KW is above the continuous rating of 2550 KW, the maximum two-hour load of 2800 KW, and the maximum Loss-of-Power/Loss-of-Coolant Accident (LOP/LOCA) load of 2778 KW for the diesel generators. This calculation is an acceptable method to estimate the minimum fuel required for a diesel generator and 35,280 gallons is greater than the volume based on the unusable volume and the fuel consumption rate. Therefore, the staff concludes that the proposed changes to LCO 3.9.A.6, to increase the amount of diesel fuel required in the 7-day fuel oil tank assembly for each diesel generator to 35,280 gallons, is acceptable.

The changes to the Bases of TS Section 3.9/4.9 associated with the proposed changes to LCO 3.9.A.6 are correct and consistent with the changes to LCO 3.9.A.6; therefore, the proposed changes are acceptable.

2.3 Sampling Diesel Generator Fuel Oil

TVA stated that the proposed changes to SR 4.9.A.1.e are to clarify the existing requirements to sample the quality of diesel fuel for the diesel generators. TVA had originally interpreted the SR as meaning to sample the fuel oil in one 7-day fuel tank assembly each month and to sample the eight 7-day fuel tank assemblies on a staggered basis. Therefore, each assembly would be sampled only once every eight months, which is less restrictive than in the NRC Standard Technical Specifications for General Electric Boiling Water Reactors (BWRSTS), NUREG-0123, Revision 4. TVA has recently reinterpreted this SR and has concluded that every assembly should be sampled once a month, which is more restrictive than the BWRSTS. This is discussed in License Event Report 89-026-01 dated December 12, 1989 for Unit 1. To clarify this situation, TVA has proposed new requirements on sampling the diesel generator 7-day fuel oil supply.

TVA has proposed to sample the quality of the fuel in each diesel generator 7-day fuel supply once a quarter. The 7-day fuel supply is the 7-day diesel generator fuel tank assembly for each diesel generator discussed above. This

frequency and fuel supply for the diesel generators is consistent with the requirements in the NRC BWRSTS. BFN is a GE BWR and the BWRSTS on diesel generators are applicable to the BFN TS.

A description of the means to sample fuel oil from a 7-day fuel oil storage tank assembly is given in Section 2.2 above. It is not possible to take a sample from an individual tank of a 3-tank assembly except by opening a manway into a tank. A tank cannot be drained completely, including the inaccessible volume at the bottom of each tank, except by opening a manway into the tank.

These proposed requirements for the Unit 1 and Unit 2 TSs will cover the Unit 1/Unit 2 diesel generators and these proposed requirements for the Unit 3 TS will cover the Unit 3 diesel generators. The proposed wording is clearer in stating the requirements, as in the BWRSTS, that the fuel oil in the 7-day storage tanks for each diesel generator be sampled once per 92 days. Therefore, the staff concludes that this proposed change is acceptable.

TVA has also proposed to revise the current requirements in SR 4.9.A.1.e to state that the quality of the fuel oil shall be within the acceptable limits specified in Table 1 of ASTM-D975-89. The standard and table in the SR are not being changed by the proposed TS changes. TVA has proposed to (1) delete the reference to "the latest revision to" the standard and (2) state that the fuel oil would be tested in accordance with the 1989 revision of the standard.

TVA has reformatted the wording in the sentence concerning the latest revision to ASTM-D975. The latest revision to the standard is ASTM-D975-1989 as proposed by TVA. This rewording does not change the requirement in the SR that the quality of the fuel oil must meet the acceptance limits in Table 1 of the standard; therefore, the staff concludes that the reworded sentence is acceptable. TVA has also proposed to delete the requirement to "log" the fact the fuel oil meets Table 1 of the standard. The staff concludes that this is acceptable because it is not necessary to state in the SR that the results are logged.

The proposed changes to the TS Bases are correct and consistent with the proposed changes to SR 4.9.A.1.e. Therefore, the staff concludes that these proposed changes to the bases are acceptable.

In reviewing the BWRSTS, the staff determined that there were several additional requirements in the BWRSTS on maintaining the quality of the diesel fuel that are not in the BFN TSs. These include the following: (1) removing water periodically from the tanks, (2) testing new fuel oil prior to its addition to the 7-day fuel storage tanks, (3) sampling the fuel oil from the 7-day fuel storage tanks in accordance with ASTM-D270-1975. TVA has stated that it draws the sample of fuel oil from the bottom of the middle tank of the three tank 7-day fuel tank assembly for a diesel generator as fuel oil is pumped into the diesel generator day tank. The diesel generators for operation draw fuel oil from the day tank and not from the 7-day fuel tanks. The staff will request that TVA review Section 4.9 of the TS against the BWRSTS in this area, to determine if additional TS requirements are needed to assure the high quality of the fuel oil and the operation of the diesel generators.

2.4 Diesel Generator Testing

In the staff's Safety Evaluation (SE) dated December 21, 1989, the staff evaluated the diesel generator load analysis and concluded that the current SR 4.9.A.1.a did not test the diesel generators at a load of 2778 KW for two hours (i.e., load simulation for a Loss of Offsite Power (LOP) concurrent with a Loss of Coolant Accident (LOCA)). The current SR 4.9.A.1.a specifies that the diesel generators be tested for at least one hour at 75 percent or greater of rated load but requires no long duration testing (i.e., 24-hour testing). The SE states that the zero-to-two hours and greater-than-two-hours ratings for the diesel generators are 2800 KW and 2550 KW, respectively.

TVA has proposed to increase the testing to the following: (1) at least one hour at 100 percent or greater of the continuous rating of the diesel generators and (2) at least 24 hours at a minimum of 2800 KW to demonstrate full load carrying capability. The first test will be done at the frequency specified in Table 4.9.A which is the frequency in the current SR 4.9.A.1.a. The second test is a new one which will be done once per 18 months. The interval of 18 months is in agreement with the frequency for the testing of diesel generators specified in the BWRSTS.

Although TVA has proposed testing the diesel generators at 2800 KW for the entire 24 hours, this testing, which is more conservative than requested by the staff in its SE dated December 21, 1989, is for TVA's convenience in not reducing the load during the test to match the LOP/LOCA load and will not harm the diesel generator. The 2800 KW is above the LOP/LOCA load of 2778 KW and the frequency of testing is consistent with the BWRSTS requirements on such testing.

Based on the above, the staff concludes that the proposed changes to SR 4.9.A.1.a are acceptable and address the concerns raised in the SE dated December 21, 1989.

2.5 Conclusion

Based on the evaluations discussed in Sections 2.1 to 2.4 above, the staff concludes that the proposed changes are acceptable. The staff will request that TVA review the TS against the BWRSTS to determine if additional requirements on the quality of the diesel fuel are needed.

3.0 ENVIRONMENTAL CONSIDERATIONS

The amendments involve a change to a requirement with respect use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding. 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 nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 30313) on July 25, 1990, and consulted with the State of Alabama. No public comments were received and the State of Alabama did not have any comments.

The staff has concluded, based on 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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Dated: February 12, 1991