Tennessee Valley Authority 1101 Market Street, LP 3R Chattanooga, Tennessee 37402-2801



R. M. Krich Vice President Nuclear Licensing

April 11, 2011

10 CFR 50.4 10 CFR 50.90

ATTN: Document Control Desk U.S. Nuclear Regulatory Commission Washington, D.C. 20555-0001

> Browns Ferry Nuclear Plant, Units 1, 2, and 3 Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: Response to Request for Additional Information Regarding Technical Specifications Change TS-474 - TS 3.7.3, "Control Room Emergency Ventilation System," dated March 10, 2011

References: 1. Letter from TVA to NRC, "Technical Specifications Change TS-474 -Request to Add a TS 3.7.3, "Control Room Emergency Ventilation (CREV) System," Action to Address Two CREV Subsystems Inoperable Due to Inoperable CREV System High Efficiency Particulate Air (HEPA) Filter and/or Charcoal Adsorbers," dated August 27, 2010

> NRC Letter to TVA, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 -Request for Additional Information Regarding Technical Specification Change TS-474 (TAC Nos. ME4668, ME4669, and ME4670)," dated March 10, 2011

On August 27, 2010, the Tennessee Valley Authority (TVA) submitted Technical Specifications (TS) Change TS-474, TS 3.7.3, "Control Room Emergency Ventilation (CREV) System," requesting approval of a change for the condition when both CREV subsystems are inoperable due to an inoperable High Efficiency Particulate Air (HEPA) filter, or when one or more CREV subsystems are inoperable due to an inoperable due

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charcoal adsorber. TVA also requested a completion time of 90 days to restore the HEPA filter and charcoal adsorber to operable status (Reference 1). On March 10, 2011, TVA received a Request for Additional Information (RAI) letter from the NRC (Reference 2) applicable to TS Change TS-474. The NRC requested the response within 30 days, i.e., by April 9, 2011. Since April 9, 2011 is a Saturday, the response due date is no later than April 11, 2011.

The enclosure to this letter provides the TVA response to the NRC RAI. Additionally, an error was identified in TVA's submittal on March 10, 2010, in the second paragraph on page E-5 of Enclosure 1, and a corresponding error in the response to Question 3 of Section 4.3 (i.e., the Significant Hazards Determination) on page E-7 of Enclosure 1 (Reference 1). TVA is providing the corrected text in the enclosure.

This letter does not include any new regulatory commitments. Please direct any questions concerning this matter to Tom Matthews at (423) 751-2687.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 11th day of April, 2011.

Respectfully,

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R. M. Krich

Enclosure:

TVA Response to NRC Request for Additional Information

cc (Enclosure):

NRC Regional Administrator – Region II NRC Senior Resident Inspector – Browns Ferry Nuclear Plant Alabama State Department of Public Health

ENCLOSURE

Browns Ferry Nuclear Plant

Units 1, 2, and 3

Technical Specifications Change TS-474 - TS 3.7.3, "Control Room Emergency Ventilation System"

TVA Response to NRC Request for Additional Information

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ENCLOSURE

Browns Ferry Nuclear Plant

Units 1, 2, and 3

Technical Specifications Change TS-474 - TS 3.7.3, "Control Room Emergency Ventilation System"

TVA Response to NRC Request for Additional Information

NRC Request for Additional Information (RAI) Question

"The current design basis LOCA radiological consequence analysis assumes credit for the CREV HEPA filter. The application changes this assumption in the LOCA analysis by removing the credit taken for the HEPA filtration. Provide additional information describing all the basic parameters used in the LOCA dose consequence analyses. For each parameter, please indicate the current licensing basis (CLB) value, the revised value where applicable, as well as the basis for any changes to the CLB. Also describe any methodologies that may have changed based on the proposed amendment. In addition, provide the resulting change to the calculated radiological consequence of the design basis LOCA. The staff requests that the information be presented in a table as was done for the Browns Ferry alternative source term amendment request."

TVA Response

As part of the TS-405 License Amendment Request, dated July 31, 2002 (ML022200382) to adopt the Alternate Source Term (AST) methodology, TVA provided a table of inputs to be used with RADTRAD Computer Code (NUREG/CR-6604, April 1998) to calculate the radiological consequences of the design basis loss-of-coolant accident (LOCA). Table 1 of this enclosure contains the current licensing basis (CLB) values, revised values and the basis for the revised value.

Based on the inputs provided in Table 1, the revised radiological consequences of the design basis LOCA results in a control room dose of 1.94 rem. The CLB control room dose from a design basis LOCA is 1.62 rem. The revised design basis LOCA control room dose was calculated using the same methodology approved as part of the AST amendment issued by NRC letter dated September 27, 2004.

Corrected Text

The revised wording in the second paragraph on page E-5 of Enclosure 1 of the August 27, 2010, letter is provided below.

"The recent analyses show that the post-LOCA 30-day control room dose with no credit for either the HEPA filters or the charcoal adsorbers results in a minimal

increase in dose consequences (9.5% decrease in margin), with the final dose of 1.94 rem. This remains well below the regulatory limit of 5 rem."

TVA's response to Question 3 of Section 4.3 (Significant Hazards Determination) on page E-7 of Enclosure 1 of the August 27, 2010, letter contained the same error identified above. The revised wording is provided below.

"Analyses associated with the prior approval of Alternate Source Term methodology for design basis accident dose consequences previously did not credit the CREV System charcoal adsorbers. Recent analyses have been performed to assess the post-accident 30-day control room dose removing credit for the CREV System HEPA filter. The results indicate a minimal increase in dose consequences (9.5% decrease in margin) due to removing credit for the CREV System HEPA filter. Even with no credit for either the CREV System HEPA filter or CREV System charcoal filter, the resultant control room dose maintains more than 60 percent margin to the regulatory limit of 5 rem TEDE. As such there is no reduction in a margin of safety for any duration of inoperability of the CREV System HEPA filter or charcoal adsorbers. While the HEPA filter and charcoal adsorbers are not credited for accident mitigation, they remain required by the BFN TS for compliance with the LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System," further minimizing any potential reduction in a margin of safety."

TABLE 1 Loss-of-Coolant Accident (LOCA) Radiological Consequence Analysis Inputs								
Parameter	Current Licensing Basis (CLB) Value	Revised Value	Basis for Revision					
Control Room Emergency Ventilation (CREV) Intake Flow Rate	6717 scfm							
CREV Makeup Filtered Flow Rate	3000 scfm	0						
CREV Unfiltered Inleakage Rate	3717 scfm	6717	Changes made to eliminate credit for the HEPA filter in the CREV System					
CREV High Efficiency Particulate Air (HEPA) Filter Efficiency	90% Particulate	No credit taken						
CREV Charcoal Adsorption Efficiency	No credit taken							
Control Room Volume	210,000 ft ³		· · ·					
Standby Gas Treatment (SGT) Flow Rate	24,750 scfm							
SGT HEPA Filter Efficiency	90% Particulate							
SGT Charcoal Adsorption Efficiency	No credit taken							
Environment Breathing Rate	0-8 hours: 3.5E-04 m ³ /sec 8-24 hours: 1.8E-04 m ³ /sec 1-30 days: 2.3E-04 m ³ /sec							
Control Room Breathing Rate	3.5E-04 m ³ /sec							
Control Room Occupancy Factors	0-1 day: 1.0 1-4 days: 0.6 4-30 days: 0.4							
Fission Products Release Fractions	Regulatory Guide 1.183 (Revision 1) Table 1 BWR Core Inventory Fraction Released Into Containment Gap Early In- Release vessel Group Phase Phase Total Noble Gases 0.05 0.95 1.0 Hatogens 0.05 0.225 0.3 Alkali Metals 0.00 0.02 0.02 Ba, Sr 0.00 0.002 0.0025 Cerium Group 0.00 0.005 0.0005 Lanthanides 0.00 0.002 0.0002							
Fission Product Release Timing	Regulatory Guide 1.183 (Revision 1) Table 4 LOCA Release Phases BWR Phase Onset Duration Gap Release 2 min 0.5 hr Early In-vessel 1.5 hr 0.5 hr							
Fission Product Iodine Chemical Form	Particulate 95%							
Elemental 4.85%								
	Organic 0.15%							

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TABLE 1								
Parameter	Current Licensing Basis (CLB) Value	Revised Value	Basis for Revision					
Control Room Isolation/CREV Initiation	10 minutes							
Emergency Core Cooling System	Ten percent of the radioiodine in the		· · · · · · · · · · · · · · · · · · ·					
(ECCS) Leakage Release Fractions	leaked coolant is assumed to become							
	airborne in the reactor building							
	(secondary containment). Of this activity,							
	97% is assumed to be elemental iodine							
	and 3% is assumed to be organic iodine.							
Flow Rates								
Primary Containment Leak Rate	2% containment air weight/day							
(30 days)								
Secondary Containment Bypass Leak	Hardened Wet Well Vent Release =							
Rate (30 days)	10 scfh beginning at t>8 hours							
Assumed ECCS Leak Rate (30 days)	5 gpm	20 gpm	Revised to provide additional margin. The CLB Control Room Dose was increased from 1.25 REM to 1.62 REM, in accordance with 10 CFR 50.59.					
ECCS Leakage Temperature	<212°F							
Main Steam Isolation Valve (MSIV) Leak	150 scfh total							
Rate at Test Pressure of 25 psig	100 scfh maximum for one line							
Leakage at Base of Stack (stack bypass)	10 scfm	20 scfm	Revised to provide additional margin for damper testing					
MSIV Leakage that Bypasses Main	0.5%							
Condenser	(percentage of total MSIV leakage)							
Containment Atmosphere Dilution Vent	139 scfm for 24 hrs							
Rate	@ 10 days, 20 days, 29 days							
Volumes	and the second							
Drywell Airspace	159,000 ft ³ (Min value used for dose calculation)	·						
Torus Airspace	119,400 ft ³ (Minimum)							
Suppression Pool	121,500 ft ³ (Minimum)							
Reactor Building Free Volume	1,931,502 ft ³ (50% of this value used due to incomplete mixing)	1.1311E6 ft ³ (50% of this value used due to incomplete mixing)	Unit 1 Volume used for conservatism					

Parameter Current Licensing Basis (CLB) Value Revised Value Basis for Revision Stack Room 69/120 ft ² 69/20 ft ² 69/20 ft ² 69/20 ft ² High Pressure Turbine 568.6 ft ² (wo credit taken) 6 6 6 Low Pressure Turbine 51/000 ft ² (wo credit taken) 6 6 6 Removal Inputs 9 51/000 ft ² (wo credit taken) 6 6 Drywell Natural Deposition Particulate: Power's Model, 10th percentite values (conservative compared to SRP 6.5.2 λ _w 6 6 Elemental: Same as particulate. Drywell Accident Conditions (maximum) P = 48.5 psig, T = 295.2 Degrees F 6 6 Surface Area for Elemental Iodine 3409 m ² 6 6 6 Steam Line and Main Condenser 90% of 136,000 ft ³ or 122,400 ft ⁴ 6 6 6 Steam Line Volume: Inboard to Saturated Conditions at 1050 psia 6 6 6 Steam Line Volume: Unboard MSIV to 173.1 ft ³ 6 6 6 6 Steam Line Volume: Inboard to 27.2 ft 6 6 <	TABLE 1 Loss-of-Coolant Accident (LOCA) Radiological Consequence Analysis Inputs								
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