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JUL 31 1992

U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - RESOLUTION OF CONTROL ROOM EMERGENCY VENTILATION SYSTEM (CREVS) ISSUES

This letter describes the corrective actions which will be implemented to resolve previous deficiencies identified with the CREVS. Upon implementation of these corrective actions, BFN will be in full compliance with General Design Criterion (GDC) 19 - Control Room. Since these corrective actions represent a change in BFNs previously reviewed approach to meeting GDC 19, TVA requests a Safety Evaluation to document the acceptability of this method.

In References 1 and 2, TVA requested approval to allow operation of BFN Unit 2 during Cycle 6 with the CREVS inoperable only because it did not meet its design basis for essentially zero unfiltered inleakage. Compensatory actions were taken to ensure that this relaxation did not result in a significant reduction in the margin of safety. This request was approved by Reference 3. In Reference 4, BFN reviewed the alternatives investigated, discussed the physical constraints, and provided a list of corrective actions and an action plan for defining the remaining corrective actions.

Enclosure 1 to this letter summarizes the background of this issue, provides a description of the modifications that will

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be implemented to resolve this problem, and reviews the results and major assumptions of the operator dose calculations. Expeditious NRC review of these corrective actions and issuance of a Safety Evaluation Report is requested by October 30, 1992, in order to support the implementation of modifications that are required to be completed prior to the restart of Unit 2 from the next refueling outage.

A summary list of commitments contained in this letter is provided as Enclosure 2. If you have any questions, please contact R. R. Baron, Manager of Site Licensing, at (205) 729-7566.

Sincerely,

O. J. Zeringue

Enclosures
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References:

1) TVA letter, dated February 14, 1989, Unit 1, 2, and 3 Technical Specification No. 265T

2) TVA letter, dated July 14, 1989, TVA Technical Specification (TS) No. 265T Control Room Habitability

3) NRC letter, dated September 18, 1989, Technical Specification Revisions Concerning Operability of the Control Room Emergency Ventilation System (TAC 72198, 72199, 72200) (TS 265T) Browns Ferry Nuclear Plants, Units 1, 2, and 3

4) TVA letter, dated May 5, 1992, Control Room Emergency Ventilation System (CREVS)

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT (BFN)
CONTROL ROOM EMERGENCY VENTILATION SYSTEM

BACKGROUND:

The Control Room Emergency Ventilation System (CREVS) is designed to protect the control room operators by automatically starting on receipt of a control room isolation signal and pressurizing the main control bay habitability zone with filtered outdoor air during accident conditions that could result in radioactive releases. This filtered air maintains the control room at a positive pressure so that all leakage should be outleakage. The CREVS uses charcoal adsorbers to assure the removal of radioactive iodine from the air and high efficiency particulate absolute (HEPA) filters for removing radioactive particulate matter.

The Control Bay ventilation towers, located on the north wall of the reactor building, provide the outside air for the Control Building supply ductwork. Ventilation fans, which are located in the ventilation towers, pressurize the supply ductwork that traverses the main control bay habitability zone. These fans operate during the accident recovery period (30 days) to supply necessary cooling for essential equipment. The existing CREVS units take suction from these positively pressurized ducts.

During the Unit 2 Cycle 5 outage, an employee concern identified a specific condition that could impact the ability of the CREVS to provide an environment suitable for personnel occupancy. The Control Building air supply ducts are not designed or fabricated to be leak tight. Unfiltered outside air could leak from the seams/joints of the supply air ducts that traverse the control bay habitability zone. This duct leakage could result in make-up air bypassing the CREVS and introducing potentially contaminated and unfiltered outside air into the control bay habitability zone.

Duct leakage was not accounted for in the previous control room dose calculations. This was determined to be an unanalyzed condition and a condition adverse to quality report was initiated. A survey of the ducts that pass through the habitability zone was completed and the ducts that contributed to the unfiltered inleakage were identified. A representative section of duct was leak tested and the results were used to estimate the total leakage of the supply duct work. Duct leakage was estimated to be 2750 CFM.

Following a postulated loss of coolant accident (LOCA), winds from the SSE, S or SSW sectors at speeds greater than thirty (30) miles per hour could offset the negative pressure maintained in the secondary containment by the standby gas treatment system (SGTS) and produce ex-filtration from the reactor building. TVA evaluated the applicable design basis events and determined that a postulated LOCA is the controlling event in terms of radioactivity release and dose consequences to the control room operators.

ENCLOSURE 1
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(CONTINUED)

General Design Criterion (GDC) 19 - Control Room, limits control room operator doses to 5 rem whole body, or its equivalent to any part of the body (30 rem thyroid). When TVA postulated a LOCA, coupled with the unfiltered inleakage, the high winds from a specific direction, and no compensatory actions, the resulting thyroid doses would have been in excess of GDC 19 limits.

During the current Unit 2 operating cycle (Cycle 6), TVA temporarily modified the operability requirements for the Control Room Emergency Ventilation System (CREVS) in the Units 1, 2, and 3 Technical Specifications. This change involved annotating the limiting conditions for operation (LCOs) 3.7.E.1, 3.7.E.3, and 3.7.E.4 by an asterisk and defining the CREVS as being inoperable because it did not meet its design basis for essentially zero unfiltered inleakage. The Technical Specification Bases 3.7.E/4.7.E were also revised to reflect this change. Power operations and fuel movement are acceptable until just prior to startup for Unit 2 Cycle 7. During Cycle 6, CREVS is being maintained functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCOs must be complied with.

Operation of Unit 2 during Cycle 6 was approved based upon the low probability of a postulated LOCA coupled with the high wind condition and the compensatory actions instituted by BFN. The compensatory actions included:

1) The operation of all three trains of the Standby Gas Treatment System following an accident to maximize the negative pressure inside secondary containment, and

2) The monitoring of plant radiological conditions to provide an early indication that the control room habitability zone may become degraded. Upon determination that there was a possibility that the iodine uptake dose to the thyroid could exceed 10 rem, potassium iodide tablets would be distributed to control room and Technical Support Center personnel.

As discussed in BFN's May 5, 1992 submittal, studies were performed to identify and evaluate potential corrective actions. The alternatives considered were:

- Replacing the existing duct with leak tight duct.

- Providing filtration of the supply air being introduced into the Control Building.

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- Seal and/or repair the existing ductwork.
- Re-route the existing ductwork outside the control bay habitability zone.
- Install a kidney type filtration system.
- Modify the Control Bay ventilation tower intakes to offset the affects of a meteorological inversion by reducing the concentration of effluents being introduced into the control bay habitability zone.
- Modify the Turbine Building and plant stack to reduce the concentration of effluents being introduced into the control room.
- Supplement the existing CREVS capacity.

The following physical constraints significantly influenced the selection of the final corrective action plan:

- Replacing, sealing, or performing external modification to the ducts, which traverses the control bay habitability zone, would involve work over the control room panels and operators. Construction noise and the potential for falling objects could challenge operations in the control room.
- Some of the ductwork that traverses the control bay habitability zone is insulated with asbestos. Improper removal of the asbestos could pose a risk to the health of the workers and the control room operators.
- The current inleakage, from the Control Building supply ductwork, assists in pressurizing the control room habitability zone. Reducing this pressurized inleakage decreases the ability to obtain a positive pressure in the control room under isolation conditions.
- Any modifications/actions that would require additional diesel generator capacity. The available margin on the diesel generators during certain accident scenarios is limited.

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As committed in TVA's May 5, 1992 submittal, a Special Test was conducted on May 23, 1992 to determine if the existing CREVS was adequately sized to pressurize the CBHZ. This test was conducted by isolating the CBHZ, including the supply and exhaust fans and ductwork that provide ventilation air to and from the outside, isolating the CREVS, and pressurizing the CBHZ by using a test fan. From the results of this test, it was determined that the total unfiltered inleakage into the CBHZ was 3717 cfm, instead of the 2750 cfm previously estimated.

DESCRIPTION OF CORRECTIVE ACTIONS

The list of corrective actions from TVA's May 5, 1992 submittal included:

- Modify the control bay ventilation towers to reduce the concentration of effluents being introduced into the control bay habitability zone. This modification will involve extending the intakes and routing them to either side of the Turbine Building. This ductwork will be seismically qualified and will include wind loadings.

  However, tornado missile protection will not be provided since this ductwork in not required to mitigate the consequences of a tornado event. Administrative controls assure adequate ventilation is provided. Outside air supply to selected areas of the control Bay is isolated and cooling is established in the areas affected by the isolation of the outside air. In addition, temperatures are monitored and additional cooling is provided, as necessary.

- Increase the leak tightness of the control bay habitability zone. This involves sealing penetrations, building expansion joints, installation of redundant bubble tight isolation dampers, and sealing other sources of outleakage.

- Establish procedures and perform testing to periodically ensure the ability to maintain a positive pressure in the control bay habitability zone.

- Remove the changes implemented under temporary Technical Specification Amendment 265T. Temporary Technical Specification Amendment 265 expires just prior to startup for Unit 2 Cycle 7. Therefore, its removal is an administrative change.

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- Revise the applicable Technical Specification Bases section. The current section states: "The control room emergency ventilation system is designed to ... maintain the control room pressure to the design positive pressure so that all leakage should be out leakage." The revised section will require the control bay habitability zone be maintained at a positive pressure.

  Submit a Technical Specification amendment request to address the new isolation dampers referenced from Surveillance Requirement 4.7.E.4. The appropriate bases section will also be revised. This amendment request will require approval prior to Unit 2 restart from the Cycle 6 outage.

In addition, TVA will:

Replace the two existing 500 cfm redundant CREVS trains with 3000 cfm of capacity for each train. This additional CREVS capacity will increase the iodine removal from the control room habitability zone after an accident and reduce the total integrated thirty day dose to the control room operators. The additional CREVS capacity will require swapping of loads from a more heavily loaded diesel generator to a diesel generator with greater margin. The Technical Specifications will be amended to reflect this change.

Since TVA has determined that the 3717 cfm of unfiltered inleakage is acceptable in terms of meeting the requirements of GDC 19 and that further reductions to the CBHZ outleakage are also unnecessary, TVA has decided not to install redundant bubble tight isolation dampers in the CBHZ boundary and to withdraw this commitment.

RESULTS OF CONTROL ROOM OPERATOR DOSE CALCULATIONS

After the corrective actions are implemented, the resultant control room operator thirty day integrated doses from a postulated LOCA will be below the GDC 19 limit. TVA has performed calculations for Unit 2 operation that assume an unfiltered inleakage of 3717 cfm, MSIV leakage of 11.5 scfh per valve, completion of the modifications to the control bay ventilation towers and 3000 cfm of CREVS capacity for each redundant train. The resulting operator doses were well below the limits of GDC 19.

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SUMMARY OF DOSE CALCULATION METHODOLOGY

The dose calculation methodology has not changed from the summary provided in TVA's May 5, 1992 letter. As previously described, the major attributes used in the dose calculations were:

1) The extreme wind conditions, which were originally assumed to produce exfiltration from the Reactor Building, need not be postulated. A probabilistic risk assessment was performed to determine the likelihood of the exfiltration event occurring during the 30 day accident recovery. This probability of occurrence is below 10^{-7} and is no longer considered a credible event.

2) The primary containment leaks to the secondary containment (Reactor Building) at a rate of two percent per day. This is the maximum allowable leakage rate specified by Technical Specification 3.7.A.2.b.

3) In addition to the leakage from the primary containment to the secondary containment, the main steam isolation valves (MSIVs) were assumed to leak at a rate of 11.5 scfh. This is the maximum leakage rate allowed by Technical Specification 4.7.A.2.i. The leakage was assumed through the MSIVs, to the low pressure turbines and condensers, out the low pressure turbine seals, and through the Turbine Building roof vents.

4) The iodine removal efficiency of the Standby Gas Treatment System and the CREVS is 90/90 percent for inorganic and organic respectively.

CONCLUSION

The corrective actions described in this submittal will ensure that post-accident radiation doses to the control room operators are maintained below regulatory limits. Expeditious NRC review of these corrective actions and issuance of a Safety Evaluation Report is requested in order to support the implementation of modifications that are required to be completed prior to the restart of Unit 2 from the upcoming refueling outage.