ENCLOSURE 1

REVISED TECHNICAL SPECIFICATION PAGES

FOR TEMPORARY TECHNICAL SPECIFICATION AMENDMENT NO. 259T

LIMITING CONDITIONS FOR OPERATION

3.7.E. Control Room Emergency Ventilation

| * 1. Except as specified in Specification 3.7.E.3 below, both control room emergency pressurization systems shall be OPERABLE at all times when any reactor vessel contains irradiated fuel.

2. a. The results of the inplace cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥99% DOP removal and ≥99% halogenated hydrocarbon removal when tested in accordance with ANSI N510-1975.

b. The results of laboratory carbon sample analysis shall show ≥90% radioactive methyl iodide removal at a velocity when tested in accordance with ASTM D3803 (130°C, 95% R.H.).

SURVEILLANCE REQUIREMENTS

4.7.E Control Room Emergency Ventilation

1. At least once every 18 months, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to to be less than 6 inches of water at system design flow rate (± 10%).

2. a. The tests and sample analysis of Specification 3.7.E.2 shall be performed at least once per operating cycle or once every 18 months, whichever occurs first for standby service or after every 720 hours of system operation and following significant painting, fire, or chemical release in any ventilation zone communicating with the system.

b. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.

| * CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

LIMITING CONDITIONS FOR OPERATION

3.7.E. Control Room Emergency Ventilation

c. System flow rate shall be shown to be within ±10% design flow when tested in accordance with ANSI N510-1975.

*,** 3. From and after the date that one of the control room emergency pressurization systems is made or found to be INOPERABLE for any reason, reactor operation or refueling operations is permissible only during the succeeding 7 days unless such circuit is sooner made OPERABLE.

*,** 4. If these conditions cannot be met, reactor shutdown shall be initiated and all reactors shall be in Cold Shutdown within 24 hours for reactor operations and refueling operations shall be terminated within 2 hours.

SURVEILLANCE REQUIREMENTS

4.7.E. Control Room Emergency Ventilation

c. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

d. Each circuit shall be operated at least 10 hours every month.

3. At least once every 18 months, automatic initiation of the control room emergency pressurization system shall be demonstrated.

4. During the simulated automatic actuation test of this system (see Table 4.2.G), it shall be verified that the following dampers operate as indicated:

Close: FCO-150 B, D, E, and F
Open: FCO-151,
FCO-152

* LCO not applicable with no fuel in any reactor vessel.

** CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

3.7.E/4.7.E Control Room Emergency Ventilation

The control room emergency ventilation system is designed to filter the control room atmosphere for intake air and/or for recirculation during control room isolation conditions. The control room emergency ventilation system is designed to automatically start upon control room isolation and to maintain the control room pressure to the design positive pressure so that all leakage should be out leakage. During cycle 6, CREVS has been declared inoperable only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to startup for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be 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.

High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential intake of radioiodine to the control room. The in-place test results should indicate a system leak tightness of less than 1 percent bypass leakage for the charcoal adsorbers and a HEPA efficiency of at least 99 percent removal of DOP particulates. The laboratory carbon sample test results should indicate a radioactive methyl iodide removal efficiency of at least 90 percent for expected accident conditions. If the efficiencies of the HEPA filters and charcoal adsorbers are as specified, the resulting doses will be less than the allowable levels stated in Criterion 19 of the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50. Operation of the fans significantly different from the design flow will change the removal efficiency of the HEPA filters and charcoal adsorbers.

If the system is found to be inoperable, there is no immediate threat to the control room and reactor operation or refueling operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, the reactor is shutdown and brought to Cold Shutdown within 24 hours or refueling operations are terminated.

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than six inches of water at the system design flow rate will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop should be determined at least once per operating cycle to show system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Tests of the charcoal adsorbers with halogenated hydrocarbon shall be performed in accordance with USAEC Report-1082. Iodine removal efficiency tests shall follow ASTM D3803. The charcoal adsorber efficiency test procedures should allow for the removal of one adsorber tray, emptying of one bed from the tray, mixing the adsorbent thoroughly and obtaining at least two samples. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. If test results are unacceptable, all adsorbent in the system shall be replaced with an adsorbent qualified according to Table 1 of Regulatory Guide 1.52. The replacement tray for the adsorber tray removed for the test should meet the same adsorbent quality. Tests of the HEPA filters with DOP aerosol shall be performed in accordance to ANSI N510-1975. Any HEPA filters found defective shall be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.E. Control Room Emergency Ventilation | 4.7.E Control Room Emergency Ventilation |
| * 1. Except as specified in Specification 3.7.E.3 below, both control room emergency pressurization systems shall be OPERABLE at all times when any reactor vessel contains irradiated fuel. | 1. At least once every 18 months, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to to be less than 6 inches of water at system design flow rate (± 10%). |
| 2. a. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥99% DOP removal and ≥99% halogenated hydrocarbon removal when tested in accordance with ANSI N510-1975. | 2. a. The tests and sample analysis of Specification 3.7.E.2 shall be performed at least once per operating cycle or once every 18 months, whichever occurs first for standby service or after every 720 hours of system operation and following significant painting, fire, or chemical release in any ventilation zone communicating with the system. |
| b. The results of laboratory carbon sample analysis shall show ≥90% radioactive methyl iodide removal at a velocity when tested in accordance with ASTM D3803 (130°C, 95% R.H.). | b. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing. |

* CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

LIMITING CONDITIONS FOR OPERATION

3.7.E. Control Room Emergency Ventilation

c. System flow rate shall be shown to be within ±10% design flow when tested in accordance with ANSI N510-1975.

*,** 3. From and after the date that one of the control room emergency pressurization systems is made or found to be INOPERABLE for any reason, reactor operation or refueling operations is permissible only during the succeeding 7 days unless such circuit is sooner made OPERABLE.

*,** 4. If these conditions cannot be met, reactor shutdown shall be initiated and all reactors shall be in Cold Shutdown within 24 hours for reactor operations and refueling operations shall be terminated within 2 hours.

* LCO not applicable with no fuel in any reactor vessel.

SURVEILLANCE REQUIREMENTS

4.7.E. Control Room Emergency Ventilation

c. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

d. Each circuit shall be operated at least 10 hours every month.

3. At least once every 18 months, automatic initiation of the control room emergency pressurization system shall be demonstrated.

4. During the simulated automatic actuation test of this system (see Table 4.2.G), it shall be verified that the following dampers operate as indicated:

Close: FCO-150 B, D, E, and F
Open: FCO-151
FCO-152

** CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

3.7.E/4.7.E Control Room Emergency Ventilation

The control room emergency ventilation system is designed to filter the control room atmosphere for intake air and/or for recirculation during control room isolation conditions. The control room emergency ventilation system is designed to automatically start upon control room isolation and to maintain the control room pressure to the design positive pressure so that all leakage should be out leakage. During cycle 6, CREVS has been declared inoperable only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to startup for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be 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.

High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential intake of radioiodine to the control room. The in-place test results should indicate a system leak tightness of less than 1 percent bypass leakage for the charcoal adsorbers and a HEPA efficiency of at least 99 percent removal of DOP particulates. The laboratory carbon sample test results should indicate a radioactive methyl iodide removal efficiency of at least 90 percent for expected accident conditions. If the efficiencies of the HEPA filters and charcoal adsorbers are as specified, the resulting doses will be less than the allowable levels stated in Criterion 19 of the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50. Operation of the fans significantly different from the design flow will change the removal efficiency of the HEPA filters and charcoal adsorbers.

If the system is found to be inoperable, there is no immediate threat to the control room and reactor operation or refueling operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, the reactor is shutdown and brought to Cold Shutdown within 24 hours or refueling operations are terminated.

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than six inches of water at the system design flow rate will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop should be determined at least once per operating cycle to show system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Tests of the charcoal adsorbers with halogenated hydrocarbon shall be performed in accordance with USAEC Report-1082. Iodine removal efficiency tests shall follow ASTM D3803. The charcoal adsorber efficiency test procedures should allow for the removal of one adsorber tray, emptying of one bed from the tray, mixing the adsorbent thoroughly and obtaining at least two samples. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. If test results are unacceptable, all adsorbent in the system shall be replaced with an adsorbent qualified according to Table 1 of Regulatory Guide 1.52. The replacement tray for the adsorber tray removed for the test should meet the same adsorbent quality. Tests of the HEPA filters with DOP aerosol shall be performed in accordance to ANSI N510-1975. Any HEPA filters found defective shall be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.E. Control Room Emergency Ventilation | 4.7.E Control Room Emergency Ventilation |
| * 1. Except as specified in Specification 3.7.E.3 below, both control room emergency pressurization systems shall be OPERABLE at all times when any reactor vessel contains irradiated fuel. | 1. At least once every 18 months, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to to be less than 6 inches of water at system design flow rate (± 10%). |
| 2. a. The results of the inplace cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥99% DOP removal and ≥99% halogenated hydrocarbon removal when tested in accordance with ANSI N510-1975. | 2. a. The tests and sample analysis of Specification 3.7.E.2 shall be performed at least once per operating cycle or once every 18 months, whichever occurs first for standby service or after every 720 hours of system operation and following significant painting, fire, or chemical release in any ventilation zone communicating with the system. |
| b. The results of laboratory carbon sample analysis shall show ≥90% radioactive methyl iodide removal at a velocity when tested in accordance with ASTM D3803 (130°C, 95% R.H.). | b. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing. |

* CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

LIMITING CONDITIONS FOR OPERATION

3.7.E. Control Room Emergency Ventilation

c. System flow rate shall be shown to be within ±10% design flow when tested in accordance with ANSI N510-1975.

*,** 3. From and after the date that one of the control room emergency pressurization systems is made or found to be INOPERABLE for any reason, reactor operation or refueling operations is permissible only during the succeeding 7 days unless such circuit is sooner made OPERABLE.

*,** 4. If these conditions cannot be met, reactor shutdown shall be initiated and all reactors shall be in Cold Shutdown within 24 hours for reactor operations and refueling operations shall be terminated within 2 hours.

* LCO not applicable with no fuel in any reactor vessel.

** CREVS is considered INOPERABLE only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to STARTUP for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's must be complied with.

SURVEILLANCE REQUIREMENTS

4.7.E. Control Room Emergency Ventilation

c. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

d. Each circuit shall be operated at least 10 hours every month.

3. At least once every 18 months, automatic initiation of the control room emergency pressurization system shall be demonstrated.

4. During the simulated automatic actuation test of this system (see Table 4.2.G), it shall be verified that the following dampers operate as indicated:

Close: FCO-150 B, D, E, and F
Open: FCO-151,
FCO-152

3.7.E/4.7.E Control Room Emergency Ventilation

The control room emergency ventilation system is designed to filter the control room atmosphere for intake air and/or for recirculation during control room isolation conditions. The control room emergency ventilation system is designed to automatically start upon control room isolation and to maintain the control room pressure to the design positive pressure so that all leakage should be out leakage. During cycle 6, CREVS has been declared inoperable only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to startup for Unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be 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.

High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential intake of radioiodine to the control room. The in-place test results should indicate a system leak tightness of less than 1 percent bypass leakage for the charcoal adsorbers and a HEPA efficiency of at least 99 percent removal of DOP particulates. The laboratory carbon sample test results should indicate a radioactive methyl iodide removal efficiency of at least 90 percent for expected accident conditions. If the efficiencies of the HEPA filters and charcoal adsorbers are as specified, the resulting doses will be less than the allowable levels stated in Criterion 19 of the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50. Operation of the fans significantly different from the design flow will change the removal efficiency of the HEPA filters and charcoal adsorbers.

If the system is found to be inoperable, there is no immediate threat to the control room and reactor operation or refueling operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, the reactor is shutdown and brought to Cold Shutdown within 24 hours or refueling operations are terminated.

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than six inches of water at the system design flow rate will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop should be determined at least once per operating cycle to show system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Tests of the charcoal adsorbers with halogenated hydrocarbon shall be performed in accordance with USAEC Report-1082. Iodine removal efficiency tests shall follow ASTM D3803. The charcoal adsorber efficiency test procedures should allow for the removal of one adsorber tray, emptying of one bed from the tray, mixing the adsorbent thoroughly and obtaining at least two samples. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. If test results are unacceptable, all adsorbent in the system shall be replaced with an adsorbent qualified according to Table 1 of Regulatory Guide 1.52. The replacement tray for the adsorber tray removed for the test should meet the same adsorbent quality. Tests of the HEPA filters with DOP aerosol shall be performed in accordance to ANSI N510-1975. Any HEPA filters found defective shall be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52.

ENCLOSURE 2

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

## Description of Change

TVA proposes a temporary modification to the operability requirements for the Control Room Emergency Ventilation System (CREVS) in the units 1, 2 and 3 Technical Specifications. This change involves annotating limiting conditions for operations (LCOs) 3.7.E.1, 3.7.E.3 and 3.7.E.4 by an asterisk and defining the CREVS as being inoperable only because it does not meet its design basis for essentially zero unfiltered inleakage. Power operations and fuel movement are acceptable until just prior to startup for unit 2 cycle 7. During cycle 6, CREVS must be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the limiting conditions for operation must be complied with. (Note: "Prior to startup" is defined as "prior to withdrawing the first control rod for the purpose of making the reactor critical." This definition was submitted by letter from R. Gridley to NRC, dated May 31, 1988, as part of Technical Specification Amendment No. 240). Technical Specification Bases 3.7.E/4.7.E will be revised to describe this temporary change.

## Reason for Change

Technical Specification LCO 3.7.E.1 requires both CREVS to be operable at all times when any reactor vessel contains irradiated fuel, except as specified in LCO 3.7.E.3. When one of the CREVS is made or found to be inoperable, reactor operation or refueling operations are permissible only for the succeeding seven days unless such circuit is sooner made operable (LCO 3.7.E.3). If these conditions cannot be met, reactor shutdown will be initiated and all reactors will be in Cold Shutdown within 24 hours for reactor operations and refueling operations will be terminated within 2 hours (LCO 3.7.E.4).

Temporary Technical Specification (TS) Amendment TS-245T addressed and justified allowing both trains of the CREVS to be inoperable during the unit 2 cycle 5 outage while no fuel was in any reactor vessel. This was based primarily on the fact that the BFN fuel has decayed at least three years, so the radiological consequences due to potential fuel damage are much less severe than normally predicted.

Temporary Technical Specification Amendment TS-253 addressed and justified CREVS not being operable during unit 2 cycle 6 fuel loading and sub-critical functional testing operations up to the time the first control rod is pulled to critical for unit 2 cycle 6.

The proposed temporary technical specification changes are shown in enclosure 1. Since the CREVS is a common system and since its operability is required for the operation of any unit, the technical specification changes are written against all three BFN units. These changes will allow unit 2 cycle 6 operation and permit the subsequent defueling, refueling, and sub-critical functional testing activities required until just prior to startup for unit 2 cycle 7.

Technical Specification Bases 3.7.E/4.7.E states that the control room emergency ventilation system is designed to automatically start upon control room isolation and to maintain the control room pressure at a slight positive pressure so that all leakage should be outleakage. In response to BFN Final Safety Analysis Report (FSAR) Question 10.2, TVA stated that in emergencies, the makeup air to the control room will pass through at least three, and possibly four, air cleanup stages. (The fourth stage is the optional HEPA filter in the ventilation system inlet tower.) A Condition Adverse to Quality Report identified a specific limited condition which could impact the ability of the CREVS to provide an environment suitable for personnel occupancy at all times as committed to in FSAR Section 10.12.6. The control building is adjacent to, and north of, the reactor building (secondary containment). The control building ventilation supply towers are located on the north wall of the reactor building. Following a loss of coolant accident, winds from the SSE, S, or SSW sectors at speeds greater than thirty-six (36) miles per hour could offset the negative pressure maintained in the secondary containment by the standby gas treatment system (SGTS) and produce exfiltration from the reactor building. These atmospheric conditions could introduce contaminated air into the control building air supply ductwork through the ventilation supply towers. The ventilation fans, which are located in the ventilation towers, pressurize the supply ductwork which traverses the control bay habitability zone (HZ). The CREVS takes suction from these ducts, which have not been designed nor constructed to be leak tight. Therefore, unfiltered outside air could leak from the seams/joints of the supply air ducts which traverse the control bay habitability zone and could bypass the CREVS, introducing a previously unanalyzed source of unfiltered outside air into the control bay habitability zone.

Based on the above, the current CREVS does not meet the Technical Specification Bases or BFN FSAR design commitment for essentially zero inleakage of unfiltered outside air. The proposed temporary technical specification changes are written to allow power operations and permit the subsequent defueling, refueling, and sub-critical functional testing required until just prior to startup for unit 2 cycle 7 while a permanent resolution to this condition is determined and implemented.

Justification for Change

The CREVS is designed to protect the control room operators by pressurizing the main control room habitability zone (HZ) which includes the main control room (MCR) with filtered air during accident conditions which could result in radioactive releases into the MCR. The CREVS uses charcoal adsorbers to assure the removal of radioactive iodine from the air and high efficiency particulate absolute (HEPA) filters for removing particulate matter.

The BWR operating states and applicable design basis events are identified in BFN FSAR Appendix G and are further supplemented in Revision 1 to the Design Baseline and Verification Program (DB&VP) Safe Shutdown Analysis (SSA). These two sources were reviewed to determine which events had the potential for causing fuel damage and radioactive releases which could require the filtration provided by CREVS. This review indicated that the CREVS is required to mitigate events in each of the five BWR operating states (A, C, D, E and F) defined in FSAR Appendix G. It should be noted that operating state B, which is defined in Appendix G, is no longer applicable as noted in the SSA. The applicable design basis events and operating states are summarized as follows:

| SSA Event Number | Description | Operating States |
|---|---|---|
| 24 | Control Rod Drop Accident (RDA) | D, F |
| 25D | Loss of Coolant Accident (LOCA) | C, D, E, F |
| 26 | Fuel Handling Accident (FHA) | A |
| 27 | Pipe Break Outside Primary Containment [Main Steam Line Break (MSLB)] | C, D, E, F |
| 33 | Loss of Fuel Pool Cooling | All |

The RDA, LOCA, pipe break outside primary containment and the FHA were recently analyzed to evaluate the control room doses. Of these events, the LOCA (design basis pipe break inside primary containment) postulated to occur in Operating State F is the controlling event in terms of radioactive release and dose consequences.

TVA has evaluated the LOCA, FHA, MSLB and RDA to determine which is the controlling design basis accident for resulting doses to the control room operators. The control room operator doses as a result of the RDA and the MSLB accident were shown to be well below the General Design Criterion (GDC) 19 guidelines even when the control room is not isolated and the normal HVAC flow of 4000 cfm of unfiltered outdoor air is continuously supplied.

Control room operator doses have recently been calculated for the FHA considering the degraded performance of the CREVS which permits unfiltered outdoor air to leak into the control room. The calculation assumes that during the refueling period, a fuel bundle is dropped either into the reactor pressure vessel or in the fuel storage pool. The dropped fuel bundle strikes additional bundles resulting in the fracturing of 125 fuel rods. The limiting case is the fuel drop into the storage pool as described in FSAR Section 14.6.4.

The source terms in the model are the total core activities of noble gases and iodines. The iodines are split into 99.75 percent inorganic and 0.25 percent organic iodine groupings. Ten percent of the iodine inventory plus 10 percent of all the noble gases inventory (except 30 percent of Kr-85) are assumed to be released from the fractured fuel rods. The accident is postulated to occur three days after shutdown (based on past fuel handling experience) and the reactor fuel is assumed to have an average irradiation time of 876 days at rated power.

The present analysis demonstrates that the dose contribution to the operators from the stack release, subsequent to isolation of the refueling zone exhaust, is negligible. Therefore, only the activity released through the refueling zone exhaust in the five seconds before it isolates is considered in the calculation of the operator dose. A dispersion factor of 1.25 X 10(-3) sec/cubic meters is utilized for the refueling zone roof exhaust release point.

The calculation assumes 500 cfm of flow into the control room which has been filtered through the CREVS and 2750 cfm of unfiltered outdoor air leakage. The 500 cfm of CREVS processed air is the design value as stated in BFN FSAR section 10.12.5.3. In order to estimate the leakage of outdoor air into the control room, all HVAC supply air ductwork which passes through the control bay habitability zone and operates during the control bay isolation mode was reviewed. Initial estimates of the magnitude of leakage into the control bay habitability zone were made using Sheet Metal and Air Conditioning National Association (SMACNA) standards for leakage from this type of pocket lock duct construction. The leakage was estimated on the basis of the size and length of duct in the habitability zone and was estimated to be between 726 cfm and 2750 cfm. Subsequently a test was performed on a sample section of the BFN ductwork. Based on the results of the test, the initial estimates were refined to show that the amount of bypass leakage into the control bay is in the range of 1880 cfm assuming turbulent flow to 3200 cfm assuming laminar flow with the expected value being 2200 cfm. On this basis, the original estimate of 2750 cfm conservatively bounds the expected leakage rate of 2200 cfm and was utilized in the dose assessment.

Under these conditions and assumptions, the main control room doses 30 days after the FHA are predicted to be 0.27 rem whole body gamma, 0.24 rem whole body beta and 12.3 rem thyroid (inhalation). These results are well below the 5 rem whole body and 30 rem thyroid guidelines of 10CFR50, Appendix A, GDC 19.

The spent fuel pools and fuel pool cooling and cleanup system are described in FSAR Sections 10.3 and 10.5, respectively. The fuel pool cooling system is supplemented by the residual heat removal (RHR) system which can be connected to the fuel pool cooling and cleanup system. The design includes a permanently installed crosstie to the RHR system which assures adequate makeup under all normal and off normal conditions (i.e., fuel pool water boil-off). Therefore, significant radioactivity release due to loss of cooling inventory and fuel uncovery is precluded and the CREVS is not required to mitigate this event.

The control room operator doses resulting from the design basis LOCA were reevaluated considering the range of estimated CREVS bypass air leakage. A second analysis was performed for the controlling LOCA case to determine the operator dose considering the previously analyzed (FSAR Question 10.2) assumption of reactor building exfiltration due to high winds concurrent with the LOCA.

The control room operator doses resulting from the LOCA were calculated using the computer codes STP and COROD. The activity released to the environment during the accident was calculated with STP in accordance with the Regulatory Guide 1.3, Revision 2. The predicted activity release was then input to COROD which calculated the resulting control room operator doses. Details of the individual models and model assumptions are provided in the calculations. The models are generally the same except that the exfiltration model includes the additional ground level release path with associated dispersion factor and utilizes a larger volume for the secondary containment as developed in a supporting calculation. The exfiltration was modeled as a puff release beginning at the time of maximum concentration in the Reactor Building (2 hours post-LOCA). The rate of exfiltration was calculated considering the pressure differential induced across the exterior walls and roof of the Reactor Building as a function of wind speed and direction.

The results of the LOCA and fuel handling accident cases without the exfiltration assumption show that the predicted doses to the control bay operators are well below the allowable guidelines of GDC 19 even with 2750 cfm of outside air leakage which bypasses CREVS.

The control room operator whole body gamma dose due to exfiltration following a LOCA is less than 0.1 rem (with 2750 cfm of unfiltered flow into the control bay). The whole body gamma dose from stack releases and contained sources is less than 1.8 rem. Hence, the whole body gamma dose from all sources is less than 2 rem. The control room operator beta dose due to exfiltration is less than 1.0 rem. The beta dose from stack releases is less than 0.4 rem. The total beta dose from all post-LOCA sources is less than 2 rem. The control room operator iodine dose to the thyroid due to exfiltration, with the secondary containment (Reactor Building) internal pressure at -0.25" W.G., is 289 rem. The iodine dose from stack releases is less than 6 rem. The total iodine dose to the thyroid from all post-LOCA sources is 295 rem..

However, the calculations for exfiltration rates show that the exfiltration rate is strongly dependent upon the negative pressure maintained by the SGTS inside the secondary containment. For example, the thyroid dose reduces (due to reduced exfiltration rate with increased vacuum in the Reactor Building) from 295 rem at -0.25" W.G. to 13 rem at -0.60" W.G.. The wind speed required to offset -0.60" W.G. is approximately 49 miles per hour. A review of the latest meteorological data shows that (considering the appropriate seven direction sectors) wind speeds greater than 40 miles per hour have occurred only five times in the ten year period from January 1, 1977 through December 31, 1987.

Technical Specification 4.7.C.1.A requires the SGTS be able to maintain secondary containment at a 1/4 inch of water vacuum under calm wind conditions with a flow rate of not more than 12,000 CFM (two trains). The SGTS is expected to maintain more than the minimum Technical Specification requirement of 0.25" W.G. in the Reactor Building. The latest (docketed April 14, 1988) secondary containment leak test performed in accordance with Technical Specification Surveillance Instruction 4.7.C demonstrated that a SGTS flow rate of 7994 cfm maintained a vacuum of 0.29" W.G.. Each of the three SGTS trains is designed to process a flow rate of 9000 cfm. Therefore, with two trains of SGTS operating in the accident (unthrottled) mode, the secondary containment vacuum is expected to be on the order of 0.50" W.G..

Browns Ferry has three Standby Gas Treatment System (SGTS) trains. All three trains of the SGTS start automatically upon receipt of high radiation in the reactor zone exhaust duct or 2 downscales, high radiation in the refueling zone exhaust duct or 2 downscales, low reactor vessel water level, or high drywell pressure signals. Technical Specification 3.7.B.1 requires all three trains be operable at all times when secondary containment integrity is required except as specified in Specification 3.7.B.3. Technical Specification 3.7.B.3 states that from and after the date that one train of the SGTS is made or found to be inoperable, reactor operation and fuel handling is permissible only during the succeeding seven days.

Based upon the above, a LOCA concurrent with the wind conditions required to produce exfiltration is considered to be a highly unlikely event. Should this scenario occur, the actual control room operator dose is expected to be considerably less than the worst case (295 rem) prediction due to the increased vacuum maintained inside the secondary containment.

In order to provide further assurance that the control room operators are protected from thyroid doses during the temporary period (cycle 6) in which the CREVS will be declared inoperable, BFN commits to take the following compensatory actions:

1) During an emergency, plant radiological conditions will be monitored to provide an early indication that the control room and Technical Support Center (TSC) habitability may become degraded. Adverse radiological conditions would be high iodine activity in the reactor building. Upon determination that there is a significant possibility that the iodine uptake dose to the thyroid could exceed 10 rem, potassium iodide tablets will be distributed to all control room and TSC personnel. The value of 10 rem was chosen based upon a comparison of the medical risks from receiving a 10 rem thyroid dose to the medical risk from taking the potassium iodide tablet. Once the potassium iodide tablets are metabolized (in approximately 30 to 60 minutes), further uptake of iodine and the resulting dose to the thyroid will be negligible.

2) During emergency conditions, the appropriate abnormal operating procedure procedure will be clarified to assure all available trains of the SGTS will be operated to maximize the negative pressure (vacuum) in the secondary containment.

Although the CREVS is technically inoperable for the purposes of the technical specifications because it does not meet its zero unfiltered inleakage commitment, the system will be operated during accident conditions to maintain a slightly positive pressure in the control room and to provide some degree of filtering of the outside air. To demonstrate that the CREVS will be functional during cycle 6, all applicable surveillances will be performed. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's will be complied with.

The calculations show that the control room operators whole body doses following the worst case design basis accident (LOCA) remain well below the guidelines of 10 CFR 50, Appendix A, General Design Criterion 19, "Control Room". The control room operators thyroid dose will be controlled by compensatory actions and will not significantly exceeding the requirements of 10 CFR 50, Appendix A, GDC 19. These compensatory actions will be in effect throughout the period of applicability of the temporary technical specification amendment. Based on the above, TVA is requesting the temporary relaxation of the CREVS technical specifications as specified in enclosure 1. This relaxation will allow unit restart and will not compromise the health and safety of the public.

ENCLOSURE 3

# DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION
# BROWNS FERRY NUCLEAR PLANT
# UNITS 1, 2, AND 3

## Description of Proposed Technical Specification Amendment

The proposed amendment to the Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3 Technical Specifications consists of temporary changes to the operability requirements for the Control Room Emergency Ventilation System (CREVS). These changes involve annotating 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 only because it does not meet its design basis for essentially zero unfiltered inleakage. This amendment would allow power operations and fuel movement until just prior to startup for unit 2 cycle 7. During cycle 6, CREVS will be demonstrated to be functional by performing all applicable surveillances. In the event that the applicable surveillances are not successfully performed, the actions required by the LCO's will be complied with. This will allow system evaluation, design and modifications to proceed in parallel with operational activities until just prior to startup for unit 2 cycle 7.

## Basis for Proposed No Significant Hazards Consideration Determination

NRC has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92(c). A proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from an accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated. The proposed temporary changes to the technical specifications involve relaxations to system operability requirements for the CREVS during those operational and fuel handling activities leading to and just prior to startup for unit 2 cycle 7.

   This action does not increase the probability of any accident previously evaluated since the proposed temporary changes to the technical specifications do not affect the precursors or initiators for these accidents.

The loss of coolant accident (LOCA) evaluated in the Browns Ferry Nuclear Plant Final Safety Analysis Report,(FSAR) Sections 14.6.3, 14.10.5, and the response to FSAR Question 10.2 represents the most severe event that is applicable in terms of radioactive release and dose consequences. The initiating event and accident scenario are still valid. The requested relaxation in system operability for the CREVS has been evaluated. The calculation of doses to the control room operators has been performed assuming the introduction of the estimated unfiltered air inleakage. The control room operator whole body gamma and beta skin doses will not exceed the guidelines of 10 CFR 50, Appendix A, General Design Criterion (GDC) 19, "Control Room". Compensatory actions will be taken to prevent the control room operator thyroid dose from significantly exceeding the requirements of 10 CFR 50, Appendix A, GDC 19. Therefore, the proposed temporary changes do not involve a significant increase in the consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from an accident previously evaluated. The proposed temporary changes will modify present system operability requirements, however, no new modes of plant operations are introduced which could contribute to the possibility of a new or different kind of accident. The fuel handling and operational activities involved are bounded by those analyzed in the FSAR. The loss of coolant accident is the most severe event that could occur during plant operations or fuel unloading or other activities being conducted just prior to startup for unit 2 cycle 7.

3. The proposed amendment does not involve a significant reduction in a margin of safety. The proposed temporary technical specification changes will modify the operability requirements of the CREVS during plant operations and fuel handling or other activities being conducted just prior to startup for unit 2 cycle 7. The whole body doses to the control room operators following the worst case design basis accident, considering the degraded performance of the CREVS, remain well below the GDC 19 guideline. The thyroid dose to the control room operators will be controlled by compensatory actions which will be in effect throughout the period of the applicability of the temporary specification and will not significantly exceed the guidelines of 10 CFR 50, Appendix A, GDC 19. These changes do not significantly reduce the margin of safety defined in the basis of any technical specification.

Determination of Basis for Proposed No Significant Hazards

Since the application for amendment involves a proposed change that is encompassed by the criteria for which no significant hazards consideration exists, TVA has made a proposed determination that the application involves no significant hazards consideration.