Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

APR 29 1991

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

Gentlemen:

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

BROWNS FERRY NUCLEAR PLANT (BFN) - PROGRAM FOR RESOLVING LONG-TERM TORUS INTEGRITY ISSUE PRIOR TO THE RESTART OF UNITS 1 AND 3

Reference: TVA letter, dated January 9, 1991, Plans for the Return to Service of BFN Units 1 and 3

As part of the referenced letter, TVA committed to provide the NRC Staff with the action plan for dispositioning the long-term torus integrity issue at BFN Units 1 and 3. Enclosure 1 to this letter provides a summary of this issue, a review of the Unit 2 resolution, a discussion of lessons learned, and a description of how this issue will be resolved on Units 1 and 3. This submittal is provided for informational purposes only. No NRC action is specifically requested.

A summary list of commitments contained in this letter is provided in Enclosure 2. If you have any questions, please contact Joseph E. McCarthy, Unit 3 Licensing Manager, at (205) 729-3604.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
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Enclosures
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U.S. Nuclear Regulatory Commission

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# ENCLOSURE 1
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

## ISSUE SUMMARY

The Browns Ferry Units 1, 2, and 3 containment systems are one of the first generation General Electric (GE) Boiling Water Reactor (BWR) nuclear steam supply systems housed in a containment structure designated as the Mark I containment system. The original design of the Mark I containment system included pressure and temperature loads associated with a Loss of Coolant Accident (LOCA), seismic loads, dead loads, jet impingement loads, hydrostatic loads due to water in the suppression chamber, overload pressure test loads, and construction loads.

During the conduct of a large scale testing program for the advanced design pressure suppression containment system (Mark III), new suppression pool hydrodynamic loads associated with a postulated LOCA were identified which had not been included in the original design of the Mark I containment system. In addition, experience at operating plants indicated that the dynamic effects of safety relief valve discharges to the suppression pool could be substantial and needed reconsideration.

Interim operation of GE BWRs with a Mark I containment was found to be acceptable as documented in NUREG-0408, Mark I Containment Short-Term Program Safety Evaluation Report, dated December 1977. A generic letter was issued to all Mark I BWRs on March 12, 1979, which established the schedule for the resolution and implementation of the plant unique aspects of the Mark I Containment Long-Term Program.

The long-term issues were considered to be resolved in July 1980, when NRC issued NUREG-0661, Safety Evaluation Report - Mark I Containment Long-Term Program. This report specified NRC generic acceptance criteria which were required to: 1) Establish design basis loads that were appropriate for the anticipated life of each Mark I BWR facility, and 2) Restore the originally intended design safety margins for each Mark I containment system. Supplement 1 was issued in August 1982.

TVA submitted the required torus integrity long-term program plant unique analysis report by letters dated January 3, 1984, September 11, 1984, and January 25, 1985. TVA then performed the committed modifications for all three units. NRC performed a post-implementation audit and documented their review in a Safety Evaluation, dated May 6, 1985. This Safety Evaluation completed NRC action for all three BFN units.

# ENCLOSURE 1 (CONTINUED)
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

Discrepancies between the designed modifications and the as-constructed torus attached piping supports were identified in Units 1 and 3 by NRC in Inspection Report 85-26, dated May 14, 1985. Deficiencies in weldments and qualification of welders were identified in Inspection Report 86-34, dated December 5, 1986. These discrepancies were the impetus for the Unit 2 long-term torus integrity corrective action program. TVA's long-term torus integrity corrective action program was initially focussed on Units 2 and 3, but soon shifted exclusively to Unit 2 when Unit 2 was made the restart priority.

The following is a summary of the more significant TVA/NRC correspondence which documents the resolution of these discrepancies. This summary is provided in order to assist the NRC Staff if additional detailed historical information is required. TVA responded to the violation cited in Inspection Report 85-26 by letters dated June 14, 1985, July 3, 1985, and July 31, 1986. The violation was closed in Inspection Report 86-30, dated October 10, 1986. TVA responded to the violation cited in Inspection Report 86-34 by letter, dated December 30, 1986. This violation was closed in Inspection Report 87-11, dated September 16, 1987.

Monitoring and evaluation of TVA's corrective actions is also documented in:

Inspection Report 85-30, dated June 24, 1985,
Inspection Report 87-07, dated March 9, 1987,
Inspection Report 88-12, dated July 5, 1988,
Inspection Report 88-19, dated August 29, 1988,
Inspection Report 88-28, dated December 9, 1988,
Inspection Report 88-35, dated March 17, 1989,
Inspection Report 89-15, dated May 18, 1989,
Section 2.2.4.4 of NUREG-1232, Volume 3, Supplement 1, dated October 24, 1989, and
Inspection Report 89-44, dated December 11, 1989.

TVA responded to the final inspection open item by letter dated March 16, 1990. By letter dated October 2, 1990, TVA provided notification that BFN had implemented the requirements of the long-term torus integrity program for Unit 2. The acceptability of TVA's program to re-evaluate the adequacy of the torus integrity for Unit 2 was documented in Section 2.2.4.4 of NUREG-1232, Volume 3, Supplement 2, dated January 23, 1991.

# ENCLOSURE 1 (CONTINUED)
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

A review of the Unit 2 resolution, a discussion of lessons learned, and a description of how this issue will be resolved on Units 1 and 3 is presented below.

## REVIEW OF THE UNIT 2 RESOLUTION OF TORUS ATTACHED PIPING SUPPORTS, TORUS, AND TORUS RELATED STRUCTURES

TVA's long-term torus integrity corrective action program initially consisted of the development of procedures and instructions for the re-inspection of those configurational attributes associated with the torus attached piping support modifications required by the long-term torus integrity program (LTTIP). Examples of the inspection attributes included verification of support location, member sizes, welds (size and configuration), and bolting. The scope of these inspections was subsequently expanded to include additional commodities. This revised corrective action program included the following commodities:

1) Torus attached piping supports, including portions not modified as part of the LTTIP upgrades,

2) Torus structural modifications which were part of the LTTIP upgrades (e.g., torus tie-downs, cradle and ring girder reinforcements, and torus shell reinforcements), and

3) Torus related structures which were modified as part of the long-term torus upgrades (e.g., vent system, safety relief valve system, catwalk, and valve access platforms).

The safety-related portions of these commodities were inspected. Discrepancies between the as-designed and as-constructed configuration were analyzed and modified, as necessary, to correct the discrepancies.

# ENCLOSURE 1 (CONTINUED)
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

Valve access platforms and the majority of the catwalk inside the torus are non-safety-related. The safety design basis for these non-safety-related torus internal structures requires their structural integrity not be compromised by design basis loadings.

TVA's corrective action program for the valve access platforms involved an inspection of two of the six platforms using the attributes previously discussed. These inspection results were evaluated and no modifications were required to insure the structural integrity of the platforms. Therefore, inspections were not performed on the remaining four platforms.

TVA's corrective action program for the non-safety-related portion of the catwalk involved an inspection of a sample of the catwalk using the attributes previously discussed. These inspection results were evaluated. Modifications were required to welds and to bolted connections to ensure the structural integrity of the catwalk. The remainder of the non-safety-related catwalk was only inspected for these two attributes and the required modifications were performed.

TVA has developed a long-term torus integrity corrective action plan for Units 1 and 3 based upon the review of the Unit 2 precedent. This corrective action plan is composed of separate programs for:

1) Torus attached piping supports, and

2) The torus and torus related structures.

The program for torus related structures is further divided into programs for safety-related and non-safety-related structures. A discussion of the specific lessons learned from the Unit 2 precedent and a detailed description of the Units 1 and 3 corrective action plan is presented below for each of these separate program areas. In summary, TVA will implement a program for Units 1 and 3 torus attached piping supports in accordance with the Unit 2 criteria and implementation precedent. TVA's will use the lessons learned from the Unit 2 precedent to refine the implementation of the program for Units 1 and 3 torus and torus related structures.

# ENCLOSURE 1 (CONTINUED)
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

## DISCUSSION OF LESSONS LEARNED FROM UNIT 2 TORUS ATTACHED PIPING SUPPORTS

TVA's program for the resolution of torus attached piping support discrepancies resulted in modifications for each of the inspection attributes. Therefore, TVA can not justify the elimination of any of these attributes from the inspection of Units 1 and 3 torus attached piping supports.

## DESCRIPTION OF THE UNITS 1 AND 3 PROGRAM FOR TORUS ATTACHED PIPING SUPPORTS

TVA has determined that the resolution of torus attached piping support discrepancies will be implemented, in accordance with the Unit 2 criteria and will use the configurational attributes from the Unit 2 implementation precedent. This work will be completed prior to the restart of Units 1 and 3.

## DISCUSSION OF LESSONS LEARNED FROM UNIT 2 TORUS AND TORUS RELATED STRUCTURES

TVA's program for the resolution of Unit 2 structural discrepancies on safety-related torus and torus related structures resulted in modifications associated with each of the applicable inspection attributes, except for:

1) Dimensions of standard structural shapes,

2) Correct materials,

3) Grout dimensions, and

4) Location of commodities attached to concrete surface mounted baseplates.

TVA's program for the resolution of discrepancies associated with the non-safety-related valve access platforms did not result in modifications. Modifications to welds and to bolted connections were required to ensure the structural integrity of the catwalk.

# ENCLOSURE 1 (CONTINUED)
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# LONG-TERM TORUS INTEGRITY PROGRAM CORRECTIVE ACTION PLAN

## DESCRIPTION OF THE UNITS 1 AND 3 PROGRAM FOR TORUS AND TORUS RELATED STRUCTURES

TVA's inspection of Units 1 and 3 safety-related torus and torus related structures will exclude the four attributes which did not result in modifications on Unit 2. With the exception of these four attributes, the resolution of discrepancies on the torus and torus related structures will be implemented, in accordance with the Unit 2 criteria and implementation precedent. This work will be completed prior to the restart of Units 1 and 3.

TVA will not inspect the Units 1 and 3 non-safety-related valve access platforms. TVA's inspection of the non-safety-related Units 1 and 3 catwalk will be limited to welds and bolted connections associated with maintaining the integrity of the safety related structures. The resolution of catwalk discrepancies will be in accordance with the Unit 2 criteria and will be completed prior to the restart of Units 1 and 3.

# ENCLOSURE 2
# BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
# SUMMARY OF COMMITMENTS

1) TVA has determined that the resolution of torus attached piping support discrepancies will be implemented, in accordance with the Unit 2 criteria and will use the configurational attributes from the Unit 2 implementation precedent. This work will be completed prior to the restart of Units 1 and 3.

2) TVA's inspection of Units 1 and 3 safety-related torus and torus related structures will exclude the four attributes which did not result in modifications on Unit 2. With the exception of these four attributes, the resolution of discrepancies on the safety-related torus and torus related structures will be implemented, in accordance with the Unit 2 criteria and implementation precedent. This work will be completed prior to the restart of Units 1 and 3.

3) TVA's inspection of the non-safety-related Units 1 and 3 catwalk will be limited to welds and bolted connections associated with maintaining the integrity of the safety related structures. The resolution of catwalk discrepancies will be in accordance with the Unit 2 criteria and will be completed prior to the restart of Units 1 and 3.