TENNESSEE VALLEY AUTHORITY
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JUL 31 1990

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

Gentlemen:

In the Matter of the Application of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - WELDING CORRECTIVE ACTION PROGRAM (CAP) PLAN - PROPOSED FINAL SAFETY ANALYSIS REPORT (FSAR) REVISIONS

In addition to welding-related FSAR changes previously submitted in Amendment 63, this letter provides proposed updates to FSAR sections concerning the Welding CAP Plan. The enclosure provides an advance copy of the proposed updates to Sections 3.2.2.5, 3.8.2.2.1, 3.9.3.4.2(c)(5), 3.10.1, 6.2.4.4, 9.2.7, Table 3.2-2a, and Table 3.2-6 so that current information concerning the Welding CAP Plan at WBN is available for your review. These proposed revisions will be submitted in a subsequent FSAR amendment.

If there are any questions concerning this matter, please contact R. J. Stevens at (615) 365-8650.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
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Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

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ENCLOSURE

PROPOSED REVISION TO FINAL SAFETY
ANALYSIS REPORT (FSAR) SECTIONS
3.2.2.5
Table 3.2-2a
Table 3.2-6
3.8.2.2.1
3.9.3.4.2(c)(5)
3.10.1
6.2.4.4
9.2.7

sections of the Safety Analysis Report where the systems are discussed in detail.

INSERT A

3.2.2.6 Nonnuclear Safety Class (NNS)

Components that are used in Seismic Category I structures whose failure would not result in a release of radioactive products and are not required to function during an accident or malfunction within the reactor coolant pressure boundary have been assigned TVA Classifications G or K. Since these components complement components having a primary safety function during normal operation and may be in close proximity to them, they are seismically qualified to the extent necessary to prevent an unacceptable influence on Safety Class equipment during a seismic event. Thus the minimum capability of primary system components will not be compromised by the failure of a Class G or K component during a seismic event. Components not requiring any seismic qualification are assigned to TVA Class H, J, or L. The applicable codes, along with the seismic classifications used for the design of the components covered by these classifications, are shown in Table 3.2-5.

3.2.2.7 Heating, Ventilation and Air Conditioning (HVAC) Safety Classification

Those portions of the HVAC Systems which are safety related have been assigned TVA classifications and have been designed to Seismic Category I and I(L) specifications as applicable. All equipment, components, ductwork, etc.,in the August, 1970, Draft N18.2-1970 Safety Classes 1, 2a, 2b and 3 perform primary safety functions and are designed to Seismic Category I. Portions of systems not performing a safety function may need a degree of seismic qualification because their failure could produce an unacceptable influence on the performance of safety functions. These are designed to Seismic Category I(L). The applicable codes along with the seismic qualifications used for the design of the HVAC components are shown in Table 3.2- .

INSERT A

The Code of Record of Section III of the ASME Code applied to systems within TVA's scope is the 1971 Edition with Addenda through Summer 1973. The use of later Edition and Addenda, as permitted by paragraph NA-1140 of the ASME Code and by 10 CFR 50.55a, is controlled to ensure the following:

a. Later Edition and Addenda used has been accepted by the NRC through incorporation by reference in 10 CFR 50.55a(b)(i).

b. Related requirements necessary to support use of later Edition and Addenda are implemented in accordance with NA-1140.

c. Code Cases used have been accepted by the NRC through incorporation by reference in either Regulatory Guide 1.84 or Regulatory Guide 1.85.

d. Additional requirements added by either Regulatory Guide 1.84 or Regulatory Guide 1.85 are implemented.

The Code of Record for components ordered by TVA is determined in accordance with 10 CFR 50.55a, footnote 5. Material ordered by TVA and supplied with certification to a later Edition and Addenda is controlled by a comparison of the Edition and Addenda to which it is certified to the Code of Record applicable to the application in which it is used. All deviations from the applicable Code of Record are reconciled prior to use of the material.

TABLE 3.2-2a

CLASSIFICATION OF SYSTEMS HAVING MAJOR DESIGN CONCERNS RELATED TO A PRIMARY SAFETY FUNCTION

System	System Subsection	Safety Class ANS, N-18.2	TVA Class	Seismic* Category
Auxiliary Control Air	Portions of the System necessary for containment isolation. (SEE NOTE 5)	2a	B	I
	Balance of system. (See Note 1 and Note 5 System boundary is considered to exist to the upstream side of the filters which tie the normal service air or non-essential control air systems to the auxiliary control air lines).	2b	C	I
Boron Recycle	Equipment used to provide a ready supply of concentrated boric acid (boric acid tanks, boric acid transfer pumps, boric acid filters, and associated pipes and valves; B.A. transfer pumps.	2b	C	I
	Processing and Waste Holdup Equipment whose failure could result in a site boundary dose of 0.5 rem or more.	3	D	I

Revised by Amendment 56

CLASSIFICATION OF SYSTEMS HAVING MAJOR DESIGN CONCERNS
RELATED TO A PRIMARY SAFETY FUNCTION

compressors and dryers will meet the highest commercial quality standards.

NOTE 2: Although not purchased under ASME Section III requirements, the HVAC equipment is required for plant safety and does meet the highest commercial quality standards and meets the requirements of design criteria WB-DC-40-31.2 and WB-DC-40-36.1.

NOTE 3: Although not purchased under ASME Section III requirements, this HVAC equipment (except for the reactor building coolers) maintains the pressure boundary integrity of the ERCW system and meets the requirements of design criteria WB-DC-40-31.13. The reactor building coolers are supported to seismic category I(L) requirements only.

NOTE 4: Although the screen wash pumps, piping and valves are required for plant safety, they were not purchased to TVA class C standards. The pumps are seismically qualified, have limited QA, and were the best commercially available product for the service. The piping and valves are designed to TVA class G and seismic category I(L) for pressure boundary integrity. For this application, this level of qualification meets the intent of TVA class C.

INSERT B

INSERT B

NOTE 5: Portions of the Control Air System were not pneumatically tested to the correct pressure. NRC Inspection Report Nos. 50-390/90-04 and 50-391/90-04 document approval of an alternative acceptance to the pneumatic test criterion.

TABLE 3.2-6

TVA Heating, Ventilation, and Air Conditioning Classifications

TVA Class	ANS Safety Class	Code Jurisdiction	Seismic Category
M	2b*	ANSI B31.5	I or I(L)
N	None	ANSI B31.5	Note 1
Q	2b*	~~Round Duct, Steel, Spiral or Longitudinal Locked or Welded Seam, ASTM A 211 and SMACNA High Velocity Duct Construction Standards, 2nd Edition, 1969, as modified by ORNL-NSIC-65 Paragraph 2.8.~~ INSERT C	I or I(L)
S	2b*	~~Rect. Duct, Steel, Locked Seam or Welded, SMACNA High Velocity Duct Construction Standards, 2nd Edition, 1969, as modified by ORNL-NSIC-65 Paragraph 2.8~~ INSERT D	I or I(L)
U	None	Round Duct, Steel, SMACNA Low Velocity Duct Construction Standards, 4th Edition, 1969.	I(L)
V	None	Rect. Duct, Steel, SMACNA Low Velocity Duct Construction Standards, 4th Edition, 1969.	I(L)

*TVA Class M, Q, and S designations are also used on Heat, Ventilation, and Air-Conditioning systems which have no ANS Safety Class requirements if seismic requirements are involved.

Note 1: Those portions of TVA Class N systems located inside seismic category I structures are seismic category I(L). The balance of these systems are not designed for seismic loading. 49

INSERT E

Revised by Amendment 49

INSERT C

Round Duct, Steel, Spiral or Longitudinal Seam, Locked, Seam or Welded (ASTM A211) and SMACNA High Velocity Duct Construction Standards, 2nd Edition, 1969, as modified by ORNL-NSIC-65 Paragraph 2.8 (see Note 3) ANSI/ASME N-509 (see Note 2). Seismic support in accordance with Note 4.

INSERT D

Rect. Duct, Steel, Locked Seam or Seam or Welded, SMACNA High Velocity Duct Construction Standards, 2nd Edition, 1969 as modified by ORNL-NSIC-65 Paragraph 2.8 (see Note 3). ANSI/ASME N-509 (see Note 2). Seismic support in accordance with Note 4.

INSERT E

Note 2: Those portions of TVA Classes Q and S CAtegory I duct which are of welded construction, that are fabricated or repaired after January 12, 1987, shall meet the welding requirements of ANSI/ASME N-509, 1976. The workmanship samples shall not be required to have Penetrant Testing (PT) or Magnetic Testing (MT).

Note 3: ORNL-NSIC-65 paragraph 2.8 is to be used for all ANS 2b air cleanup system ductwork that is designed for a pressure of -2 in WG or greater negative pressures (e.g., -3, -4, etc.).

Note 4: Seismic Category I ducts correspond to and shall be supported seismically in accordance with the subsection entitle "Essential Ducts" of WB-DC-40-31.8; Seismic Category I(L) ducts correspond to and shall be supported seismically in accordance with subsection entitled "Nonessential Ducts" of WB-DC-40-31.8. Schedule pipe used as duct shall be designed in accordance with WB-DC-40.31.

3.8.2.2 Applicable Codes, Standards and Specifications

INSERT F

3.8.2.2.1 Codes

~~The design of the containment vessel meets the requirements of the ASME Code, Section III, Subsection NE, Applicable Code cases include 1431, 1517, 1529 and 1493, [Winter 1971 Addenda].~~

The design of the bottom liner plates conforms to the requirements of the applicable subsections of the ASME Code, Section VIII, Division 1, and Section III, Paragraph NE-5120.

Nonpressure parts, such as supports, bracing, inspection platforms, walkways, and ladders were designed in accordance with the American Institute of Steel Construction (AISC) "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings," Seventh Edition.

The anchorage at the containment vessel meets the requirements of the ASME Code, Section III, with a maximum allowable stress for the anchor bolts of 2 x Sm.

All containment penetrations including the fuel transfer, purge, and mechanical within the jurisdiction of NE 1140 are designed to Section III, Class MC of the 1971 ASME Code. The penetration assemblies for those penetrations which attach to the nozzles out to and including the valve or valves required to isolate the system and provide a pressure boundary for the containment function are designed to Section III, Class 2 of the ASME Code. Spare penetrations including the nozzle caps are designed to Section III, Class MC of the ASME Code. 38 Q131.

INSERT G

3.8.2.2.2 Design Specification Summary

Design Criteria

The containment vessel, including access openings and penetrations, is designed so that the leakage of radioactive materials from the containment structure under conditions of pressure and temperature resulting from the largest credible energy release following a loss-of-coolant accident (LOCA), including the calculated energy from metal-water or other chemical reactions that could occur as a consequence of failure of any single active component in any emergency cooling system, will not result in undue risk to the health and safety of the public, and is designed to limit below 10CFR100 values the leakage of radioactive fission products from the containment under such (LOCA) conditions.

The basic structural elements considered in the design are the vertical cylinder and dome acting as one structure, and the bottom liner plate acting as another. The bottom liner plate is encased in concrete and is designed as a leak tight membrane only. The liner plate is anchored to the concrete by welding it continuously to steel members embedded and anchored in the concrete base mat.

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The design of the containment vessel meets the requirements of the ASME Code, Section III, Subsection NE, Winter 1971 Addenda and code cases 1431, 1517, 1529, 1493, and 1768.

INSERT G

Two welds (1-074B-D045-01A and 1-074B-D045-08A) in the containment sleeves at the unit 1 RHR sump have radiographic indications which have been interpreted as exceeding the radiographic acceptance criteria of ASME Section III. Calculation CEB-CQS-415 RO documents the basis for the acceptability of these welds.

2. All thermal modes of operation shall be considered in load evaluation. Thermal loads should not be considered to relieve primary loads induced by gravity, other sustained loads, or seismic events.

3. Installation tolerances should not be considered a source of load reduction unless special installation requirements are required.

4. The required movement in unrestrained directions for the line being supported was tabulated in the table of support loads. The support design was arranged to accommodate this required movement of the piping. Hangers shall be designed in such a manner that they cannot become disengaged by any movement of the supported pipe.

INSERT H

d. <u>Deformation Limits</u>

Struts, framed systems or braced structures were used wherever practical. Struts, framed systems, and braced structures designed in accordance with the AISC manual of Steel Construction to take load primarily in tension or compression were considered acceptable rigid supports, i.e., no frequency or deflection checks were required.

Cantilevers and other supports which are designed to carry load primarily in bending were evaluated for rigidity. The following rules establish rigidity requirements for these types of supports:

1. Supports on 2 inch and smaller lines were designed to have a first natural frequency equal to or greater than 20 hertz, or the deflection under normalized design load was 1/16 inch or less at the point of application of loading for each component of loading used to evaluate support allowable stress. 51

2. Supports of this type on lines larger than 2 inches at either or both of the first two support points adjacent to a pump, compressor, or turbine nozzle were designed to have a first natural frequency equal to or greater than 20 hertz. Supports in this category were exempt from deflection requirements unless deflection requirements were specified on the analysis isometric.

3. All other supports of this type on lines larger than 2 inches were designed to have a first natural

INSERT H

If ASME Code Case N-318-3 is used in the design of integral welded attachments to the piping pressure boundary, the requirements of Regulatory Guide 1.84 are documented in project calculation CEBN3180001.

INSERT I

vation on which any of these panels are mounted. The test criteria were in accordance with IEEE 344-1971. 24 30.2

~~Where space requirements preclude the use of the standard local panels, a small wall-mounted panel designed for only two instruments is used. This panel is qualified, to the same criteria as the local panels, by analysis. The analysis is very conservative and shows that the wall-mounted panels are adequate for supporting Seismic Category I instrumentation.~~ 33

3.10.2 Methods And Procedures For Qualifying Electrical Equipment And Instrumentation

For qualification methods on equipment and instrumentation see Tables 3.10-1 and 3.10-2.

Instrumentation

The seismic type testing performed by the Nuclear Steam Supply System supplier (Westinghouse) is described in references [11] through [10]. The test method used was the sine beat procedure described in IEEE Standard 344-1971 and reference [11]. In addition, as noted in Section 3.10.1, Westinghouse is conducting a "Demonstration Test Program" which, when considered in conjunction with the tests presented in references [11] through [13], will result in meeting the requirements of IEEE-344-1975.

Supporting Structures - Panels

The qualification of the supports for Seismic Category I instruments has been accomplished by either analysis or testing. The method commonly used is testing under simulated conditions. Basically, all tests by TVA on supporting structures were similar and were qualified under similar specifications. The support structure was mounted on a vibration generator in a manner

INSERT I

Where space requirements preclude the use of the standard local panels, a small wall-mounted panel is used. This panel is qualified, to the same criteria as the local panels, by analysis and/or test.

3. A water seal at greater than peak containment accident pressure is used to prevent bypass leakage in certain lines (such as the Safety Injection Pump Discharge). The seals are available for at least 30 days after a design basis event.

4. The secondary side of the steam generator is kept at a higher pressure than the primary side soon after the LOCA occurs (See Section 10.4.9). Any leakage between the primary and secondary sides of the steam generator is thus directed inward to the containment.

Table 6.2.4-3 lists potential bypass leakage paths to the atmosphere and the methods chosen to eliminate such leakage.

6.2.4.4 Test and Inspections

All components of the Containment Isolation Systems were designed, fabricated, and tested under quality assurance requirements in accordance with 10CFR50, Appendix B, as further described in Chapter 17. INSERT J

Nondestructive examination was performed on the components of the system in accordance with the applicable codes described in Chapter 3.

Subsequent to initial plant operation, containment isolation systems will be periodically tested under conditions of normal operation to determine that all systems are in constant readiness to perform the desired function.

Automatic isolation valves that receive a containment isolation signal to close, where closure of the valve will not limit or restrict normal plant operation, are periodically functionally tested by the on-line testing capability described in Section 7.3. All other valves are periodically tested for CIS circuit electrical continuity. Other testing information is provided in Section 6.2.6.

INSERT J

An alternative to visual examination during ASME Section III hydrostatic pressure testing was approved by the NRC in Inspection Report No. 50-390/90-04 for Unit 1 penetrations having inaccessible vendor welds.

An alternate vent path is afforded by an 8" diameter overflow line, which is mainly internal to the RWST and is therefore protected. 34 212.88

INSERT K 35

212.88

INSERT K

The Refueling Water Storage Tank's (RWST) vortex nozzle assemblies were not radiographed. ASME Section III Subsection NC Paragraph NC-5282.6 (1974 Code Edition and 1975 Winter Addendum) requires butt joints in atmospheric storage tanks be fully radiographed. TVA has issued CAQR's WBP890317 and WBP890318 Unit 1 & 2 respectively for documentation of the problem. Calculation WBP-MTB-001 documents the basis for the acceptability of these welds.