WESTINGHOUSE CLASS 3

WCAP-12500

ADDITIONAL INFORMATION IN SUPPORT OF ELIMINATING LARGE PRIMARY LOOP PIPE RUPTURE AS THE STRUCTURAL DESIGN BASIS FOR WATTS BAR UNITS 1 AND 2

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SECTION 1.0
INTRODUCTION

Tennessee Valley Authority contracted with Westinghouse Electric Corporation to develop a leak-before-break analysis for the Watts Bar Units 1 and 2 primary loops. The leak-before-break analysis is documented in Westinghouse Proprietary Class 2 Report WCAP-11985 (Reference 1.1). WCAP-11984 is the associated Westinghouse Class 3 report. During the regulatory review process the Nuclear Regulatory Commission (NRC) issued a Request for Additional Information on Elimination of Postulated Primary Loop Pipe Ruptures as a Design Basis (Appendix A). This report addresses the NRC requests.

SECTION 2.0

RESPONSE TO THE REQUEST FOR ADDITIONAL INFORMATION

REQUEST 1. Table 4-3 in WCAP-11985 shows that the primary loop piping material has yield and ultimate tensile strength values lower than the ASME Code specified minimums. Justify compliance with ASME Section III requirements.

RESPONSE: The ASME Section III code properties in Table 4.3 were taken from the latest Code edition (1989) and are provided for reference only. The actual lower bound material properties from Tables 4-1 and 4-2 were used for crack stability analysis as part of the LBB evaluation.

The ASME Section III Code of record for Watts Bar Units 1 & 2 piping is Summer 1973. The Code specifies a minimum yield stress of 35 ksi at room temperature and 19.8 ksi at 650 degrees for SA351 CF8A. Requirements for ultimate strength were not provided in the ASME Code of record; however, ASTM specification A351-1972 specifies an ultimate strength of 77 ksi at room temperature. All heats of material listed in Tables 4-1 and 4-2 exhibit yield and ultimate strength values in excess of the applicable Code and the ASTM standard requirements. Therefore, the Watts Bar materials are in full compliance with the applicable Code of record.

REQUEST 2. Provide the inner or outer diameter and wall thickness of the primary loop piping for each weld location in Table 3-1 in WCAP-11985.

There is a discrepancy in the cold leg piping dimension. On Page 3-1 and Figure 3-1 in WCAP-11985, the cold leg piping has an outer diameter of 32.13 in. and a wall thickness of 2.21 in. On Page 7-1 of WCAP-11985, the cold leg piping has an outer diameter of 32.52 in. and a wall thickness of 2.52 in. Provide clarification.

RESPONSE: The outer diameter and the minimum wall thickness of the primary loop piping at each weld location are provided in Table 1.

The wall thickness of 2.21 inches is the minimum pipe thickness at the weld undercut (i.e. counterbore) whereas the 2.52 inch wall thickness is the nominal wall thickness of the nozzle safe end forging. Note that for calculating fatigue crack growth due to thermal transient loads it is appropriate to use the nominal wall thickness of the component. This was done for the locations examined (see figure 7-1 and table 7-1 of WCAP-11985). The minimum pipe wall thickness is used for performing crack stability analysis as recommended by the NRC.

REQUEST 3. Verify the units for the modulus of elasticity of Page 4-2 on WCAP-11985.

RESPONSE: The units for the modulus of elasticity of page 4-2 in WCAP-11985 are psi and <u>not ksi</u>.

TABLE 1

WATTS BAR UNITS 1 AND 2 PRIMARY LOOP DATA

Weld Location	Outside Diameter (inch)	Thickness[1] (inch)
1	33.87	2.33
2	33.87	2.33
3	36.17	2.48
4	36.17	2.48
5	36.17	2.48
6	36.17	2.48
7	36.17	2.48
8	36.17	2.48
9	36.17	2.48
10	32.13	2.21
11	32.13	2.21
12	32.13	2.21

Notes: 1. Minimum pipe wall thickness at weld undercut.

SECTION 3.0
REFERENCES

3.1 WCAP-11985, "Technical Justification for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for Watts Bar Units 1 and 2" November 1988 (Westinghouse Proprietary Class 2).

APPENDIX A

THE NRC REQUEST FOR ADDITIONAL INFORMATION

After reviewing WCAP-~~11411, Revision 1~~ 11985 JL 2-2-90, the NRC submitted to Tennessee Valley Authority a Request for Additional Information consisting of three items. The request is reproduced on the following page.

REQUEST FOR ADDITIONAL INFORMATION ON ELIMINATION OF DYNAMIC EFFECTS OF POSTULATED PRIMARY LOOP PIPE RUPTURES FROM DESIGN BASIS FOR WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

By letter dated April 17, 1989, Tennessee Valley Authority (the applicant) requested the elimination of the dynamic effects of postulated primary loop pipe ruptures from the design basic for Watts Bar Nuclear Plant, Units 1 and 2. The applicant submitted the technical basis in Westinghouse Report WCAP-11985 dated November 1988. The staff requires the following additional information before continuing its review:

1. Table 4-3 in WCAP-11985 shows that the primary loop piping material has yield and ultimate tensile strength values lower than the ASME Code specified minimums. Justify compliance with ASME Section III requirements.

2. Provide the inner or outer diameter and wall thickness of the primary loop piping for each weld location in Table 3-1 in WCAP-11985.

   There is a discrepancy in the cold leg piping dimension. On Page 3-1 and Figure 3-1 in WCAP-11985, the cold leg piping has an outer diameter of 32.13 in. and a wall thickness of 2.21 in. On Page 7-1 of WCAP-11985, the cold leg piping has an outer diameter of 32.52 in. and a wall thickness of 2.52 in. Prov de clarification.

3. Verify the units for the modulus of elasticity of Page 4-2 on WCAP-11985.