Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

October 6, 2000

TVA-WBN-TS-00-06 10 CFR 50.90

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) - TECHNICAL SPECIFICATION (TS) CHANGE NO. 00-06 - INCREASE UNIT 1 REACTOR POWER TO 3459 MWt - RESPONSE TO NRC I&C BRANCH REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MA9152)

TVA's letter of June 7, 2000, provided the NRC with the subject license amendment request which would increase the WBN full core thermal power rating by 1.4% from 3411 MWt to 3459 MWt. The purpose of this letter is to provide a response to an NRC staff (Electrical and Instrumentation/Controls Branch) request for additional information pertaining to TVA's proposed amendment request. TVA's response is provided in the Enclosure.

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This submittal contains no new commitments. TVA's previous determination that there are no significant hazards considerations associated with the proposed change remains valid.

To facilitate the staff's ongoing review of WBN's proposed power uprate request, TVA and its contractors are available to meet with NRR as often as necessary to resolve staff review questions. Should you have any questions, please call me at (423) 365-1824.

Sincerely,

P. L. Pace,
Manager, Licensing and Industry Affairs

Enclosures

Subscribed and sworn to before me
on this 6th day of October 2000.

E. Jeannetta Long
Notary Public

My Commission Expires June 27, 2001

cc (Enclosure):

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1 - DOCKET 390

PROPOSED TECHNICAL SPECIFICATION (TS)-00-06
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

(A) Questions on Caldon Topical Report ER-160P, Enclosure 2

Question (A) 1

Table 1 on page A-3 is proprietary while the same information are non-proprietary on page 3 and in TU-ELECTRIC response to staff question 31, dated December 17, 1998. Clarify the inconsistency.

Response to Question (A) 1

Table 1 on page A-3 can be considered non-proprietary. There is other information on this page that is considered proprietary.

Question (A) 2

Figure 3 shows equal probability of exceeding 102% of the current power level for using the current instrument or the LEFM with the proposed power uprate. Explain figure 3 indications and differences, between this figure and figure 5-2 of ER-80P.

Response to Question (A) 2

The differences between Figure 3 in ER-160P and Figure 5-2 in ER-80P are two: the content of the data are different, and the data are presented in a different format.

The content difference has to do with the power uprate percentage. Figure 5-2 in ER-80P presents a 1% power uprate case and Figure 3 in ER-160P presents a 1.4% power uprate case. In both figures the LEFM thermal power uncertainty is presented as 0.6%, a bounding or limit value. Figure 5-2 illustrates that in the 1% uprate case the probability of exceeding 102% power with the LEFM is less than with the original instrumentation and no uprate. Figure 3 of ER-160P illustrates that in the 1.4% uprate case the probability of exceeding 102% power with the LEFM is the same as with the original instrumentation and no uprate.

The second difference is in the format of the data presented. Figure 5-2 in ER-80P presents a probability <u>density</u> while Figure 3 of ER-160P presents a probability. As described in detail in TU-ELECTRIC response to staff question 31, plotting the probability instead of the probability density permits one to read the vertical axis directly in probability percentage units. (On a probability density curve, the vertical axis is presented in statistical units established so that the area under the curve will integrate to equal

1.) This change was made to improve the comprehension of the curve, but does not change the content conclusion described in the above paragraph.

Both ER-80P and ER-160P state that there are two assumptions that must be met to use this probability argument. The first is that the instrument uncertainty is based on elemental errors that are normally or uniformly distributed. The second is that there is assurance the instrument is operating within this uncertainty bounds at all times. The LEFM systems meet both of these criteria, as described in ER-80P and in ER-160P.

Question (A)3

An effective value of 0.62% uncertainty is calculated in the appendix. Explain why 0.6% total power uncertainty is used for the uprate as shown in Table 1.

Response to Question (A)3

The uncertainty is conservatively rounded from 0.62% to 0.6%. This uncertainty of 0.6% is used as a limit which must not be exceeded by site-specific LEFM installations, so the rounding is conservative. For example, at the TVA/NRC meeting on September 7, 2000, data were presented in support of an actual LEFM instrument uncertainty as installed at Watts Bar of 0.4%. This is well within the 0.6% assumed in ER-80P and in ER-160P.

(B) Questions on Westinghouse Plant Specific Uncertainty Calculation, Enclosure 4

Question (B)1

Section 3 of the calculation states that the combined accuracy of feedwater flow and temperature measurement (density and enthalpy components), as provided by Caldon, is 0.483%. In Section 1 of the report this statement is listed as an assumption. Table 11a of the calculation lists the density and enthalpy effects in addition to 0.483%. Is this uncertainty value included in Table 1 of the Caldon Topical Report ER-160P or was it provided by Caldon as a plant specific LEFM flow measurement uncertainty? Also explain the relationship between the instrument error and power uncertainties listed in table 11a.

Response to Question (B)1

The value of 0.483% is for LEFM flow and temperature measurement, including LEFM contributors to feedwater density and enthalpy. There is a separate small contributor to feedwater density and enthalpy from feedwater pressure uncertainty, based on pressure transmitters outside the LEFM. Table 1 of ER-160P includes an estimated bounding value for the pressure error. Both the ER-160P and the Westinghouse calculation were completed prior to the hydraulic testing for the Watts Bar LEFM described in the September 7, 2000 meeting with NRC. The actual value for LEFM uncertainty is smaller than this value, as described in the September meeting.

The sensitivities listed in Table 10a define the relationship between the instrument errors and the power uncertainties listed in Table 11a. For example, multiplying the feedwater pressure measurement uncertainty from Table 11a times the sensitivity of the power uncertainty to the feedwater pressure impact on density from Table 10a, results in the power uncertainty contribution shown in Table 11a.

Question (B)2

Table 1 of ER-160P lists total power uncertainty as 0.6%, Tables 3-1 and E-3 of ER-80P list it as 0.57%, and Table 11a of the Westinghouse calculation lists it as 0.58%. Compare these values and explain.

Response to Question (B)2

As discussed in response to Question (B)1, these are all values estimated prior to the completion of hydraulic testing and calculated to ensure they would be bounding of the actual result. The uncertainty analysis for the installed LEFM at Watts Bar will not be final until the installation and commissioning is complete. However, the best current estimate is 0.4% total power uncertainty, as presented in the September 7 meeting.

Specifically, Table 1 of ER-160P estimates a bounding value for a generic single header measurement at 0.6%, rounded to one significant figure. Table 3-1 of ER-80P estimates a bounding value for a generic single header measurement of 0.61% and for a two loop installation (not applicable to Watts Bar) of 0.57%. Table E-3 estimates the same 0.61% and 0.57% as Table 3-1 in ER-80P. The Westinghouse calculation provides an uncertainty applicable to Watts Bar using site-specific values, and is bounded by the 0.6% and 0.61% values.

(C) Questions on Description and Evaluation of the Proposed Change, Enclosure 1

Question (C)1

Section 6.6 states that WCAP-12096, revision 8, provides the basis for the RTS and ESF actuation setpoints and WCAP-14738, revision 0, provides the basis for the RCS control system uncertainties that are used in the plant safety analyses. Are these topical reports applicable to Watts Bar Nuclear Plant and were they reviewed by the staff?

Response to Question (C)1

The subject reports, WCAP-12096, "Westinghouse Setpoint Methodology for Protection System, Watts Bar Unit 1 Eagle 21 Version," and WCAP-14738, "Westinghouse Revised Thermal Design Procedure Instrumentation Uncertainty Methodology for Tennessee Valley Authority, Watts Bar Unit 1," are each applicable to WBN and have been previously reviewed by the NRC Staff. WCAP-12096, Revision 7 and WCAP-14738, Revision 0 were each reviewed by NRC in support of WBN Unit 1 Cycle 2 Core Reload Changes (TAC. M98258), Amendment 7, issued September 11, 1997.

The current version of WCAP-12096 is Revision 8, which did not require review by NRC staff. The primary information changed by Revision 8 included deletion of the negative flux rate reactor trip function (WBN License Amendment 18, January 15, 1999) and the addition of new model information for WBN containment sump level transmitters.

As discussed in Section III.6.7 and Enclosure 4 of TVA's June 7, 2000, Power Uprate submittal, WCAP-14738, Revision 0, has been revised to re-calculate the power calorimetric uncertainty to account for the use of the LEFM uncertainties. The information revised in WCAP-14738, Revision 1, that is pertinent to the power calorimetric calculation, was provided in Enclosure 4 of TVA's June 7, 2000 submittal.

Question (C)2

Section 6.6 states that based on evaluations performed for other plant uprates, it is judged that the 1.4% uprate would have a negligible effect on the steam generator narrow range water level instrument tap and thus, there would be no impact on the existing instrumentation setpoints and allowable values. Provide a sample of those plant uprate evaluations with a comparison to justify the judgment.

Response to Question (C)2

The specific terms in the steam generator (SG) narrow range water level uncertainty which could potentially be impacted by the power uprate, due to the small reduction in steam pressure, are the Process Measurement Accuracy (PMA) terms. These terms explicitly account for process pressure variations, reference leg temperature effects, downcomer subcooling, and fluid velocity effects in the SG Water Level Low-Low and SG Water Level High-High uncertainty calculations in WCAP-12096, Rev 8. The effects of the 1.4% uprating were evaluated specifically to Watts Bar and are noted below.

The SG Level High-High PMA term magnitudes are evaluated at both 100% RTP and 0% RTP conditions. However, in all cases, the limiting set of conditions was found to be 0% RTP. A significant characteristic of this evaluation is that the no-load conditions (primary side Tavg and secondary side steam pressure) remain unchanged between the current and uprated power levels. Thus the magnitudes of the PMA terms for this function do not change between the current and uprated power levels. As a result, neither the trip setpoint, nor the allowable value for this function are affected by the 1.4% uprating.

The SG Level Low-Low PMA term magnitudes are also evaluated at both 100% RTP and 0% RTP conditions. For two of the parameters, process pressure variations and downcomer subcooling, the limiting set of conditions is 0% RTP. The same conclusions are reached for these parameters as for the SG Level High-High PMA terms noted above. With respect to fluid velocity, it has been determined that the effect at both power levels (0 and 100% RTP) is always in the conservative direction, i.e., indicated level is lower than actual level. This will not change with an uprating in power. The only PMA term affected by the power uprating is the reference leg temperature effects. The most limiting condition for this parameter is 100% RTP.

At the limiting conditions, decreasing the steam pressure by 22 psi increases the magnitude of this parameter by less than 0.01% span. This is considered a negligible amount, and the expected Watts Bar power uprating steam pressure decrease is only half that amount. As a result, neither the trip setpoint nor the allowable value for this function will be affected by the 1.4% uprating.