From: Lawrence Burkhart
To: Brian Sepelak
Date: 6/13/01 2:13PM
Subject: SLIGHTLY REVISED RAI - RTDP

Please see attached.

This is slightly changes from the RAI I sent yesterday (designated as 061201-1).

<u>RAI RELATED TO BVPS RTDP TS CHANGES</u>

1. The BVPS current TS BASES states that the design DNBR limit using the mini-RTDP is 1.21, and the safety analysis DNBR limit is 1.33. By using the RTDP, the design DNBR limits are 1.24 and 1.23 for typical cells and thimble cells, respectively.

   A. Provide the derivation of the design DNBR limits for the typical cells and thimble cells for the RTDP. The derivation should include the uncertainty values of these parameters, e.g., nuclear peaking factor, fuel fabrication parameters and THINC-IV thermal hydraulic code, included in mini-RTDP, the uncertainty values for the reactor power, pressurizer pressure, RCS flow rate and temperature, as well as the WRB-1 correlation.

   B. The secondary power calorimetric measurement uncertainty have different uncertainty values depending on the use of feedwater venturi or Caldon leading edge flow meter for feedwater flow measurement. Is the RTDP design DNBR limits of 1.23 and 1.24 based on feedwater venturi or Caldon LEFM?

2. As a result of changing from mini-RTDP to RTDP methodology, the design DNBR and safety analysis DNBR limits are changed accordingly. The reactor core safety limits figure, which show the loci of points of T-avg as a function of pressurizer pressure and rated thermal power for which the minimum DNBR is no less than the safety analysis DNBR limit, or the average enthalpy at the vessel exit is equal to the saturated liquid enthalpy, is also revised. Attachments A-1 and A-2, respectively, to the December 27, 2000, letter provide revised Figure 2.1-1, "Reactor Core Safety Limits," for Units 1 and 2.

   A. Describe how this new figure is determined. Is this figure based on the RTDP safety analysis DNBR limit of 1.36?

   B. Provide a reference to topical report which describe the methodology for the determination of the core safety limit figure. Has the TR referenced in TS Section 6.9.5.

   C. What is the rated power level the revised figure based on? Is the rated power in the revised Figure 2.1-1 the current power level of 2,652 Mwt, or the 1.4% power uprate condition of 2,689 MWt?

3. The DNB-related parameters in TS 3.2.5 for pressurizer pressure, RCS average temperature and total flow are changed from "analysis" values to "indicated" values as follows:

	For Unit 1	Unit 2
RCS T-avg:	from 580.7^{o}F to 580.0^{o}F	from 580.2^{o}F to 579.9^{o} F
pressurizer pressure:	from 2220 psia to 2215 psia	from 2220 psia to 2214 psia
RCS total flow :	from 261,600 to 267,400 gpm	from 261,600 to 267,200 gpm

Since the thermal design flow (current analysis value) for both BVPS units is 261,600 gpm, the minimum measured flows (indicated values) of 267,400 and 267,200 gpm, respectively, for Units 1 and 2 reflect the corresponding flow measurement uncertainties of 2.2% and 2.1%, respectively.

A. Explain how the indicated values of pressurizer pressure and RCS average temperature are related to the safety analysis values and the uncertainty values.

B. Why are the indicated values for the pressurizer pressure lower than the current TS values for Units 1 and 2?

C. Explain how the current analysis values and the indicated values of these DNB parameters are related to the RTDP methodology.

D. Have new analyses been performed with the revised DNB parameters values as the initial conditions to demonstrate that the RTDP safety analysis DNBR limit is not exceeded for all AOOs? If not, are the existing analyses for all AOOs satisfy the RTDP safety analysis DNBR limit?

E. How are the indicated values of the DNB parameters related to the design parameter values?

4. For the BVPS Unit 1 OT@T and OP@T trip function equations, the T-avg at RATED THERMAL POWER, T' and T", respectively, is changed from 576.3^{o}F to 576.2^{o}F (same as Unit 2), which is said to be necessary to make the values for T' and T" in the TS consistent with the nominal RCS average temperature assumed in the safety analysis. However, the vessel average RC temperature, whereas the revised T-avg values in TS 3.2.5 are 580.0 and 579.9^{o}F, respectively, for Units 1 and 2.

A. Explain the difference in the T-avg for the OT@T and OP@T trip function and the DNB parameter value.

B. What is the value used in the safety analysis? What is the rated thermal power, 2652 or 2689 MWt?

5. Describe how the constants K_1, K_2, K_3, K_4, K_5 and K_6 in the OT@ P and OP@T trip functions are determined from the revised reactor core safety limits associated with the RTDP.

6. Since the OT@T and OP@T trip functions have been revised, have the safety analysis of various transients (e.g., uncontrolled RCCA bank withdrawal at power, loss of external load/turbine trip, accidental RCS depressurization) been performed with the revised OT@T and OP@T trip equations to ensure that the SAFDL limits are not violated? If not, what is the basis for acceptability of the revised OT@T and OP@T trip functions setpoints?

7, In the OT@T and OP@T trip functions:

A. Explain the basis for adding the inequality "@" for the coefficients K_1 and K_4, and "@" for K_2, K_3, K_5 and K_6. Or provide the following reference: NTD-RROI-SSO-430/NTD-NSA-TA-95-370, "Identification of Conservative Directions for Constants in OT@T and OP@T Reactor Trip Functions," September 1, 1995.

B. Explain the basis for adding the "@" for the values of lead time constants, and "@" for lag time constants in the dynamic compensation of the OT@ T and OP@T trip functions.

8. Page B-10 in Attachment B to the 12/27/2000 letter lists a proposed change as: "Revision of BASES section titled "2.2.1 Reactor Trip setpoints" to reflect the relocation of Figure 2.2-1 to COLR."

A. What is Figure 2.2-1?

B. Would it be that the change in BASES 2.2.1 reflect the relocation of reactor trip system setpoints to LRM and removal of "allowable values" to Table 3.3.1?

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Subject: SLIGHTLY REVISED RAI - RTDP
Creation Date: 6/13/01 2:13PM
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MESSAGE	663	06/13/01 02:13PM	

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