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SUBJECT: Provides requested addl info in response to 890613 telcon re differences in Topical Repts DPC-NE-2002 & 3000

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June 19, 1989

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, -270, and -287
Response to Questions Regarding
Differences Between Duke Topical
Reports DPC-NE-2003 and DPC-NE-3000

During a telecon on June 13, 1989, the NRC staff requested additional information to clarify the intended applications and other technical details regarding the VIPRE-01 models for Oconee submitted in DPC-NE-3000, Revision 1 and in DPC-NE-2003. This letter provides that information. In general, the VIPRE-01 models described in DPC-NE-2003 are applied in the thermal-hydraulic design of each reload core. The VIPRE-01 models described in DPC-NE-3000 are applied in the prediction of the minimum DNBRs resulting from FSAR Chapter 15 transients. A more detailed description of the applications of these models follows.

DPC-NE-2003 describes the VIPRE-01 models and methodology to be used for reload thermal-hydraulic analyses. The steady-state analyses that determine the thermal-hydraulic limits that define the regions of safe operation in terms of power level, reactor coolant temperature and pressure (Pressure-Temperature curves), and power distribution (RPS Maximum Allowable Peaking (MAP) limits) are described in this report. The steady-state analyses, based on the limiting two-pump coastdown statepoint, that determine the allowable power distribution during the limiting DNBR transient (Operational MAP limits) are also described. The methodology for determining the limiting statepoint during the two-pump coastdown transient is included. These analyses are routinely performed for a reload core to demonstrate that applicable safety criteria are met.

As discussed in DPC-NE-2003, two additional hot channel factors to account for power spikes due to spacer grids, and axial nuclear uncertainty are applied to the local heat flux factor, F_q'', only when calculating MAP limits. The two sets of MAP limits, RPS and Operational MAP limits, are used to demonstrate that peaking will be acceptable during steady-state operation and during anticipated transients. All other core thermal-hydraulic analyses (calculation of pressure-temperature curves, FSAR Chapter 15 analyses) are based on the reference design peaking given in the appropriate reports and F_q'' without the additional hot channel factors. This approach is consistent with the current application of hot channel factors in the NRC-approved methodology described in the Duke Power topical report NFS-1002. The use of the VIPRE-01 code has no impact on this approach.

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The reference axial peaking (1.50) used in the two-pump coastdown transient is also used in the FSAR Chapter 15 transients to verify that the results are acceptable. The higher reference axial peaking factor (1.65) given in DPC-NE-2003 indicates the objective of using a higher value which results in less limiting Operational MAP limits. A higher reference axial peaking factor yields a lower two-pump coastdown MDNBR which results in higher allowable peaking. The methodology described in DPC-NE-2003 is applicable to any axial peaking assumption, provided that the resulting DNBRs and other peaking factor-related aspects are addressed. The current value of the reference axial peaking factor used in the MAP methodology is 1.50. Prior to increasing this value to, for example, 1.65, a complete evaluation of all potential safety concerns will be performed.

The VIPRE-01 SER states that "the use of VIPRE-01 with an approved CHF correlation and its safety limit should be justified by showing that, given the correlation data base, VIPRE-01, gives the same or a conservative safety limit." VIPRE-01 was used to predict the BWC CHF test results as discussed in Section 5.13 of DPC-NE-2003. The VIPRE-01/BWC results yield a DNBR limit of 1.161; thus, it will be conservative to use the NRC approved BWC correlation limit of 1.18 for all Oconee thermal-hydraulic analyses.

DPC-NE-3000 Section 2.3 describes the VIPRE-01 models to be used for predicting the minimum DNBRs resulting from FSAR Chapter 15 transients. The one exception is the two-pump coastdown described above, which is analyzed with the models described in DPC-NE-2003. The two-pump coastdown is a unique transient in that it is an integral part of the reload thermal-hydraulic design methodology. Therefore, the VIPRE model used for the two-pump coastdown should be the same model used for all other reload design thermal-hydraulic analyses. As discussed in DPC-NE-3000, Section 2.3.4, the VIPRE methodology for transient analyses includes a few differences when compared to the DPC-NE-2003 methodology. These differences when compared to the DPC-NE-2003 methodology. These differences are either necessary for meeting the modeling requirements of transient analyses, or incorporate additional conservatisms beyond those in the DPC-NE-2003 methodology. These additional conservatisms are desired in order to build margin into the transient DNBR results and avoid the need for reanalyzing transients in the future. It would be undesirable to use the DPC-NE-3000 VIPRE models as part of the normal reload thermal-hydraulic design process due to these differences.

In order to support the Oconee Unit 3, Cycle 12 reload licensing effort, an SER on DPC-NE-2003 is needed by August 15, 1989. If you have further questions regarding this matter, please contact Scott Gewehr (704/373-7581) or Gregg Swindlehurst (704/373-5176).

Very truly yours,

Hal B. Tucker

H. B. Tucker

SAG171/lcs

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