4.2.3 CRITICAL POWER RATIO

Critical Power Ratio is calculated using the General Electric BWR Thermal Analysis Basis (GETAB) [18,19,20]. The GEXL correlation was obtained from General Electric for use by Northern States Power as a part of the current fuel contract.

The GEXL correlation has been incorporated into the DYNODE-B hot channel model. Input to this model consists of the bundle average radial peaking factor, the relative bundle inlet flow, the bundle initial pressure and inlet enthalpy, the bundle R-factor, and the axial power distribution. The axial power distribution used in the ~~analysis~~ is given in Table 4.2-2, which is taken from Reference 7. The R-factors are supplied by General Electric.

The bundle average redial peaking factor and the relative bundle inlet flow factor are assumed constant throughout the transient and are calculated from the three-dimensional simulator [1] with the appropriate uncertainties included (see section 4.2.1.1). The GEXL correlation safety limit (see section 4.3.1) includes an 8.7% (one standard deviation) uncertainty on the TIP readings. As long as the NSPNAD determined bundle power model reliability factor (see Section 4.2.1.1) is less than 8.7%, no additional uncertainty need be applied.

Proper programming and use of the GEXL correlation was tested by comparing steady state CPR values for the fuel types of interest. Small differences will exist between the GE and DYNODE-B values due to a slight difference in the water property tables used. These comparisons are shown in Table 4.2-3. Further comparisons are also shown in Table 4.1-5.

These comparisons show that NSPNAD has properly implemented the GEXL correlation and that it can be used, along with the associated safety limit (see section 4.3.1), in licensing calculations.

benchmarks

Time varying axial power shapes will be used for all safety evaluations. This will provide additional conservatism over the benchmark cases.

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