POWER DISTRIBUTION LIMITS

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

LIMITING CONDITION FOR OPERATION

3.2.1 All AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) shall not exceed the result obtained from multiplying the applicable MAPLHGR values* by the smaller of either the flow dependent MAPLHGR factor (MAPFAC_f) of Figure 3.2.1-1 or the power dependent MAPLHGR factor (MAPFAC_p) of Figure 3.2.1-2.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% of RATED THERMAL POWER.

ACTION:

If at any time during operation it is determined that an APLHGR is exceeding the result of the above multiplication, initiate corrective action within 15 minutes and restore APLHGR to within the required limits within 2 hours or reduce THERMAL POWER to less than 25% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.1 All APLHGRs shall be verified to be equal to or less than the above limits:

- a. At least once per 24 hours,
- b. Within 12 hours after completion of a THERMAL POWER increase of at least 15% of RATED THERMAL POWER in one hour, and
- c. Initially and at least once per 12 hours when the reactor is operating with a LIMITING CONTROL ROD PATTERN for APLHGR.
- d. The provisions of Specification 4.0.4 are not applicable.

* These applicable MAPLHGR values are:

- Those that have been approved for the respective fuel and lattice type as a function of the average planar exposure (as determined by the NRC approved methodology described in GESTAR-II)
- 2) When hand calculations are required, the MAPLHGR as a function of the average planar exposure for the most limiting lattice (excluding natural uranium) shown in the Figures 3.2.1-3, 3.2.1-4, 3.2.1-5, and 3.2.1-6 for the applicable type of fuel.

or



FLOW DEPENDENT MAPLHGR FACTOR (MAPFAC_f)

FIGURE 3.2.1-1

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3/4.2 POWER CISTRIBUTION LIMITS

BASES

The specifications of this section assure that the peak cladding temperature following the postulated design basis loss-of-coolant accident will not exceed the 2200°F limit specified in 10 CFR 50.46.

3/4.2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

This specification assures that the peak cladding temperature (PCT) following the postulated design basis Loss-of-Coolant Accident (LOCA) will not exceed the limits specified in 10 CFR 50.46 and that the fuel design analysis limits specified in GESTAR-II (Reference 1) will not be exceeded.

The peak cladding temperature (PCT) following a postulated loss-of-coolant accident is primarily a function of the average heat generation rate of all the rods of a fuel assembly at any axial location and is dependent only secondarily on the rod to rod power distribution within an assembly. The peak clad temperature is calculated assuming a LHGR for the highest powered rod which is equal to or less than the design LHGR corrected for densification. This LHGR times 1.02 is used in the heatup code along with the exposure dependent steady state gap conductance and rod-to-rod local peaking factor. The Technical Specification AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) is this LHGR of the highest powered rod divided by its local peaking factor. The MAPLHGR limits of Figures 3.2.1-1, 3.2.1-2, and 3.2.1-3 are multiplied by the smaller of either the flow dependent MAPLHGR factor (MAPFAC,) or the power dependent MAPLHGR factor (MAPFAC $_{\rm p}$) corresponding to existing core flow and power state to assure the adherence to fuel mechanical-design bases during the most limiting transient. MAPFAC,'s are determined using the threedimensional BWR simulator code to analyze slow flow runout transients. $MAPFAC_{D}$'s are generated using the same data base as the $MCPR_{D}$ to protect the core from plant transients other than core flow increases.

The Technical Specification MAPLHGR value is the most limiting composite of the fuel mechanical design analysis MAPLHGR and the ECCS MAPLHGR.

Fuel Mechanical Design Analysis: NRC approved methods (specified in Reference 1) are used to demonstrate that all fuel rods in a lattice, operating at the bounding power history, meet the fuel design limits specified in Reference 1. This bounding power history is used as the basis for the fuel design analysis MAPLHGR value.

LOCA Analysis: A LOCA analysis is performed in accordance with 10 CFR Part 50 Appendix K to demonstrate that the MAPLHGR values comply with the ECCS limits specified in 10 CFR 50.46. The analysis is performed for the most limiting break size, break location, and single failure combination for the plant.

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POWER DISTRIBUTION LIMITS

BASES

AVERAGE PLANAR LINEAR HEAT GENERATION RATE (Continued)

Only the most limiting MAPLHGR values are shown in the Technical Specification figures for multiple lattice fuel. When hand calculations are required, these Technical Specification MAPLHGR figure values for that fuel type are used for all lattices in that bundle.

For some GE fuel bundle designs MAPLHGR depends only on bundle type and burnup. Other GE fuel bundles have MAPLHGRs that vary axially depending upon the specific combination of enriched uranium and gadolinia that comprises a fuel bundle cross section at a particular axial node. Each particular combination of enriched uranium and gadolinia, for these fuel bundle types, is called a lattice type by GE. These particular fuel bundle types have MAPLHGRs that vary by lattice type (axially) as well as with fuel burnup.

Approved MAPLHGR values (limiting values of APLHGR) as a function of fue! nd lattice types, and as a function of the average planar exposure are provided in Technical Specification Figures 3.2.1-3 through 3.2.1-6.

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