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L. T. Gucwa
Manager Nuclear Engineering
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NED-84-264

May 25, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC DOCKET 50-366
OPERATING LICENSE NPF-5
EDWIN I. HATCH NUCLEAR PLANT UNIT 2
RESPONSE TO NRC STAFF QUESTIONS ON TIPS SYSTEM

Gentlemen:

On May 15, 1984 a teleconference was held between members of the NRC staff, Georgia Power Company (GPC) Nuclear Generation Engineering, and Southern Company Services Nuclear Safety and Fuel. The subject of the discussion was the Plant Hatch Unit 2 Traversing Incore Probe (TIP) system. The NRC staff requested that GPC provide a written description of how individual Local Power Range Monitor (LPRM) strings are recalibrated using the TIP system and the process computer program known as "OD-2". That information is provided in the enclosure to this letter.

The enclosure contains no proprietary information, therefore this submittal may be placed in the public document room without exception.

Sincerely yours,

for L. T. Gucwa

CBS/mb

xc: J. T. Beckham, Jr.
H. C. Nix, Jr.
J. P. O'Reilly (NRC- Region II)
Senior Resident Inspector

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DESCRIPTION OF FUNCTION FOR PROCESS COMPUTER PROGRAM OD-2

Process computer program OD-2, "Specified LPRM Substitute Value and Base Distribution," is intended to be used for individual LPRM strings which either need re-establishment of BASE, BASLP, and C values, or need substitute values for failed or drifted LPRM chambers. The BASE values, used in the power distribution calculations, represent the axial distribution of TIP-machine independent and core-power-independent TIP signals in a given TIP channel at the elevations of the center of the fuel segments. BASLP contains the BASE values at the LPRM elevations. The process computer LPRM calibration constant C relates the LPRM reading, taken at the time of the last TIP traverse in that string, to the machine-normalized TIP reading at the LPRM elevation at that time.

If the core power distribution changes significantly, or if one or more LPRMs drift or fail, the axial distribution for some locations based upon the LPRM readings may deviate from the stored BASE distributions for those locations by more than an acceptable amount. In that case, the accuracy of the axial power shape determination would be affected. The power distribution calculation (Program P-1) will identify such an occurrence and will type an edit giving the string coordinates in which new BASE distributions are required, and a "criticality code" assessing the seriousness of the need.

The method of OD-2 is (1) to insert the TIP probe into the channel having the failed sensor (or sensors), or into a channel requiring a new BASE distribution; (2) determine a new TIP machine normalization factor A(M) which makes the newly-normalized TIP signals best match the calibrated signals from the LPRMS in that string which are unfailed and which have not been diagnosed as having "drifted; and (3) apply that normalization factor to the TIP readings to obtain a new BASE distribution and new full-power-adjusted substitute LPRM readings for the traversed channel. If all the chambers in the string in question are either failed or drifted, the TIP probe must first be run into a different channel containing some unfailed and undrifted chambers to determine an updated TIP normalization factor A(M). This factor will then be used following the subsequent traverse of the channel containing all failed or drifted LPRMs.

Note that this method involves the assumption, not required when performing a whole-core calibration, that the average LPRM error in the traversed string is zero. More specifically, it is assumed that the machine normalization constant A(M), calculated from the unfailed and undrifted chambers in the given string, is the same value that would be calculated if a similar traverse were made of any other string serviced by that particular machine.

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The method of determination of the new machine normalization constant A(M) forces the average of the deviations between the calibrated LPRM readings (for unfailed LPRMs) and the normalized TIP readings at the elevations of LPRMs to zero. Individual deviations will, however, be non-zero, due to "normal" error sources such as small power level fluctuations during the course of the TIP traverse or errors in the calculated compensation for exposure-dependent LPRM sensitivity loss. Compensation is made for these small deviations by calculating new process computer LPRM calibration constants (C-values) for any unfailed LPRMs in the traversed string.

The calibration constants (Cs) for all LPRMs besides those in the traversed channel remain unaffected by use of program OD-2. Changing the machine normalization constant A(M), therefore, only affects the Cs for the LPRM string traversed and has no other effect on calibration constant.

Also, use of program OD-2 will not affect results from PlB, the backup thermal limits calculation, because machine normalization factors and LPRM calibration constants are not involved in that calculation.