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NED-84-186

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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 DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
EDWIN I. HATCH NUCLEAR PLANT UNITS 1, 2
REQUEST TO CHANGE TECHNICAL SPECIFICATIONS
APRM/RBM/TECH SPEC IMPROVEMENTS

Gentlemen:

Our letter of February 6, 1984, requested an APRM/RBM/TECH SPEC (ARTS) technical specification amendment. Enclosed are hardware descriptions and drawings which are submitted in support of the review of that amendment. Specifically, enclosed are:

FDI No. RWHA Rev. 0 and 1

FDI No. RJKA Rev. 0 and 1

Also, revisions to pages 1 through 4 of Attachment 2 of our February 6, 1984, submittal are enclosed. These revised pages supersede the original pages 1 through 4 and more clearly define the reasons that ARTS changes will not result in a significant hazards consideration.

GEORGIA POWER COMPANY

for L. T. Gucwa

DLT/mb
Enclosure

xc: J. T. Beckham, Jr. (w/o drawings)
H. C. Nix, Jr. (w/o drawings)
Senior Resident Inspector (w/o drawings)
J. P. O'Reilly (w/o drawings)
J. L. Ledbetter (w/o drawings)

A001
1/1

Georgia Power

ATTACHMENT 2

NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
EDWIN I. HATCH NUCLEAR PLANT UNITS 1, 2
REQUEST TO CHANGE TECHNICAL SPECIFICATIONS
APRM/RBM/TECH SPEC IMPROVEMENTS

Pursuant to 10 CFR 50.92, the following statements provide a summary of and the basis for the proposed changes:

1. Change the slope of the flow-biased Average Power Range Monitor/Simulated Thermal Power Monitor (APRM/STPM) scram and rod block setpoints from 0.66 to 0.58 and change their intercept values such that, at rated core flow, the setpoints are unchanged from their current values.

   BASIS:

   The Extended Load Line Limit Analyses (ELLLA), NEDC 30260, provide the analytical bases for raising the APRM scram and rod block lines at the bottom of the flow control range by reducing the flow biasing slopes from 0.66 to 0.58.

   Analyses have shown that the consequences of events initiated from within the region of the Power-Flow operating map made accessible by this changes, are bounded by the consequences of the same events initiated from the licensing basis condition. Changing the slope of these lines has the potential to increase the power-flow ratio following a two-pump trip event. Standard core stability calculations were performed for this scenario. The results meet the acceptance criteria defined by the NRC. Adjusting the zero-drive-flow intercept values as indicated assures that the rated-flow setpoints maintain the margins existing under current analyses. This proposed change therefore has no adverse effects on the probability or consequences of previously postulated accidents. Because no physical change is required to operate in the ELLLA region, the proposed change does not create the possibility of a new, previously unanalyzed accident. As stated above, because the consequences of events initiated within the ELLLA region are bounded by the consequences of the same events initiated from licensing basis conditions, margins of safety are not reduced. Furthermore, the results of this change are clearly within all acceptance criteria as presented in the licensing basis document, GESTAR II. Consequently, this change will not result in a significant hazards consideration.

2. The ARTS improvements have been divided into two areas of changes, those associated with the APRM/STPM setdown and those associated with the Rod Block Monitor (RBM). The changes have been analyzed collectively and the results reported in NEDC-30474-P, "General Electric BWR Licensing Report: Average Power Range Monitor, Rod Block Monitor and Technical Specification Improvement (ARTS) Program for Edwin I. Hatch Nuclear Plant, Units 1 and 2."

A description of and the basis for the proposed ARTS changes is given below.

A. Delete the requirement for setdown of the APRM/STPM flow-biased scram and rod block setpoints, when core maximum fraction of limiting power density (MFLPD) exceeds the fraction of core rated thermal power (core total peaking factor exceeding design peaking factor). In order to maintain function and margins, replace the setdown requirement with new multipliers to the MCPR and APLHGR operating limits when core power or flow conditions are less than the licensed conditions.

BASIS:

The setdown requirement originated from the obsolete Hench-Levy Minimum Critical Heat Flux Ratio (MCHFR) thermal limit criterion. The change to GETAB/GEXL with its de-emphasis of local thermal-hydraulic conditions makes the use of APRM/STPM trip setdown (based on core total peaking factor) much less meaningful for the purpose of assuring that onset of transient boiling does not occur during anticipated operational transients initiated from power levels less than rated. Further, the analysis of limiting transient events with primary reliance on anticipatory scram trips (e.g., turbine control valve and stop valve position scram trips) and with reduced reliance on APRM flow-biased flux scrams has led to a more effective and operationally acceptable alternative to the setdown requirement. ARTS proposes that alternative. ARTS uses results from analyses of limiting operational transients and of the design basis loss of coolant accident to define thermal operating limits. These limits assure that the applicable fuel licensing criteria stated in GESTAR II (NEDE-24011-P-A-6 and NEDE-24011-P-A-US-6) and in the E. I. Hatch Unit 1 FSAR, Chapter 14, are satisfied without the setdown of the APRM/STPM flow biased scram and rod block trips. Administration of fuel thermal limits is more direct and fewer manual setpoint adjustments are required.

As part of the justification for removal of the setdown requirement, it is necessary to define the operating limit MCPR (OLMCPR) such that no postulated transient events initiated from off-rated power or flow conditions may result in violation of the MCPR Safety Limit. Analyses of the limiting transients, presented in NEDC-30474-P, show that the ARTS power-dependent multiplier, (k_p), when multiplied by the rated-power, rated-flow operating limit MCPR, conservatively bounds the operating MCPR needed to insure the MCPR safety limit is not violated during any anticipated transient. The flow-dependent MCPR requirement introduced by ARTS, $MCPR_F$, was derived from results of analysis of slow-flow runout events and, thus, serves the same purpose as the K_f multipliers which it replaces. No $MCPR_F$ is required for Automatic

Flow Control because that mode of operation will not be used. The governing MCPR limit for any power and flow condition is the greater of the values determined based on core power considerations ($MCPR_P$) or core flow consideratons ($MCPR_F$).

In the absence of the APRM scram setdown requirement, new limits are also substituted to assure compliance with the fuel thermal-mechanical design base given in GESTAR II. Power-dependent limits on linear heat generation rate were generated from the same transient calculations used to determine the power dependent MCPR multiplier, K_P. Also, flow-dependent linear heat generation rate requirements were derived such that the peak transient during slow-flow runout transients will not increase above the GESTAR II design basis values. For ease of administration, the ARTS linear heat generation rate limits are defined as multipliers, $MAPFAC_P$ and $MAPFAC_F$, which apply to the existing fuel-type and exposure-dependent MAPLHGR limits. The flow-dependent MAPLHGR multiplier, $MAPFAC_F$, definiton also incorporates the requirements derived from the LOCA analysis performed under ARTS, without taking credit for the existing APRM/STPM setdown based on core total peaking factor. The more limiting of the MAPLHGR multipliers at any time is used to calculate the governing MAPLHGR limit at that time.

Analyses performed to support elimination of the APRM setdown requirement were done with methods given in GESTAR II, which have been previously reviewed and approved. The acceptance criteria used in ARTS for defining the off-rated MCPR and APLHGR requirements were the same criteria defined for fuel-rod integrity in the existing licensing basis (GESTAR II). There is no reduction in the margin of safety, because all acceptance criteria are met under this change.

The causes of each of the events evaluated in the Plant Safety Analysis chapters of the Hatch FSARs were considered. The probability of occurrence of each of the causes enumerated would be unaffected by operation of either reactor with fuel thermal limits defined as described above. Furthermore, no new modes that could lead to occurrence of the FSAR events or other events could be identified due to use of the ARTS operating limits.

Information presented in NEDC 30474-P shows that the consequences of accidents and transient events which might be affected by implementation of this change are bounded by the consequences of the same events initiated from current licensing basis conditions, provided the appropriate adjustments to the operating limits as outlined above are made. The proposed Technical Specification changes will assure that needed adjustments are made.

B. Replace the Rod Block Monitor (RBM) flow-biased trip equation with power-dependent setpoint definitions, incorporate RBM filter and time delay setpoints, and change the RBM downscale trip setpoint. Add appropriate RBM operability and surveillance requirements, including the definition of Limiting Rod Pattern for Rod Withdrawal Error (RWE).

BASIS:

Revision of the RBM trip logic provides a system response which more accurately reflects the actual margin to the MCPR safety limit at various power conditions. An exhaustive, generic Rod Withdrawal Error (RWE) analysis was performed to evaluate the upgraded RBM system described in NEDC-30474-P. It was shown that all requirements for prevention of cladding failure during an RWE are met, if the logic setpoints, filter setpoints, time delays, and downscale trips defined in this change and the power-dependent Minimum Critical Power Ratio ($MCPR_p$) operating limit adjustment, described in Item A above, are implemented.

The generic RWE analysis performed for ARTS was also used to determine the pre-RWE MCPR margin that would assure that the complete withdrawal of any single control rod would not violate the Safety Limits whenever the operational MCPR is above the limiting values defined by this change, i.e., the core is not operating on a limiting rod pattern for RWE.

The ARTS analyses also justify complete bypass of the RBM system below 30% of rated thermal power. This part of the amendment also would require a functional test of the RBM prior to withdrawal of control rods when RBM operability is required and when only one RBM channel is operable.

For Hatch Unit 1, the Limiting Conditions for Operation with only one or neither RBM channel operable are defined for use when RBM operability is required. Hatch Unit 2 Limiting Conditions for Operation are already defined for this condition.

Analyses performed to support the changes to the RBM system were done with methods given in GESTAR II, which have been previously reviewed and approved. The acceptance criteria used in the ARTS Program for defining the power-biased RBM setpoints were the same criteria defined for fuel-rod integrity in the original licensing basis given in GESTAR II. There is no reduction in the margin of safety nor is there any increase in the consequence of a postulated RWE, because all acceptance criteria are met under the new system. Changes in the RBM design and operating parameters will improve RBM reliability and enhance operator interface with the RBM, reducing the probability of a rod withdrawal error event due to operator error.

The RBM pays no role in any other postuated transients. No new failure modes that could create the possiblity of a new or different kind of accident are introduced by the proposed changes to RBM systems because no other plant systems are affected.