

Georgia Power Company
333 Piedmont Avenue
Atlanta, Georgia 30308
Telephone 404 526-6526

Mailing Address:
Post Office Box 4545
Atlanta, Georgia 30302

L. T. Gucwa
Manager Nuclear Engineering
and Chief Nuclear Engineer



NED 85-333
1557B

May 6, 1985

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
REACTOR VESSEL WATER LEVEL INSTRUMENTATION IN BWRs
(GENERIC LETTER 84-23)

Gentlemen:

By letter dated November 20, 1984, Georgia Power Company stated that a complete response to Generic Letter 84-23 would be submitted by May 6, 1985. In accordance with that commitment, Enclosure 1 is provided.

Please contact this office if you have any questions.

Very truly yours,

L. T. Gucwa

JH/jh

Enclosure

xc(w/encl): J. T. Beckham, Jr.
H. C. Nix, Jr.
J. N. Grace (NRC-Region II)
Senior Resident Inspector

8505140335 850506
PDR ADOCK 05000321
P PDR

A002
11

ENCLOSURE 1

EDWIN I. HATCH NUCLEAR PLANT UNITS 1, 2

RESPONSE TO GENERIC LETTER 84-23

REACTOR VESSEL WATER LEVEL INSTRUMENTATION IN BWRs

May 6, 1985

I. INTRODUCTION

In this report Georgia Power Company (GPC) proposes a plan and schedule for addressing the NRC staff position on BWR reactor vessel water level instrumentation as stated in Generic Letter 84-23.

II. BACKGROUND

Item II.F.2 of NUREG 0737 required a description of proposed additional instrumentation to detect inadequate core cooling (ICC). Revision 2 to Regulatory Guide 1.97 later identified core thermocouples as an acceptable means of satisfying Item II.F.2 in BWRs. The BWR Owners Group (BWROG) questioned the effectiveness and need for core thermocouples. An evaluation performed for the BWROG by S. Levy, Inc. (SLI) confirmed that the slow response time of core thermocouples would severely limit their usefulness as ICC detection devices. That evaluation was documented in the report SLI-8121, "Thermal Analyses of In-Core Thermocouples in Boiling Water Reactors". Following presentation of that report to the NRC staff, it was agreed by the staff and the BWROG that a general study responding to Item II.F.2 should be performed. The study was to address the adequacy of existing reactor water level instrumentation during "off-normal" conditions as well as the general question of ICC detection. The staff agreed that core thermocouples would not be required if an acceptable program were implemented by the BWR Owners.

The study was performed by SLI for the BWROG and was documented in two reports. The first report, SLI-8211 "Review of BWR Reactor Vessel Water Level Measurement Systems", identified several areas for potential improvement of existing systems. The second report, SLI-8218 "Inadequate Core Cooling Detection in Boiling Water Reactors", demonstrated that reactor water level was a conclusive indicator of the adequacy of core cooling and that, given the implementation of improvements to existing level instrumentation, additional ICC devices would have little or no benefit.

The staff has completed its review of SLI-8211 and SLI-8218. Generic Letter 84-23 provides the staff position regarding reactor water level measurement system improvements. The following sections address GPC's plans and schedule for addressing the staff position.

III. HATCH MODIFICATION PLANS

GPC has actively participated in the BWROG effort. Following completion of SLI-8211 and SLI-8218, a plant-specific evaluation of the Hatch reactor water level measurement systems was initiated. The evaluation was performed by S. Levy, Inc. and addressed all of the generic concerns raised in the Owners Group study. The results of the Hatch-specific study are summarized as specific responses to the three categories of improvement identified in Generic Letter 84-23:

A. STAFF POSITION-HIGH DRYWELL TEMPERATURE EFFECTS

"Improvements to plant(s) that will reduce level indication errors caused by high drywell temperature. These improvements include prevention of reference leg overheating or reduction of the vertical drops within the drywell. (Vertical drop should be measured from the condensation pot to the drywell exit point. Maximum drop would allow an indicated level at the bottom of the normal operating range when actual level is just above lower tap for worst flashing condition.) Those plants for which the vertical drop in the drywell has already been minimized will not have to make additional changes for the drywell heating effect."

RESPONSE

Due to significant vertical drops of level instrument sensing lines within primary containment, the Hatch units would be susceptible to level indication errors in the event of a high drywell temperature condition. These errors would be detected by the Hatch Safety Parameter Display System (SPDS), however. The SPDS uses sampled data from nine level sensors for water level measurement. Water level information available to the operator includes:

1. A bar graph display and digital reading of current level;
2. A time history plot of water level; and
3. Separate bar graph displays for the nine sensors.

The water level signals from the nine sensors are corrected for instrument line fluid density changes and vessel fluid density changes. The instrument line fluid densities are estimated from sensed drywell temperatures and the vessel fluid density is estimated from sensed vessel pressure. A single value for vessel level is calculated using a weighted average of the nine corrected values. The SPDS provides a warning message to the operator if conditions for instrument line flashing are approached, although flashing errors can not be corrected. The onset of flashing can be significantly delayed and the operator burden thereby reduced, however, by insulating level sensing lines within the drywell. GPC plans to install insulation on the reference legs serving the wide range (-150 to +60") instruments. This will provide the operator with additional time to correct the cause of the high drywell temperature.

B. STAFF POSITION-MECHANICAL EQUIPMENT RELIABILITY

"Review of plant experience relating to mechanical level indication equipment. Plant experience shows that mechanical level equipment is more vulnerable to failure or malfunction than analog equipment. A number of plants have already connected analog trip units to their level transmitters to improve reliability and accuracy. Those plants that use mechanical level indication equipment should replace the mechanical level indication equipment with analog level transmitters unless operating experience confirms high reliability."

RESPONSE

To improve the reliability and accuracy of certain plant instrumentation, GPC has elected to install Analog Transmitter Trip Systems (ATTS) in both Hatch units. ATTS installation has included level instrument replacement.

C. STAFF POSITION-PROTECTIVE SYSTEM LOGIC

"Changes to the protection system logic that may be needed for those plants in which operator action may be required to mitigate the consequences of a break in a reference leg and a single failure in a protection system channel associated with an intact reference leg. Changes will generally result in additional transmitters to satisfy the single failure criterion. This improvement, under evaluation by NRC, may be needed in plants where an analysis has demonstrated a vulnerability."

RESPONSE

GPC will respond to this issue following completion of the NRC staff evaluation.

IV. IMPLEMENTATION SCHEDULE

A. HATCH UNIT 1

The SPDS will be fully implemented by June 1986. Reference leg insulation will be installed during the refueling outage currently scheduled for spring 1987. The portions of ATTS applicable to this issue have been installed.

B. HATCH UNIT 2

The SPDS will be fully implemented by June 1986. Reference leg insulation will be installed during the refueling outage currently scheduled for fall 1986. The portions of ATTS applicable to this issue have been installed.

V. CONCLUDING SUMMARY

In Generic Letter 84-23 it is stated that:

"Implementation of the first two categories of improvements (high drywell temperature effects and mechanical equipment reliability) will give increased assurance that the level instrumentation will provide the inadequate core cooling instrumentation required by NUREG-0737 Item II.F.2 and thereby satisfy this requirement."

GPC believes that the aforementioned modifications, when implemented, will give increased assurance that the level instrumentation of the Hatch units provides adequate ICC instrumentation, and will therefore complete Item II.F.2 for Plant Hatch.

MAY 06 1985