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New York Power Authority

William J. Cahill, Jr.
Chief Nuclear Officer

March 29, 1996
JPN-96-012

U. S. Nuclear Regulatory Commission
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Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Stability Monitor Description for Long-Term Solution on Reactor Stability (Generic Letter 94-02)

Reference:
1. NYPA letter, W. J. Cahill, Jr. to NRC (JPN-95-032), "Submittal of Plant Specific Licensing Topical Report for Long-Term Solution on Reactor Stability (Generic Letter 94-02)," dated June 29,1995.
2. NYPA letter, W. J. Cahill, Jr. to NRC (JPN-96-009), "Proposed Change to the Technical Specifications Regarding Implementation of BWROG Option 1-D Long-Term Solution for Thermal Hydraulic Stability (JPTS-96-005)," dated March 22, 1996.

ear Sir:

This letter transmits a description of the on-line stability monitor to be installed to augment the Option 1-D reactor stability solution, and its application to the FitzPatrick plant (Reference 1). This submittal is in response to commitment JPN-95-032-01 (Reference 1). The description is submitted as Attachment 1. Proposed changes to the Technical Specifications to support implementation of the Option 1-D solution were submitted on March 22, 1996 (Reference 2).

There are no new commitments in this submittal.

If you have any questions, please contact Mr. A. Zaremba.

Very truly yours,

William J. Cahill, Jr.
Chief Nuclear Officer

att: As stated
cc: next page

A001

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Attachment 1 to JPN-96-012

On-line Stability Monitor Description

The New York Power Authority has chosen the General Electric SOLOMON (Stability On Line ODYSY MONitor) product as the on-line stability monitor to be implemented at the FitzPatrick Plant (JAF). SOLOMON is integrated with the 3D MONICORE software used for core monitoring at JAF and will be installed on the same hardware platform. SOLOMON uses live plant data to determine the power-flow operating state relative to the stability buffer and exclusion regions, and uses 3D MONICORE output and the ODYSY (One dimensional DYnamics for StabilitY) program to evaluate and predict core and hot channel decay ratios (which provide an indication of stability margin) upon automatic or manual demand.

SOLOMON monitors the power-flow state point as often as new power and flow data are available to promptly detect reactor operation in user-defined regions of the core power-flow map. The power-flow map is divided into three regions with respect to stability. Operator action appropriate to each will be directed by plant procedures. The regions are:

- The exclusion region, in which plant conditions are susceptible to thermal hydraulic instability. To avoid potential oscillations, immediate action will be taken to maneuver the power and/or flow out of this region. SOLOMON will generate alarm messages for this condition. The exclusion region will be calculated in accordance with JAF Technical Specifications and included in the Core Operating Limits Report.

- A buffer region adjacent to the exclusion region. This region may be entered for planned maneuvers such as plant startup and shutdown, provided decay ratio monitoring is performed to ensure adequate stability margin is maintained. If the calculated margin is unacceptable, operating parameters such as core flow or control rod pattern will be adjusted to obtain acceptable stability margin. SOLOMON will generate alarm messages for this condition. If the stability monitor is not operable, this region will be treated as an exclusion region.

- The normal operation region (areas of acceptable operation exclusive of the buffer and exclusion regions). No SOLOMON alarm messages are generated. Decay ratio calculations are not required in this region.

When required, SOLOMON calculates core and hot channel decay ratios. The decay ratios are compared to a stability criterion map to indicate the overall plant stability margin. When decay ratio monitoring is performed, a 3D MONICORE Official case output file is used to prepare input for ODYSY.

ODYSY uses linearized, small perturbation, frequency domain models of the core components and coolant recirculation system to predict the thermal-hydraulic reactivity stability of BWRs. These detailed models provide best-estimate results, as contrasted to licensing basis models.

SOLOMON may be used to predict stability margins for anticipated reactor maneuvers by specifying use of 3D MONICORE Predictor case outputs for ODYSY input, rather than an Official case output.

ODYSY has been qualified over a wide range of conditions by comparisons with analytical solutions, design codes, plant data and steady state results.