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 BYRAM, R.G. Pennsylvania Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 MILLER, C.L. Project Directorate I-2

SUBJECT: Responds to requested actions of NRC GL 94-02, "Long-Term Solutions & Upgrade Of Interim Operating Recommendations for Thermo-Hydraulic Instabilities in Boiling Water Reactors."

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SEP 12 1994

Director of Nuclear Reactor Regulation
Attn.: Mr. C. L. Miller, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO GENERIC LETTER 94-02: LONG-TERM
SOLUTIONS AND UPGRADE OF INTERIM OPERATING
RECOMMENDATIONS FOR THERMAL-HYDRAULIC
INSTABILITIES IN BOILING WATER REACTORS
PLA-4195 FILES A17-4/R41-1D**

Docket Nos. 50-387
and 50-388

- References:*
- 1.) *Letter, L.A. England to M. J. Virgilio, "BWR Owners' Group Guidelines for Stability Interim Corrective Action," June 6, 1994.*
 - 2.) *Letter, L.A. England to M. J. Virgilio, "BWR Owners' Group Improved Guidelines for Stability Interim Corrective Actions," April 4, 1994.*
 - 3.) *Letter, A. Thadani to L. A. England, "Acceptance for Referencing of Topical Reports NEDO-31960 and NEDO-31960, Supplement 1, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology", " July 12, 1993.*

Dear Mr. Miller:

The purpose of this letter is to provide Pennsylvania Power and Light Company's (PP&L) response to the requested actions of NRC Generic Letter 94-02 entitled, "Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal-Hydraulic Instabilities in Boiling Water Reactors." Each requested action and associated response is provided below:

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NRC REQUESTED ACTION

1. **All licensees of BWRs, except Big Rock Point which does not have the capability for operation under variable flow conditions, are requested to review their current procedures and training programs and modify them as appropriate to strengthen the administrative provisions intended to avoid power oscillations or to detect and suppress them if they occur prior to implementation of the long-term solutions. The experience gained at WNP-2 should be a primary guide in this review. In doing this, each licensee of a BWR (except for Big Rock Point) should:**
 - a. **Ensure that procedural requirements exist for initiation of a manual scram under all operating conditions when all recirculation pumps trip (or there are no pumps operating) with the reactor in the RUN mode, and ensure that operators are aware of the potential for very large power oscillations and the potential for exceeding core thermal safety limits before automatic protection systems function following the trip of all recirculation pumps (the procedural manual scram is not necessary after long-term solutions are approved and implemented for individual plants); and**
 - b. **Ensure that factors important to core stability characteristics (e.g., radial and axial peaking, feedwater temperature, and thermal hydraulic compatibility of mixed fuel types) are controlled within appropriate limits consistent with core design, power/flow exclusion boundaries, and core monitoring capabilities of the reactor in question, and that these factors are controlled through procedures governing changes in reactor power, including startup and shutdown, particularly at low-flow operating conditions. Each licensee should review its procedures and determine if instability can be avoided by these procedures and if the procedures can be carried out using existing instrument information. If it is concluded that a near-term upgrade of core monitoring capability is called for to ease the burden on operators, determine the need to incorporate on-line stability monitoring or monitors for stability sensitive parameters and inform the NRC of the schedule and technical evaluation for such upgrades found to be necessary. (These procedural operation controls will no longer be necessary for licensees which implement fully automatic long-term solutions, such as Options III or IIIa of Reference 2 [NEDO-31960, Supplement 1]. Licensees should propose for plant-specific review the administrative controls to be retained in conjunction with other long-term solutions.)**



PP&L RESPONSE:

PP&L implemented the Interim Corrective Actions (ICAs) specified in NRC Bulletin 88-07, Supplement 1. As a result of the WNP-2 stability incident, along with the continued assessment of the instability phenomenon, the BWR Owners' Group (BWROG) developed improved guidelines for the ICAs to better address startup and low power maneuvering conditions. A copy of the improved BWR Owners' Group Guidelines for Stability Interim Corrective Action was provided to the NRC in Reference 1. It is our understanding that, based on a review of an advance copy of these guidelines (Reference 2), the NRC will accept the improved BWR Owners' Group Guidelines as an adequate response to requested action 1a. and 1b. of Generic Letter 94-02.

In addition, the Susquehanna Steam Electric Station (SSES) has modified its operating procedures and operator training such that they are now consistent with, or more conservative than, the BWROG guidelines in Reference 1. The Reference 1 guidelines incorporate an expanded stability region and power distribution control definition to strengthen the oscillation prevention feature. This revised stability region, in conjunction with the detection and suppression provisions of the guidelines, provides an enhanced degree of protection against unacceptable power oscillations from that of the original 1988 BWROG ICA's.

It should be noted, that the Reference 1 guidelines and resulting plant operating procedure and operator training modifications are intended for use only until the stability long-term solution is implemented. Beyond this, all appropriate procedures and training will be specified by the long-term solution implemented at the Susquehanna Stream Electric Station.

NRC REQUESTED ACTION

2. All licensees of BWRs, except for Big Rock Point, are requested to develop and submit to the NRC a plan for long-term stability corrective actions, including design specifications for any hardware modifications or additions to facilitate manual or automatic protective response needed to ensure that the plant is in compliance with General Design Criteria 10 and 12. An acceptable plan could provide for implementing one of the long-term stability solution options proposed by the BWROG and approved by the NRC in Reference 3 or in subsequent documentation. The plan should include a description of the action proposed and a schedule of any submittal requiring plant-specific design review and approval by the NRC and an installation schedule (if applicable). The plan should also address the need for near-term and long-term technical specification modifications. Generic BWROG documents or plan submittal may be referenced in the plan.

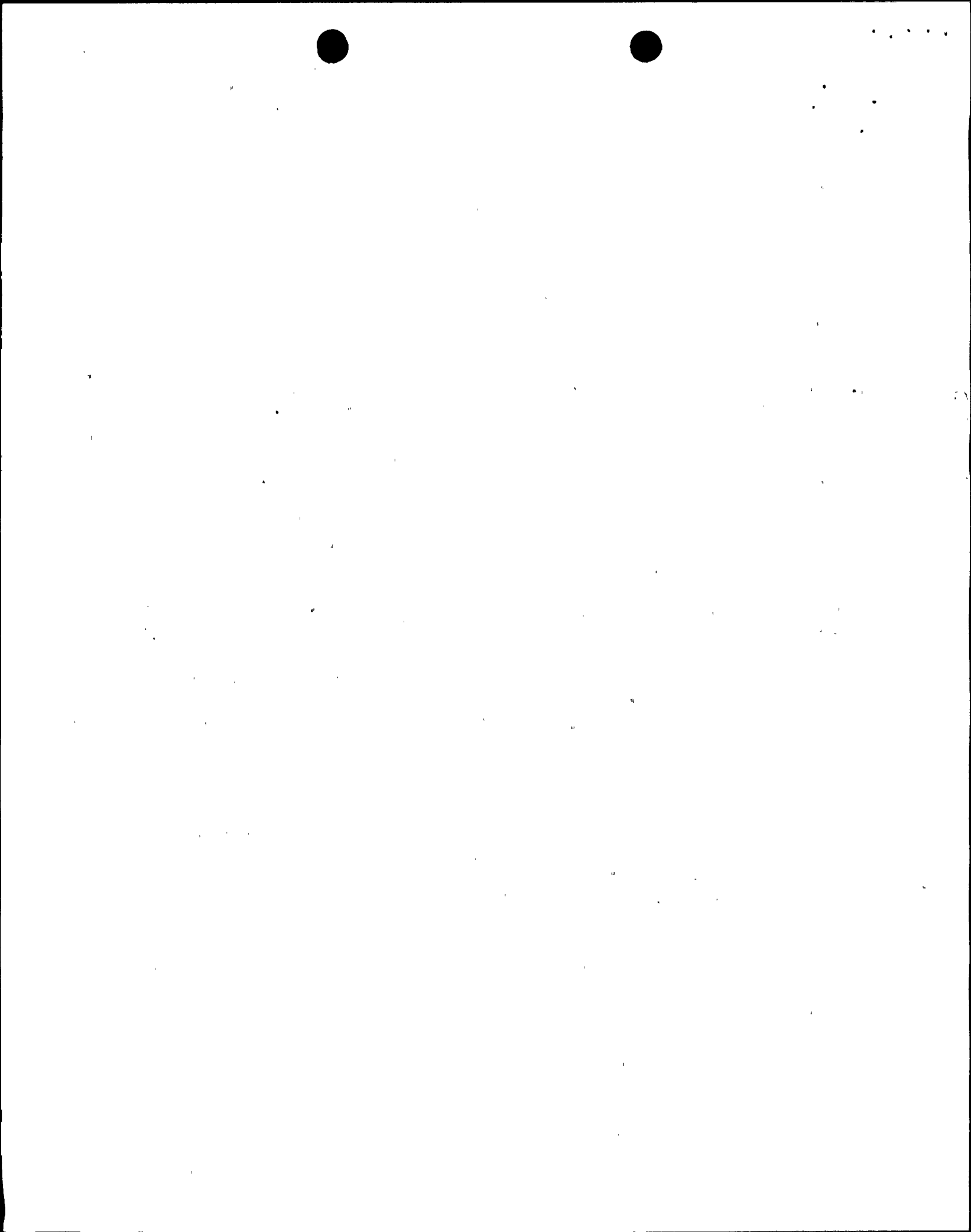


PP&L RESPONSE:

The NRC requirement for stability long-term corrective actions to ensure compliance to GDC 10 and 12 was originally presented in NRC Bulletin 88-07, Supplement 1 (December 30, 1988). The Bulletin acknowledged that the NRC was working with the BWR Owners' Group to develop generic approaches to resolve this issue. The resulting BWROG efforts have led to the solution concepts and supporting methodology described in NEDO-31960 and NEDO-31960, Supplement 1 "BWR Owners' Group Long-Term Stability Solution Licensing Methodology." NRC acceptance of the BWROG developed-solution concepts and supporting methodology is indicated in Reference 3.

Based on the technical progress that has been made in the BWROG stability program and the degree of NRC acceptance indicated in the referenced letter, plans have been formulated for implementing a stability long-term solution at SSES. PP&L has elected to proceed with a solution which introduces new plant hardware/software to provide early detection of oscillations and to initiate an appropriate mitigating action. This "Long-Term Solution Stability System" (LTSSS) features the Option III (OPRM) concept description in NEDO-31960 and NEDO-31960, Supplement 1. To complete this activity, PP&L is participating with other utilities under a BWROG program and has contracted with ABB Combustion Engineering to develop the hardware/software design and deliver the final product. Recommendations for Technical Specification changes will be provided as part of the program. These changes will be incorporated at SSES as appropriate. Implementation of the stability long-term solution plan is contingent upon NRC acceptance of the planned BWROG submittal on methodology and the BWROG/ABB Combustion Engineering submittal on hardware and software.

The current milestone schedule for completion of the joint design and licensing activities is provided in Enclosure 1. The LTSSS hardware is scheduled to be available in Fall 1995. The plan, as discussed at the July 21, 1994 Option III Owners' Group meeting with the NRC, is for the first installation of the LTSSS to be in the fourth quarter of 1996. This schedule allows appropriate time for engineering preparation for system installation. The Owners' Group recommendation is for all plants to operate with the RPS trip function disabled for at least six (6) months to evaluate the system performance, determine its potential for spurious trips signals, and become familiar with the system operation. The present Interim Corrective Actions (ICAs) will be used during the evaluation period when the RPS trip is disabled. During this period, the alarm and trip alarm functions will be operational to increase the operator's ability to recognize an instability event. The near term plan is to use the existing Technical Specification without modification for the evaluation period operation. Upon successful completion of the evaluation period, the RPS trip function will be enabled and the system declared operational. The present ICAs will be replaced by the appropriate operational procedures for long-term operation.



The SSES Technical Specification will be modified to reflect the installation of this LTSSS as a new component of the Reactor Protection System. Assuming that the joint development and NRC acceptance is completed as scheduled (see enclosure 1), it is PP&L's objective to have LTSSS installed as follows:

- Unit 1 by the end of the Ninth Refueling and Inspection Outage, currently scheduled to begin September 9, 1996 and following acceptance testing, to have it operational by May 12, 1997.
- Unit 2 by the end of the Eighth Refueling and Inspection Outage, currently scheduled to begin March 15, 1997 and following acceptance testing, to have it operational by November 19, 1997.

Questions regarding this response should be directed to Mr. A. K. Maron at (215) 774-7852.

Very truly yours,



R. G. Byram

Enclosure

cc: NRC Document Control Desk (original)
NRC Region I
Ms. M. Banerjee, NRC Sr. Resident Inspector
Mr. C. Poslusny, Jr., NRC Sr. Project Manager

**DESIGN & LICENSING ACTIVITIES
(ABB CE OPTION III)**

2Q/94	Initiate Design Work (ABB CE)
3Q/94	Meet With NRC On Hardware/Software Development Process
4Q/94	Option III Hardware/Software Topical Report Submittal (ABB)
1Q/95	Detect & Suppress Topical Report Submittal (First Time Application And Reload Review)
3Q/95	NRC Approval Of Option III Hardware/Software Topical And Generic Technical Specification
4Q/95	System Design And Development Complete
3Q/95	Start Option III Initial Plant Installation Engineering Preparation
4Q/96	Option III Initial Plant Installation Outage Start
4Q/96	Plan For Option III Installation At SSES Unit 1
2Q/97	Plan For Option III Installation At SSES Unit 2

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA)

: SS

COUNTY OF LEHIGH)

I, ROBERT G. BYRAM, being duly sworn according to law, state that I am Senior Vice President - Nuclear of Pennsylvania Power & Light Company and that the facts set forth in the attached response to Generic Letter 94-02, are true and correct to the best of my knowledge, information and belief.

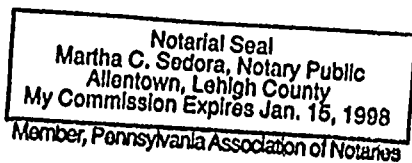


Robert G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed
before me this 12th day
of September, 1994.



Notary Public





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