UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 1, 1995

Mr. Robert G. Byram
Senior Vice President-Nuclear
Pennsylvania Power and Light
Company
2 North Ninth Street
Allentown, PA 18101

SUBJECT: INOPERABLE EX-CORE MONITORING SYSTEM CHANNEL, SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2 (TAC NO. M91520)

Dear Mr. Byram

The Commission has issued the enclosed Amendment No. 115 to Facility Operating License No. NPF-22 for the Susquehana Steam Electric Station (SSES), Unit 2. This amendment is in response to your letter dated February 7, 1995.

This amendment revises the Technical Specification (TS) 3.3.7.5 to allow continued operation with one neutron flux monitor system channel ("B" channel) inoperable and should the remaining channel become inoperable to allow continued plant operation for 7 days to restore one of the two inoperable channels. The effective duration of this amendment is until the first unit shutdown which would allow containment entry of sufficient duration to properly evaluate and correct the condition of the "B" ex-core monitoring channel, not to exceed the seventh refueling and inspection outage for SSES Unit 2. This outage is scheduled for the fall of 1995.

On February 6, 1995, your staff verbally requested, and we orally granted, a request to exercise enforcement discretion from complying with the TS 3.3.7.5 limiting condition for operation based on an inoperable ex-core monitoring channel. You documented this request in a letter dated February 6, 1995. We subsequently confirmed that the enforcement discretion had been granted in our letter to you dated February 8, 1995.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance of Amendment to Facility Operating License and Final Determination of No

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Significant Hazards Consideration and Opportunity for Hearing will be included in the Commission's Biweekly Federal Register Notice.

Sincerely,

/S/

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-388

Enclosures: 1. Amendment No. 115 to License No. NPF-22
2. Safety Evaluation

cc w/encls: See next page

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Significant Hazards Consideration and Opportunity for Hearing will be included in the Commission's Biweekly Federal Register Notice.

Sincerely,

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-388

Enclosures: 1. Amendment No. 115 to
License No. NPF-22
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 115
License No. NPF-22

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by the Pennsylvania Power & Light Company, dated February 7, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-22 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 115 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PP&L shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and is to be implemented on the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 1, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 115

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following pages of the Appendix A Technical Specifications with enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE	INSERT
3/4 3-71	3/4 3-71

TABLE 3.3.7.5-1
ACCIDENT MONITORING INSTRUMENTATION

INSTRUMENT	REQUIRED NUMBER OF CHANNELS	MINIMUM CHANNELS OPERABLE	ACTION	APPLICABLE OPERATIONAL CONDITIONS
1. Reactor Vessel Steam Dome Pressure	2	1	80	1,2
2. Reactor Vessel Water Level	2	1	80	1,2
3. Suppression Chamber Water Level	2	1	80	1,2
4. Suppression Chamber Water Temperature	8,6 locations	6,1/location	80	1,2
5. Suppression Chamber Air Temperature	2	1	80	1,2
6. Primary Containment Pressure	2/range	1/range	80	1,2
7. Drywell Temperature	2	1	80	1,2
8. Drywell Gaseous Analyzer				
a. Oxygen	2	1	80	1,# 2#
b. Hydrogen	2	1	82	1,# 2#
9. Safety/Relief Valve Position Indicators	1/valve*,##	1/valve*,##	80	1,2
10. Containment High Radiation	2	1	81	1,2
11. Noble gas monitors**				
a. Reactor Bldg. Vent	1	1	81	1,2 and***
b. SGTS Vent	1	1	81	1,2 and ***
c. Turbine Bldg. Vent	1	1	81	1,2
12. Primary Containment Isolation Valve Position	1/valve	1/valve	80	1,2
13. Neutron Flux	1###	0###	80	1,2

* Acoustic monitor.

** Mid-range and high-range channels.

*** When moving irradiated fuel in the secondary containment.

\# See Special Test Exception 3.10.1.

Compliance with these requirements for the "S" SRV acoustic monitor is not required for the period beginning January 21, 1994, until the next unit shutdown of sufficient duration to allow for containment entry, not to exceed the sixth refueling and inspection outage.

Revision of the requirements for the ex-core neutron flux monitor is required for the period beginning February 6, 1995 until the next unit shutdown which allows for containment entry of sufficient duration to properly evaluate and correct the impaired condition, not to exceed the seventh refueling and inspection outage.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.115TO FACILITY OPERATING LICENSE NO. NPF-22

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

DOCKET NO. 50-388

1.0 INTRODUCTION

By letter dated February 7, 1995, Pennsylvania Power and Light Company (the licensee) submitted a request for changes to the Susquehanna Steam Electric Station, Unit 2, Technical Specifications (TS). (The current TS 3.3.7.5 has a limiting condition for operation (LCO) that requires shutdown initiation after 7 days with one ex-core monitor channel inoperable and shutdown initiation within 48 hours with two channels inoperable.) The requested changes would revise the Technical Specification (TS) 3.3.7.5 to allow continued plant operation with one neutron flux monitor system channel ("B" channel) inoperable and should the remaining channel become inoperable to allow continued plant operation for 7 days to restore one of the two inoperable channels. The effective duration of this amendment is until the first unit shutdown which would allow containment entry of sufficient duration to properly evaluate and correct the condition of the "B" ex-core monitoring channel, not to exceed the seventh refueling and inspection outage for SSES Unit 2. This outage is scheduled for the fall of 1995.

2.0 BACKGROUND

On January 30, 1995, PP&L staff found that the SSES Unit 2 "B" channel log power range indicator of the ex-core neutron flux monitor was reading upscale. In accordance with TS 3.3.7.5, and Table 3.3.7.5-1, the "B" channel was declared inoperable and the LCO was entered. (The "A" channel remains operable.) This LCO requires bringing the plant to HOT SHUTDOWN within 12 hours if the channel can not be restored to an operable condition within seven days. Since the LCO was entered, the licensee indicated that its staff had completed significant effort to identify the cause and correct the impaired condition working on the channel components and cables outside containment during several successive days so that the channel might be restored to an operable condition. It was suggested after the unsuccessful attempt to repair the channel, that the evidence indicated that the root cause might be a faulty detector, a cable or connection problem inside primary containment and therefore a shutdown would have been required to reestablish operability.

PP&L on the seventh day of the LCO, in order to avoid an unnecessary transient, requested enforcement discretion from compliance with the TS and submitted the February 6th formal request for enforcement discretion followed by the February 7th amendment request. The Commission granted the enforcement discretion for the period of time it will take to process the TS change discussed herein.

3.0 EVALUATION

As described in he SSES Final Safety Analysis Report, the ex-core monitoring system provides the neutron flux monitoring requirements of Regulatory Guide 1.97. It is a Category 1 monitoring system which includes requirements for environmental qualification, seismic qualification, Class 1E power sources, and redundant channels. Its most important function is to provide an indication of reactor power to the operators after an ATWS (anticipated transient without scram) event. It is comprised of two redundant and separate channels, and each channel has four detectors which are located inside containment outside the biological shield. This system provides only indication and alarm functions. For the Safety Parameter Display System (SPDS) and plant computer, it provides log and low power countrate inputs. The control room readouts indicate log and low power countrate and period from the system inputs. In addition, the countrate information is also displayed at the shutdown range monitor. The system is powered from instrument AC with backup from the emergency diesel generators.

In the submittal, the licensee stated that there are sufficient alternate sources of information about reactor power available to the operators in the event that the ex-core monitoring system is not available after an accident. Specifically, the post-accident neutron flux monitoring function at SSES can be accomplished by the source range monitors (SRMs), the intermediate range monitors (IRMs), the low power range monitors (LPRMs), and the average power range monitors (APRMs). These monitors are collectively referred to as the neutron monitoring system (NMS). The SRMs and APRMs provide flux information to the SPDS and the SRMs, APRMs, and IRMs provide information to the plant computer. The SRMs and IRMs are provided with 24VDC batteries, and the APRMs and LPRMs are supplied from the reactor protection bus and are diesel generator backed. Further, it was stated that the SSES emergency operating procedures do not rely upon the ex-core monitoring system.

The BWR Owners' Group (BWROG) in 1988 proposed alternate criteria for neutron flux monitoring instrumentation in lieu of the Category 1 criteria stated in the RG in its NEDO Report No. 31558, "BWR Owners' Group Licensing Topical Report Position on NRC Regulatory Guide 1.97, Revision 3, Requirements for Post-Accident Neutron Monitoring System." The report analyzed event scenarios to determine the consequences of neutron flux monitoring unavailability and concluded that the failure of this instrumentation would not prevent the operator from determining reactor power levels. This is because alternate parameter status would be available from which reactor power could be inferred. The multiple inputs available to the operator would therefore provide sufficient information upon which to base operational decisions and to

conclude that reactivity control has been established. PP&L in its submittal indicated that it supported the BWROG position for the SSES neutron flux monitoring design and that this position helps justify the TS change.

The staff reviewed this BWROG document and issued its safety evaluation (SE) on January 13, 1993 approving the NEDO's conclusions. This SE reflected the staff's conclusion that Category 1 neutron flux monitoring instrumentation is not needed for existing BWRs to cope with a Loss-of-Coolant Accident, ATWS, or other accidents that do not result in severe core damage conditions. Further the staff indicated that instrumentation to monitor the progression of a core melt accident is best addressed by the current severe accident management program at each plant. The staff further indicated in its letter dated November 28, 1994 that the neutron flux monitoring system installed at SSES Units 1 and 2 exceeds the criteria of NEDO-31558 and that PP&L may take advantage of any relaxation that the new criteria might allow in the design of the neutron flux monitoring system. PP&L indicated in its submittal that it is currently reviewing in detail the design of the NMS and the staff's SE addressing NEDO-31558 to determine whether a permanent change to the TS could be justified for the SSES units.

The staff has considered the above information provided by PP&L, conclusions in the BWROG NEDO-31558 and the staff's January 13, 1993 SE, as applied to the SSES design. Accordingly, the staff finds that the SSES NMS and other instrumentation addressed in the plant emergency operating procedures provide sufficient and reliable information concerning reactor neutron flux equivalent to that provided by the ex-core monitoring system in the event it is not operable. The requested TS change as discussed above is acceptable from an operational and safety perspective.

PP&L also indicated in their submittal that they have concluded that based on the information included in the NEDO report discussed above and in the staff's evaluation of that report that there may exist sufficient justification for removing the ex-core operability LCO from the SSES TS. The staff understands that this may be pursued by the licensee as a request for TS change in the future.

4.0 EMERGENCY CIRCUMSTANCES

On January 30, 1995, PP&L staff found that the SSES Unit 2 "B" channel log power range indicator of the ex-core neutron flux monitor was reading upscale. In accordance with TS 3.3.7.5, and Table 3.3.7.5-1, the "B" channel was declared inoperable and the LCO was entered. (The "A" channel remains operable.) This LCO requires bringing the plant to HOT SHUTDOWN within 12 hours if the channel can not be restored to an operable condition within 7 days. The licensee staff had expended significant effort to identify the cause and correct the impaired condition working on the channel components and cables outside containment during several successive days so that the channel might be restored to an operable condition. It was suggested after the

unsuccessful attempt to repair the channel, that the evidence indicated that the root cause might be a faulty detector, a cable or connection problem inside primary containment and therefore a shutdown would have been required to reestablish operability.

PP&L, on the seventh day of the LCO, February 6, in order to avoid an unnecessary transient, requested enforcement discretion from compliance with the TS and submitted the February 6th formal request for enforcement discretion followed by the February 7th amendment request. The Commission granted the enforcement discretion for the period of time it will take to process the TS change discussed herein.

In its amendment request submittal in accordance with 10 CFR 50.91, PP&L provided a justification that an emergency existed, as stated in that section i.e., "...failure to act in a timely manner would result in... prevention of either resumption of operation or of increase in power output..." Specifically PP&L stated that the requested amendment would:

> avoid an undesirable plant shutdown as a result of forcing compliance with a license condition and thus minimize potential safety consequences and operational risks that are inappropriate for the plant condition.

The staff agrees with the fact that a forced shutdown would represent an unnecessary and avoidable transient based on the evaluation included in this document.

In addition, the licensee discussed a second justification required by 10 CFR 50.91 to "explain why this emergency situation occurred and why it could not avoid this situation..." In the application it was stated:

> The Ex-core Neutron Flux Channel "B," log power range indicator was found to be reading upscale at 2130 hours on January 30, 1995. An extensive effort was immediately initiated to address this event. These efforts, including Original Equipment Manufacturer (OEM) troubleshooting guidance, have resulted in the testing and replacement of many related electronic components and assemblies outside the Unit 2 primary containment.

The staff agrees with the licensee that it performed in a timely manner all reasonable attempts to correct the identified problem with the channel on appropriate components outside containment and that the failure of the channel was not predictable or avoidable. The only additional work that could have been attempted would have required the entry into primary containment and therefore would have required a forced shutdown which is not desirable as discussed above.

As noted previously, the TS changes being approved by this amendment were implemented on February 6, 1995, when the Commission verbally granted PP&L's request for enforcement discretion.

The staff determined that operation with one channel of the ex-core monitoring system inoperable involved minimum or no safety issues and that enforcement discretion was clearly warranted. The staff has also concluded that processing an amendment to the TS to formally implement what was approved in the Notice of Enforcement Discretion was warranted under 10 CFR 50.91(a)(5).

5.0 FINAL NO SIGNIFICANT CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or

(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or

(3) Involve a significant reduction in a margin of safety.

The licensee proposed that the TS change did not involve a significant hazards consideration, stated as follows:

> The proposed change does not:
>
> 1. Involve a significant increase in the probability or consequences of an accident previously evaluated.
>
> The ex-core system at SSES was installed for the purposes of providing accident neutron flux monitoring capabilities in accordance with Regulatory Guide 1.97. The ex-core system provides indication and alarm functions only. It provides log and low power countrate information to SPDS and the plant computer. Indication of log and low power countrate and period is provided at Control Room panel 2C652-42B. The system also provides countrate information at the Shutdown Margin monitor on panels 2C690 A and B.
>
> Although the ex-core system was installed at SSES to meet the requirements of Regulatory Guide 1.97, the accident monitoring functions can be accomplished by the NMS instrumentation (SRMs, IRMs, LPRMs, and APRMs). NEDO-31558 provides an [a] review of the available neutron monitoring instrumentation from an Emergency Procedure Guidance (EPG) standpoint and provide alternate requirements to those stated in Regulatory Guide 1.97.
>
> The NEDO report examined the consequences of post-accident failures of the existing NMS. The report evaluated a range of events where the operator might be required to use the NMS for post-accident monitoring, and determined the effect of a NMS

failure. This review was based on the generic BWROG EPGs. The events selected provided a spectrum of impacts, but the study concluded that they bound the importance of NMS for all events within the scope of the [R]regulatory Guide 1.97 criteria.

The conclusion reached by the NEDO-31558 was that for these analyzed events, the long term post-accident function to monitor neutron flux is not needed after reactor shutdown has been confirmed. Although the environment of the NMS equipment will undergo severe environmental conditions, the automatic plant responses make the NMS indication of low importance to plant operators.

The analysis showed that for these events operator actions are not affected by the loss of the NMS if the RPIS [rod position indication system] remains operable. In addition to this, the initial environment in which the equipment is located is not expected to be harsh. Therefore, failure of the NMS or the RPIS is not expected to occur prior to shutdown confirmation.

The NMS at SSES meets the intent of the design requirements given in NEDO-31558 (both generic and plant specific). Therefore, the results of the analysis apply to SSES. Based on this the neutron flux monitoring capabilities are maintained by the use of the NMS. Furthermore, these capabilities are maintained even with a failure of the NMS as discussed in NEDO-31558.

At SSES Emergency Operating Procedures (EOP) were reviewed to assure that there is no plant specific role for neutron flux monitoring that differs from the evaluation in NEDO-31558. Our conclusion from this review is that the ex-core system is not in the SSES EOPs and that adequate procedural guidance exist[s] to determine core power or the future response of core power.

2. Create the possibility of a new or different type of accident from any accident previously evaluated.

The ex-core system at SSES was installed for the purposes of providing accident neutron flux monitoring capabilities in accordance with Regulatory Guide 1.97. The system provides indication and alarm functions only. As stated above, the NMS instrumentation will provide indications to ensure that post accident monitoring of neutron flux is available to the operators. This alternate indications [indication] will also allow the operators to confirm that reactivity control functions have been accomplished.

The analysis documented in NEDO-31558 also concluded that even with a total failure of all NMS plant safety would not be compromised, since core power could be determined from other plant variables. Therefore, a failure of this system will not cause the operators to take unanalyzed actions, nor will it cause the operator to commit errors of commission or omission, and as such will not create the possibility of a new or different type of accident.

3. Involve a significant reduction in the margin of safety.

Operating without the ex-core system does not reduce the margin of safety. The operators can determine neutron flux from the NMS instrumentation (SRMs, IRMs, and APRMs). In the unlikely event that all of the NMS instrumentation were to fail, core power could be determined from other plant parameters, such as steam flow, reactor pressure and pressure trend, and number of open SRVs. Thus, this change of Applicability has been demonstrated to have no safety significance and will not result in a decrease to the margin of safety.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards finding with respect to this amendment. Accordingly, the amendment meets eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) the amendment does not (a) significantly increase the probability or consequences of an accident previously evaluated, (b) increase the possibility of a new or different kind of accident from any previously evaluated or (c) significantly reduce a safety margin and, therefore, the amendment does not involve a significant hazards consideration; (2) there is

reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (3) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: C. Poslusny
H. Garg

Date: March 1, 1995