10 CFR 50.90

PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

955-65 CHESTERBROOK BLVD.

WAYNE, PA 19087-5691

(215) 640-6000

April 1, 1993

Docket Nos. 50-277
50-278
License Nos. DPR-44
DPR-56

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Peach Bottom Atomic Power Station, Units 2 and 3
Technical Specification Change Request 93-01

Dear Sir:

Philadelphia Electric Company (PECo) hereby submits Technical Specifications Change Request (TSCR) No. 93-01, in accordance with 10 CFR 50.90, requesting a change to Appendix A of the Peach Bottom Facility Operating Licenses. The proposed changes implement an expanded operating domain for PBAPS, Units 2 and 3. The technical analyses associated with this change are the ARTS/MELLLA (Average Power Range Monitor, Rod Block Monitor, Technical Specifications Improvements/Maximum Extended Load Line Limit Analysis) analyses.

Attachment 1 to this letter describes the proposed changes, and provides justification for the changes. Attachment 2 contains the revised Technical Specification pages. Attachment 3 contains analysis prepared by General Electric to support implementation of ARTS/MELLLA.

Attachment 3 contains information proprietary to General Electric. General Electric requests that the document be withheld from public disclosure in accordance with 10 CFR 2.790(a)(4). An affidavit supporting this request in accordance with 10 CFR 2.790(b)(1) is provided in Attachment 3.

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Jr., Director
Licensing Section
Station Support Department

050075

Enclosures: PECo Affidavit, Attachment 1, Attachment 2, and Attachment 3

Ltr. Encl. 1 INP

Change: NRC PDR

A001 1/1

cc: T. T. Martin, Administrator, Region I, USNRC
J. J. Lyash, USNRC Senior Resident Inspector, PBAPS
W. P. Dornsife, Commonwealth of Pennsylvania

COMMONWEALTH OF PENNSYLVANIA:

: ss.

COUNTY OF CHESTER :

G. R. Rainey, being first duly sworn, deposes and says:

That he is Vice President of Philadelphia Electric Company; the Applicant herein; that he has read the attached Attachment 1 and Attachment 2 of the Technical Specifications Change Request (Number 93-01) for Peach Bottom Facility Operating Licenses DPR-44 and DPR-56, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

Gerald R. Rainey

Vice President

Subscribed and sworn to
before me this 3rd day
of April, 1993.

Notary Public

Notarial Seal
Erma A. Sarson, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires July 10, 1995

ATTACHMENT 1

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

TECHNICAL SPECIFICATION CHANGE REQUEST
93-01

"Average Power Range Monitor, Rod Block Monitor and Technical Specification (ARTS) Improvements and Maximum Extended Load Line Limit Analysis (MELLLA)"

Supporting Information for Changes, 11 Pages

References

1. "Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Peach Bottom Atomic Power Station Units 2 and 3," NEDC-32162P, Revision 1, February, 1993.

2. "Peach Bottom Atomic Power Station Units 2 and 3 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-32163P, January, 1993.

Introduction

Philadelphia Electric Company (PECo), Licensee under Facility Operating Licenses DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, requests that the Technical Specifications (TS) contained in Appendix A of Operating Licenses Nos. DPR-44 and DPR-56 be amended as proposed herein to expand the operating domain for PBAPS, Units 2 and 3. The technical analyses associated with this change are the ARTS/MELLLA (Average Power Range Monitor (APRM), Rod Block Monitor (RBM), and Technical Specifications Improvements/Maximum Extended Load Line Limit Analysis) analyses. Proposed changes to the Technical Specifications are shown in Attachment 2 for PBAPS, Units 2 and 3.

The proposed changes will permit PBAPS, Units 2 and 3 to operate in an expanded operating domain. Operation in the expanded operating domain is based on MELLL analysis performed by General Electric (GE) using methods described in Reference 1 (Attachment 3). The current operating envelope is being modified to include the extended operating region bounded by the rod line which passes through the 100% power/75% core flow point (approximately 121% rod line). Expanded operating domains have been approved by the NRC at other BWRs which include Brunswick Steam Electric Plant, Unit Nos. 1 and 2, and Fermi 2. The analytical methods discussed in Reference 1 have been used to support changes to the operating domains of these BWRs.

In order to support operation in the expanded operating domain, modifications will be made to the APRM and RBM systems. Similar changes have also been approved by the NRC at Brunswick Steam Electric Plant, Unit Nos. 1 and 2 and Fermi 2.

A summary of the proposed changes associated with the MELLL analysis are included in Section 2 of Reference 1. Changes to the APRM and RBM systems (ARTS) necessary to support the operation in the expanded power/flow map are summarized in Section 4 of Reference 1.

In support of the proposed changes, an analysis of the design basis Loss-of-Coolant Accident (LOCA) using the SAFER/GESTR methodology was performed by GE as described in Reference 2. In a letter dated March 19, 1993, PECo notified the NRC that the SAFER/GESTR methodology was being implemented at PBAPS, Units 2 and 3. As stated in the March 19, 1993 letter, the SAFER/GESTR methodology is currently being utilized by the majority of operating Boiling Water Reactors.

We request that the proposed changes be issued on or before September 1, 1993, and the changes be made effective upon completion of the ARTS/MELLLA modification.

This TS change request provides a description of the proposed TS change, the basis for the change, information supporting a finding of No Significant Hazards Consideration, and information supporting an Environmental Assessment.

Proposed Change Number 1

Delete the flow-biased APRM scram and rod block trip setpoint setdown requirements, delete reference to the k_f flow adjustment factor, introduce power and flow dependent adjustments to the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) and Minimum Critical Power Ratio (MCPR) limits, revise the documentation requirements of the Core Operating Limits Report (COLR), and delete the definitions of the Fraction of Rated Thermal Power (FRP) and the Maximum Fraction of Limiting Power Density (MFLPD).

Basis

The proposed change eliminates the requirement for setdown of the flow-biased APRM scram and rod block trip setpoints when the MFLPD is greater than the FRP and substitutes adjustments to the MCPR and MAPLHGR operating limits that are flow and power dependent.

The APRM scram and rod block setdown requirement originated from the Hench-Levy Minimum Critical Heat Flux Ratio (MCHFR thermal limit criterion. Since then, improved methodologies ha been developed. The GETAB/GEXL correlation, which de-emphasized local thermal-hydraulic conditions, was accepted by the NRC in 1973 as one of the criterion used to satisfy General Design Criteria 10 of 10 CFR 50, Appendix A. Additionally, a secondary reliance on the flow-biased APRM flux scram in licensing transient evaluations, for transients terminated by an anticipatory or direct scram, provides more effective and operationally acceptable alternatives to the setdown requirement.

An alternative method of assuring that the safety limit MCPR and fuel thermal-mechanical design bases are not violated is to define the operating limit MCPR and MAPLHGR limits such that no postulated transient event, if initiated from other than rated power or flow conditions, could result in violation of either the safety limit MCPR or the fuel thermal-mechanical design bases. Evaluations to determine the flow and power dependent requirements on the MCPR and MAPLHGR limits were performed and are described in detail in Reference 1. The results of these evaluations were used to determine the following set of flow and power dependent parameters for the fuel designs present in PBAPS, Units 2 and 3:

a) A new power dependent MCPR limit adjustment factor, MCPR(P),
b) A new power dependent MAPLHGR limit adjustment factor, MAPFAC(P),
c) A new flow dependent MCPR limit, MCPR(F), which replaces the current k_f MCPR multiplier, and
d) A new flow dependent MAPLHGR limit adjustment factor, MAPFAC(F).

Since the MCPR(F) limit replaces the k_f factor, all references to k_f are deleted. Consistent with the approach of the elimination of cycle specific parameters, such as k_f, from the Technical Specifications, the parameters which are used to determine thermal operating limits are reported in the Core Operating Limits Report for each cycle. The governing MCPR and MAPLHGR limit for any power and flow condition is the more limiting of the values as adjusted by the core power and flow dependent factors.

The power dependent requirements, MCPR(P) and MAPFAC(P), were derived from analyses of the limiting anticipated operational occurrences which are the generator load rejection with no bypass, turbine trip with no bypass and feedwater controller failure maximum demand event. The MCPR(P) bounds the initial MCPR needed to assure that the fuel safety limit will not be violated for each transient event. The power-dependent MCPR requirements are also consistent with the definition of the RBM setpoints and the rod withdrawal error (RWE) analyses described in Proposed Change Number 3. The MAPFAC(P) requirement was determined from the same transient evaluations used to determine the MCPR(P) and demonstrates compliance with the fuel thermal-mechanical design basis.

The flow dependent requirements, MCPR(F) and MAPFAC(F), were derived from results of analyses of the slow-flow (recirculation flow) runout events. The MCPR(F) requirement serves the same purpose as the current k_f multiplier which it replaces. The MAPFAC(F) requirements are specified in terms of a MAPLHGR multiplier, which is applied to the full power and flow fuel type and exposure dependent MAPLHGR limits. This multiplier has been derived such that the peak transient MAPLHGR during the slow-flow

runout transients will not increase above the fuel thermal-mechanical design bases values. The flow dependent MAPLHGR requirements also bound the MAPLHGR requirements which are needed to demonstrate conformance to 10 CFR 50.46 and 10 CFR 50, Appendix K as reported in Section 6 of Reference 1.

The elimination of the APRM setpoint setdown and substitution of core flow and power dependent adjustment factors provides more direct administration of fuel thermal limits compared with the current practice of modifying the APRM gain adjustment factors.

The definitions of MFLPD and FRP are used only in the determination of the required setdown of the flow-biased APRM scram and rod block setpoints. Since the setdown requirements are being deleted, these definitions are also being deleted by the proposed change.

Proposed Change Number 2

Modify the flow-biased APRM scram and rod block trip equations to accommodate an expanded operating domain.

Basis

The purpose of the flow-biased APRM rod block trip setpoint is to block control rod withdrawal when core power exceeds design bases and approaches the scram level. Should operation continue in a manner such that the power/flow condition exceeds that specified by the APRM rod block setpoint, the flow-biased APRM scram trip setpoint would initiate a scram. As such, the flow-biased APRM rod block provides a buffer in power and flow conditions from the flow-biased APRM scram function.

Both the current and proposed formulation of the flow-biased APRM scram equations are clamped such that a maximum value of the trip setpoint is less than or equal to the trip setpoint of the fixed neutron flux scram. The proposed formulation does, however, reach this maximum at a lower flow condition.

The current formulation of the flow-biased APRM rod block trip equation maintains a power and flow buffer over the entire applicable power and flow range without any need of clamping. The proposed formulation of the flow-biased APRM rod block trip equation requires a clamp to provide a similar buffer. The current configuration of the electronics of the APRM rod block system at PBAPS, Units 2 and 3 will require modification to accommodate this clamping function and to establish a maximum trip value. The modification will consist of a change in the card in each APRM page which electronically implements the required flow-biased setpoint for the rod block trip. These modifications will be implemented on PBAPS, Unit 3 during the upcoming refueling outage scheduled to begin September, 1993, and

on PBAPS, Unit 2 during the scheduled September, 1994 refueling outage.

Proposed Change Number 3

Modify the RBM trip setpoints.

Basis

The RBM system is explicitly designed to mitigate the consequences of the rod withdrawal error (RWE) event and is not assumed to be available to mitigate any other anticipated operational occurrence. The current RBM system configuration is described in detail in Section 10 of Reference 1. The modified RBM system configuration is described in Section 10 and Appendix A of Reference 1. The modified RBM system uses advances in electronics to enhance instrumentation accuracy and to improve the signal to thermal margin correlation. Modification of the RBM trip logic provides a system response which more accurately reflects the actual margin to the safety limit at various power conditions.

The more accurate response of the RBM system will reduce the number of rod blocks which are not associated with reduced thermal limit margins. The operator will be better able to predict system response which improves the man/machine interface and enhances safety.

Coincident with the analyses of the modified RBM system, a generic RWE approach was taken such that neither the safety limit MCPR or the fuel thermal-mechanical design basis is jeopardized. This approach included determining appropriate MCPR requirements and corresponding RBM power dependent setpoints for the modified RBM system for current fuel designs. By an appropriate selection of the setpoints, the RWE will not be the limiting event and will not determine the operating limit MCPR. In this respect, the RBM setpoints are dependent upon the operating limit values which depend on the cycle-specific conditions. For these reasons, the proposed change incorporates a reference to the Core Operating Limits Report.

Information Supporting a Finding of No Significant Hazards Consideration

We have concluded that the three proposed changes to the PBAPS, Units 2 and 3 TS do not constitute a significant hazards consideration. In support of this determination, an evaluation of each of the three (3) standards set forth in 10 CFR 50.92 is provided below.

Proposed Change Number 1

Delete the flow-biased APRM scram and rod block trip setpoint setdown requirements, delete reference to the k_f flow adjustment factor, introduce power and flow dependent adjustments to the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) and Minimum Critical Power Ratio (MCPR) limits, revise the documentation requirements of the Core Operating Limits Report (COLR), and delete the definitions of the Fraction of Rated Thermal Power (FRP) and the Maximum Limiting Power Density (MFLPD).

Basis

The change does not involve a significant hazards consideration in that:

1) The proposed change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

   There will be no impact on the probability of any accident previously evaluated since the change applies a new methodology for assuring that the fuel thermal and mechanical design bases are satisfied and has no effect upon any accident initiating mechanism. The proposed change identifies that adjustments to the MCPR and MAPLHGR limits, as specified in the Core Operating Limits Report, will be made as a function of core flow and power. These adjustments are determined using NRC approved methods as required by Technical Specification 6.9.1.e.2. Operation within the operating limits will ensure that the consequences of any accident which could occur would be within acceptable limits. Thus, there is no significant change in the consequences of any accident previously evaluated.

2) The proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

   The proposed change eliminates the requirement for setdown of the flow-biased APRM scram and rod block trip setpoints under specified conditions and substitutes adjustments to the MCPR and MAPLHGR operating limits. Because the MCPR and MAPLHGR limits will continue to be met, no transient event will escalate into a new or different type of accident. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) The proposed change does not result in a significant reduction in the margin of safety.

The changes in the operating limits will maintain the existing margin to safety limits. The new adjustments impose thermal limit restrictions such that the consequences of anticipated operational occurrences are no more severe than the most limiting conditions with the current Technical Specifications with flow-biased APRM scram and rod block setpoint setdown provisions. The flow and power adjustment factors were determined using NRC approved methods and satisfy the same NRC approved criteria met by analyses assuming setdown of the flow-biased APRM scram and rod block setpoints. The impact of eliminating the setdown requirements on the LOCA response has been evaluated at low flow ccnditions and all 10 CFR 50.46 and 10 CFR 50, Appendix K criteria have been met. Therefore, the proposed amendment does not involve a significant reduction in the margin of safety.

Proposed Change Number 2

Modify the flow-biased APRM scram and rod block trip equations to accommodate an expanded operating domain.

Basis

The change does not involve a significant hazards consideration in that:

1) The proposed change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

The proposed change expands the power and flow operating domain by relaxing the restrictions imposed by the formulation of the flow-biased APRM rod block and scram trip setpoints. The probability of any accident is not increased by operating in the expanded operating domain because formulation of the flow-biased APRM rod block trip equation (including a new maximum value for the APRM rod block) has been established to maintain margin between the rod block setpoint and the scram setpoint. Additionally, this change will have no effect on any accident initiating mechanisms. The consequences of anticipated operational occurrences have been evaluated using NRC approved methods and the proposed setpoint formulations have been selected such that the consequences of any accident remain bounded by NRC approved criteria.

2) The proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

Changing the formulation for the flow-biased APRM rod block and scram trip setpoints does not change their respective functions and manner of operation. The change does not introduce a sequence of events or introduce a new failure mode that would create a new or different type of accident. The APRM rod block trip setpoint will continue to block control rod withdrawal when core power significantly exceeds normal limits and approaches the scram level. The APRM scram trip setpoint will continue to initiate a scram if the increasing power/flow condition continues beyond the APRM rod block setpoint. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) The proposed change does not result in a significant reduction in the margin of safety.

The APRM rod block trip setpoint will continue to block control rod withdrawal when core power significantly exceeds normal limits and approaches the scram level. The APRM scram trip setpoint will continue to initiate a scram if the increasing power/flow condition continues beyond the APRM rod block setpoint. Operation in the new expanded operating domain has been analyzed by General Electric and sufficient margin to design limits exists. Therefore, the proposed change does not involve a reduction in the margin of safety.

Proposed Change Number 3

Modify the RBM trip setpoints.

Basis

The change does not involve a significant hazards consideration in that:

1) The proposed change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

The RBM system is not involved in the initiation of any accident and does not increase the probability of the occurrence of any accident. The RBM system only serves to mitigate the consequences of one event; the rod withdrawal error (RWE) anticipated operational occurrence. Analyses of the RWE were performed using NRC approved methods for the modified RBM configuration and setpoints. The results demonstrate that the consequences of the RWE event are less severe with the modified RBM system than with the current

configuration. Therefore, the proposed change does not involve an increase in the consequences of any accident previously evaluated.

2) The proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

The proposed change does not alter the function of any component or system other than the RBM system. The changes to the RBM system have been designed to enhance the reliability and accuracy of the RBM system without impacting the degree of isolation of the RBM system from other plant systems. The function of the RBM system does not change. The change does not involve a new sequence of events or the introduction of a new failure mode that could create a new or different kind of accident. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) The proposed change does not result in a significant reduction in the margin of safety.

The proposed change revises the setpoints for the RBM system which is solely designed to mitigate the consequences of the RWE event. The RBM setpoint is being changed from a flow biased equation to 3 discrete power dependent setpoints. Analyses of the RWE event are used to derive the setpoints such that the safety limit for the minimum critical power ratio (MCPR) will not be challenged. By an appropriate selection of the setpoints, the RWE will not be the limiting event and will not determine the operating limit MCPR. In this respect, the RBM setpoints are dependent upon the operating limit MCPR values which depend on the cycle-specific conditions. For this reason, the proposed change also identifies that these setpoints are specified in the COLR. The COLR is prepared based on the results of analyses using NRC approved methods as required by Technical Specification requirements for the COLR. The operating limit MCPR maintains the margin of safety for this thermal limit. Thus, the proposed change does not involve a reduction in margin of safety.

Information Supporting an Environmental Assessment

An environmental assessment is not required for the changes proposed by this TSCR since the requested changes conform to the criteria for "actions eligible for categorical exclusion" as specified in 10 CFR 51.22(c)(9). The requested changes will have no impact on the environment. The proposed changes do not involve a significant hazards consideration as discussed in the preceding section. The proposed changes do not involve a change

in the types or increase in the amounts of any effluents that may be released offsite. In addition, the proposed changes do not involve a significant increase in individual or cumulative occupational radiation exposure.

Conclusion

The Plant Operations Review Committee and the Nuclear Review Board have reviewed these proposed changes to the PBAPS, Units 2 and 3 TS and have concluded that the changes do not involve an unreviewed safety question and will not endanger the health and safety of the public.