

PHILADELPHIA ELECTRIC COMPANY

10 CFR 50.90

NUCLEAR GROUP HEADQUARTERS

955-65 CHESTERBROOK BLVD.

WAYNE, PA 19087-5691

November 1, 1993

(215) 640-6000

Docket Nos. 50-277  
50-278

License Nos. DPR-44  
DPR-56

STATION SUPPORT DEPARTMENT

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

Dear Sir:

Philadelphia Electric Company (PECo) hereby submits Technical Specification Change Request (TSCR) 91-06, in accordance with 10 CFR 50.90, requesting a change to Appendix A of the Peach Bottom Atomic Power Station (PBAPS) Operating Licenses. The proposed changes concern the Main Control Room Intake Air Radiation Monitors, and an administrative change to the Seismic Monitoring Instrumentation section.

Attachment 1 to this letter describes the proposed changes and Attachment 2 contains the revised Technical Specification pages and Attachment 3 contains a detailed description of the watchdog circuitry used to detect microprocessor failures.

If you have any questions concerning this submittal, please contact us.

Sincerely,

*G. A. Hunger, Jr.*

G. A. Hunger, Director  
Licensing Section

050019

Enclosures: Affidavit, Attachments

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

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ADD 1

COMMONWEALTH OF PENNSYLVANIA:

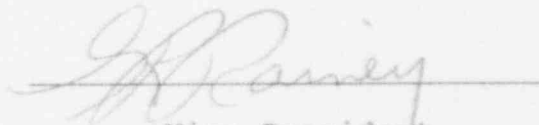
: SS.

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 Technical  
Specification Change Request (TSCR 91-06) for changes to the  
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.

  
Vice President

Subscribed and sworn to  
before me this 29<sup>th</sup> day  
of October 1993.

  
Notary Public

Notarial Seal  
Erica A. Santori, Notary Public  
Tracyville Twp., Chester County  
MA 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  
91-06

"Main Control Room Intake Air Radiation Monitors "  
"Seismic Monitoring Instrumentation"

Supporting Information for Changes

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 respectively, requests that the Technical Specifications contained in Appendix A to the Operating Licenses be amended. Proposed changes to the Technical Specifications are indicated by vertical bars in the margins of the pages contained in Attachment 2 and listed here: 59, 75, 84, 93, 97, 233a, 234, 235, 240v.

The proposed changes concern the Radiation Monitoring Systems - Isolation and Initiation Functions section of the Technical Specifications and are necessary to support modification 5281. Modification 5281 updates the obsolete control room ventilation radiation monitoring equipment and replaces it with a microprocessor based in-duct system.

The proposed administrative change to the Seismic Monitoring Instrumentation section of the Technical Specifications revises page 240v (Table 4.15), to change the title of Item 3 from "Triaxial Response-Spectrum Recorders" to "Central Recording and Analysis System". This will then be consistent with Item 3 of page 240u. This administrative change is necessary due to an omission that occurred during the preparation of TSCR 92-11, which was previously NRC approved by amendment numbers 176 and 179.

Licensee proposes that the changes will be issued as soon as possible in order to support the installation of modification 5281, which must be completed during the months when low outside air temperatures prevail. The changes concerning the new control room ventilation radiation monitoring equipment will be effective upon completion of modification 5281. The seismic monitoring administrative change will be effective upon issuance.

#### Description of Changes

Licensee proposes the following changes:

(1) Page 59

- (a) Insert proposed Limiting Condition for Operation 3.2.D.2., "Main Control Room" which states:

"The limiting conditions for operation are given in Table 3.2.D."

- (b) Insert proposed Surveillance Requirements 4.2.D.2., "Main Control Room" which states:

"Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D."

- (2) Page 75 (Table 3.2.D), "Radiation Monitoring Systems that Initiate and/or Isolate Systems"

- (a) Revise the column heading "Minimum No. of Operable Instrument Channels" to read: "Minimum No. of Operable Instrument Channels per Trip System," to provide clarity regarding the minimum number of instruments required for each trip system.
- (b) Insert Trip Function "Main Control Room" and its associated information.
- (c) Insert Item D, under Note 2, "Action."
- (d) Insert Note 4, in "Notes for Table 3.2.D."

- (3) Page 84, (Table 4.2.D), "Minimum Test & Calibration Frequency for Radiation Monitoring Systems"

Insert proposed "Instrument Channel" Item 4, "Main Control Room" and its associated information.

- (4) Page 93, 3.2 BASES (Cont'd)

Insert proposed 4th paragraph which states:

"Four channels of in-duct radiation monitors are provided which initiate the Main Control Room Emergency Ventilation System. Each set of instrument channels are arranged in a one (1) out of two (2) twice trip logic."

- (5) Page 97, 4.2 BASES (Cont'd)

Insert proposed 3rd paragraph which states:

"The Control Room Intake Air Radiation Monitors are safety-related and are required to be operable at all times when secondary containment is required. The calibration interval is as described in Section 4.11.A."

- (6) Page 233a, Additional Safety Related Plant Capabilities
  - (a) Revise Limiting Condition for Operation 3.11.A.5.
  - (b) Insert proposed Limiting Condition for Operation 3.11.A.5.a and 3.11.A.5.b.
  - (c) Relocate and renumber Surveillance Requirement 4.11.A.d. from page 234 to 4.11.A.2.e.
  - (d) Revise Surveillance Requirements 4.11.A.3 and 4.11.A.4.
  - (e) Insert proposed Surveillance Requirements 4.11.A.5 and 4.11.A.6.
- (7) Page 234, Additional Safety Related Plant Capabilities
  - (a) Delete Limiting Condition for Operation 3.11.A.2 which is a restatement of existing 3.11.A.5 on page 233a.
  - (b) Insert proposed Limiting Condition for Operation 3.11.A.6 and 3.11.A.7.
  - (c) Relocate and renumber Surveillance Requirement 4.11.A.d to page 233a, 4.11.A.2.e.
  - (d) Delete Surveillance Requirement 4.11.A.2 which is a restatement of 4.11.A.4 on page 233a.
- (8) Page 235, 3.11. BASES, "Main Control Room Emergency Ventilation System"
  - (a) Revise first and last paragraphs as indicated.
- (9) Page 240v, Table 4.15, "Seismic Monitoring Instrumentation Surveillance Requirements."
  - (a) Revise "Instruments and Sensor Locations#", Item 3, title from "Triaxial Response-Spectrum Recorders" to "Central Recording and Analysis System."

Safety Discussion

Change requests 1 through 8 are required to support PBAPS Modification 5281 which was initiated to replace and upgrade the main control room ventilation intake radiation monitoring system.

Modification 5281 will remove the obsolete control room ventilation radiation monitoring equipment and replace it with a microprocessor based in-duct system. The modification will also install new flow switches in the control room vent duct, replace the control room vent duct flow transmitter, and rework the control room recorders associated with the radiation and flow instruments. Revisions to the logic for the initiation of the Control Room Emergency Ventilation (CREV) System, as well as changes to the control room annunciators are also being proposed.

Upon completion of Modification 5281, the Control Room Ventilation Intake Radiation Monitoring System will consist of four radiation detectors powered from two divisions mounted in the main control room fresh air supply plenum and two radiation detectors, one in each division, mounted in the main control room emergency air supply duct. The system is designed to ensure protective action when required and to prevent inadvertent actuation resulting from instrument malfunctions.

The PBAPS Technical Specifications require a minimum of one (1) detector for indication and alarm of radioactive air being drawn into the Control Room be operable. The associated Bases also state that "control room intake air filtration is initiated when a trip signal from the detectors is given." Currently, CREV is initiated via high radiation signals from either detector (using a one out of two logic) or failure signals from both detectors or failure of one detector and low flow in the other detector sample line or low flow in both detector sample lines.

With the new system, CREV will be initiated on 1) high radiation (using a one out of two twice logic), 2) low flow in the control room ventilation duct, 3) loss of power in one division at the local radiation monitoring system (RMS) panel, or 4) downscale/failure of the radiation indicating switches (RIS) (using a one out of two twice logic). High radiation, low flow in the ventilation duct, loss of power or downscale/failure of an RIS will be annunciated in the control room.

When an increase in radioactivity at a preset amount above the normal background is detected, an annunciator will alarm and trip signals will initiate control room emergency ventilation using a one out of two twice logic. The one out of two twice



logic uses two divisions with two channels each: Division I (channels A and C), and Division II (channels B and D). The CREV logic is configured to meet the intent of single failure delineated by IEEE 279. Failure of any one channel does not result in an inadvertent actuation nor does it prevent actuation.

The addition of the new equipment has been designed with adequate ventilation and does not introduce additional thermal loads to the plant HVAC system. The new flow switches shall be installed such that they meet the intent of IEEE 279. If either flow switch senses a loss of flow, CREV will initiate. The logic for the new Control Room Ventilation Intake Radiation Monitoring System will maintain the system's ability to initiate CREV with a single failure.

The new system uses six in-duct beta scintillation detectors. The detectors use a preamplifier (RT) manufactured by the Nuclear Research Corporation (NRC). The preamplifier uses a stable reference signal to drive a light emitting diode (LED) in the detector (RE). This signal can be raised to preset levels to check the operation of the system over the entire range. Use of this LED with a stable, self adjusting reference signal makes the use of a radioactive check-source unnecessary.

The new system uses a multi-function smart ratemeter, also manufactured by NRC, as are the RISs that initiate CREV on high radiation or loss of power. The RIS is a microprocessor based instrument that uses factory configured firmware stored on an Erasable Programmable Read Only Memory (EPROM). NRC firmware contains routines for detection and annunciation of failures such as power loss, loss of digital communications and loss of detector signal. All of NRC's firmware used for the Control Room Ventilation Intake Radiation Monitoring System is qualified and is controlled by their Quality Assurance (QA) Program. NRC's validation and verification program for the ADM-600 Series Software utilizes methods and techniques endorsed by ANSI/IEEE 7.4.3.2, 1982 and ANSI/ANS 10.4, 1987.

To ensure that Central Processing Unit (CPU) lockup does not occur, NRC microprocessor based instruments contain a "watchdog" circuit to detect failures that may cause the microprocessor to cease functioning. For a detailed description of the watchdog circuitry see Attachment 3.

A common failure of the firmware is considered a credible failure mode, however, because the equipment is designed with a watchdog circuit this does not induce a new type of system level failure. If the microprocessor should cease to function, the RIS



will indicate equipment failure which is annunciated in the main control room and provide an input to the CREV logic. Failure of any cable between RE, RT and radiation monitoring switches (RIS) will also be identified as equipment failure by the RISs. The monitors in the control room and the panel in the fan room will also indicate equipment failure.

The microprocessor based RIS has the same output failure mode due to a loss of power as the analog RIS. When power is restored, the monitor does a self-diagnostic check and begins to indicate ambient radiation levels. The new radiation detectors and monitors have been tested based on criteria as established in SAMA PMC 33.1, MIL-STD-461C and MIL-STD-462 standards for EMF/RFI. The equipment will be installed in an area that is within the electromagnetic field parameters of the equipment.

The new equipment also uses two redundant flow switches to initiate CREV on loss of fresh air flow into the Main Control Room. The switches are installed seismically on the control room ductwork. Failure of either flow switch will not prevent initiation of the CREV system.

The new radiation monitoring equipment utilizes a filtering mode similar to the existing equipment. The response time is a function of the filtering mode (statistical/time) selected. In the statistical mode, the response time is within the acceptable limit of the existing equipment. In the time mode (1 minute, 3 minutes and 10 minutes), the response time is less than or equal to the time selected. For plant operation, the equipment will be utilized in the statistical mode. The equipment accuracy is based on the statistical mode (1%, 3% and 10%), which is the same for the existing equipment. The calibration interval of 18 months is based on vendor recommendations. Experience with instrumentation of similar design has found this interval to be adequate.

Because change requests 1 through 8 support PBAPS Modification 5281, which upgrades the main control room ventilation intake radiation monitoring system, they are considered enhancements to safety.

Change requests 6(c), 7(a), 7(c) and 7(d) are administrative changes to correct inaccuracies in the existing Technical Specifications (TS), and to avoid any confusion or misinterpretation of the TS.

Change request 9 is purely an administrative change to correct an omission from a previously approved TSCR. This request has no impact on safety.

No Significant Hazards Consideration

Licensee proposes that this application does not involve significant hazards consideration for the following reasons:

- i) The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The Control Room Ventilation Intake Radiation Monitoring System does not serve as an initiator or contributor to any accidents previously evaluated. The system provides indication and detection of radioactivity in the control room ventilation intake and initiates the appropriate trip logic to start the Control Room Emergency Ventilation (CREV) system. This modification increases the number of radiation monitors and reduces the overall complexity of the Control Room Ventilation Intake Radiation Monitoring System. The logic to initiate CREV is revised from one out of two to one out of two twice, to reduce the number of spurious initiations of CREV.

The proposed seismic monitoring changes are purely administrative and will correct an omission from a previously approved TSCR.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

- ii) The proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

The proposed Control Room Ventilation Intake Radiation Monitoring System changes support modification 5281 which upgrades the Control Room Ventilation Intake Radiation Monitoring System. The modification replaces the obsolete Control Room Ventilation Intake Radiation Monitoring System equipment with state-of-the art equipment. All radiation detectors and monitoring components shall have equal or better performance specifications and qualification requirements than the existing components. The new equipment to be installed under modification 5281 does not introduce any new failure modes as compared to the existing equipment.

The proposed seismic monitoring changes are purely administrative and will correct an omission from a previously approved TSCR.

Based on the above, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

- iii) The proposed changes do not involve a significant reduction in a margin of safety.

The current PBAPS Technical Specifications require a minimum of one (1) detector for indication and alarm of radioactive air being drawn into the Control Room be operable. The associated Bases also state that "control room intake air filtration is initiated when a trip signal from the detectors is given." Currently, CREV is initiated via high radiation signals from either detector (using a one out of two logic) or failure signals from both detectors or failure of one detector and low flow in the other detector sample line or low flow in both detector sample lines.

With the new system, CREV will be initiated on 1) high radiation (using a one out of two twice logic), 2) low flow in the control ventilation duct, 3) loss of power in one division at the local radiation monitoring system (RMS) panel, or 4) downscale/failure of the RIS (using a one out of two twice logic). High radiation, low flow in the ventilation duct, loss of power or downscale/failure of an RIS will be annunciated in the control room.

The proposed seismic monitoring changes are purely administrative and will correct an omission from a previously approved TSCR.

Based on the above, the proposed changes do not involve a significant reduction in a margin of safety.

#### Environmental Impact Assessment

An environmental impact assessment is not required for the changes proposed by this application because the changes conform to the criteria for "actions eligible for categorical exclusion" as specified in 10 CFR 50.22(c)(9). The proposed changes do not involve any systems or equipment that has a direct relationship with the environment. The proposed changes: support modification 5281 which replaces and upgrades the obsolete Control Room Ventilation Intake Radiation Monitoring System and; corrects an omission from previously approved TSCR 92-11.

The Application involves no significant change in the

types or significant increase in the amounts of any effluent that may be released offsite and there will be no 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 and have concluded that they do not involve an unreviewed safety question and that they are not a threat to the health and safety of the public.