



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 230 AND 235 TO FACILITY OPERATING

LICENSE NOS. DPR-44 AND DPR-56

PECO ENERGY COMPANY

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION, UNIT NOS. 2 AND 3

DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By letter dated December 24, 1998, as supplemented May 25 and September 27, 1999, the PECO Energy Company (the licensee) submitted a request for changes to the Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3, Technical Specifications (TSs). The requested changes would revise Table 3.3.8-1-1 and applicable Bases for PBAPS, Units 2 and 3. The existing loss of power (LOP) relay setpoints in TS Table 3.3.8.1-1 were based on the voltage regulation study performed in 1989. The proposed relay setpoints are calculated in accordance with the Improved Instrument Setpoint Control Program (IISCP) methodology. This methodology accounts for relay accuracy, potential transformer accuracy, measurement and test equipment accuracy, and margin above the design limit established within the voltage regulation study. The May 25 and September 27, 1999, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

The following changes are proposed to TS Table 3.3.8.1-1 for Peach Bottom Units 2 and 3:

1. Degraded Voltage Low Setting (Function 2) relay: The associated allowable value limits are widened for both voltage and time. The current allowable value for voltage is ≥ 2288 volts and ≤ 2704 volts. The proposed allowable value is ≥ 2286 volts and ≤ 2706 volts. The current allowable value for time is ≥ 1.6 seconds and ≤ 2.0 seconds. The proposed allowable value for time is ≥ 1.5 seconds and ≤ 2.1 seconds.
2. Degraded Voltage High Setting (Function 3) relay: The associated allowable value limits are widened for both voltage and time. The current allowable value for voltage is ≥ 3411 volts and ≤ 3827 volts. The proposed allowable value is ≥ 3409 volts and ≤ 3829 volts. The current

allowable value for time is ≥ 27.0 seconds and ≤ 33.0 seconds. The proposed allowable value for time is ≥ 23.0 seconds and ≤ 37.0 seconds.

3. Degraded Voltage - LOCA (Loss-of-Coolant Accident) (Function 4) relay: The relay setpoint is changed from 3702 volts (89%) to 3801 volts (91.4%) of rated 4 kV Emergency bus voltage. The associated allowable value limits are widened for both voltage and time. The current allowable value for voltage is ≥ 3691 volts and ≤ 3713 volts. The proposed allowable value is ≥ 3766 volts and ≤ 3836 volts. The current allowable value for time is ≥ 9.3 seconds (0.9 seconds internal plus 8.4 seconds external) and ≤ 10.7 seconds (1.1 seconds internal plus 9.6 seconds external). The proposed allowable value for time is ≥ 9.2 seconds and ≤ 10.8 seconds.
4. Degraded Voltage - non-LOCA (Function 5) relay: The relay setpoint is changed from 4077 volts (99%) to 4151 volts (99.8%) of rated 4 kV emergency bus voltage. The associated allowable value limits are widened for both voltage and time. The current allowable value for voltage is ≥ 4065 volts and ≤ 4089 volts. The proposed allowable value is ≥ 4116 volts and ≤ 4186 volts. The current allowable value for time is ≥ 57.9 seconds (0.9 seconds internal plus 57 seconds external) and ≤ 64.1 seconds (1.1 second internal plus 63 seconds external). The proposed allowable value for time is ≥ 57.8 seconds and ≤ 64.2 seconds.
5. For Function 4 and 5, the internal time delay for relays is deleted.
6. In the September 27, 1999, letter from the licensee, a temporary note was added to the TS Table 3.3.8.1-1 to clarify that prior to the implementation of modification 96-01511, the relay voltage and time trip setpoint allowable values for the indicated functions remain at the previously approved values on a relay-by-relay basis. Phase 1 applies to Functions 2 and 3 in TS Table 3.3.8.1-1 and shall be implemented within 30 days of the date of issuance of the amendment. Phase 2 applies to Functions 4 and 5 in TS Table 3.3.8.1-1 and shall be implemented no later than March 1, 2000. Note (a) shall be implemented within 30 days of the date of issuance of the amendment and shall be voided upon completion of modification 96-01511, but no later than March 1, 2000.

2.0 EVALUATION

The LOP relays monitor the voltage of the 4 kV emergency buses. The rated 4 kV bus voltage is 4160 volts. Offsite power is the preferred source of power for the 4kV emergency buses. If the LOP relays detect low voltage levels on one offsite source, the 4kV buses are disconnected and transferred to the other offsite source, or to their emergency diesel generators, if the second offsite source is unavailable.

The voltage at each 4 kV emergency bus is monitored at five levels, which can be considered as two different functions: one level of loss of voltage and four levels of degraded voltage. The degraded voltage function is monitored by four (Functions 2 thru 5) under voltage relays per source, and loss of voltage is monitored by one (Function 1) under voltage relay for each 4 kV emergency bus. The combination of the loss of voltage relaying and degraded grid relaying provides protection to the Class 1 E distribution system for all credible conditions of voltage

collapse or sustained voltage degradation.

The licensee states that the calibration of the LOP relays has identified repeated deviation between the actual relay trip setpoints and the TS allowable values in Table 3.3.8.1-1. Therefore, the licensee feels that the current allowable value limits in TS Table 3.3.8.1-1 for the LOP relays are not adequate to implement the present plant setpoint methodology. The existing LOP relay setpoints in TS Table 3.3.8.1-1 were based on the voltage regulation study performed in 1989. The proposed relay setpoints are calculated in accordance with the IISCP methodology. IISCP methodology utilizes the square root of the sum of the squares to combine random non-directional accuracy values. This methodology accounts for relay accuracy, potential transformer accuracy, measurement and test equipment accuracy, and margin above the design limit established within the voltage regulation study.

Since the implementation of the current LOP instrumentation setpoints, the licensee has replaced all eight Class 1E 500 kVA transformers with 1000 kVA load center transformers having lower impedance. Further, as part of the design improvements, the licensee has added a third viable offsite power source conforming to the guidance of General Design Criterion 17 of 10 CFR Part 50, Appendix A. A significant portion of the non-critical plant loads have been transferred from the plant auxiliary buses to the third offsite source. The design is such that if less than three offsite sources are available when a LOCA signal occurs, the non-critical plant loads are shed to support the LOCA loading of the one unit and the long-term shutdown loading of the other unit (worst case).

The plant electrical load study has been updated to incorporate all the load changes and the design improvements from 1989 through the present. Using the updated load data and the limiting offsite source, the voltage regulation study has been revised to establish the proposed setpoints for the LOP relays in accordance with IISCP methodology. The existing allowable values and the proposed allowable values for Functions 2, 3, 4, and 5 have been analyzed, and the licensee has found that both values satisfy the design limits established in the setpoint calculation and Voltage Regulation Study and are acceptable for operation. The proposed values were revised as follows:

1. Loss of Voltage (Function 1) relay: No setpoint changes were involved.
2. Degraded Voltage Low Setting (Function 2) relay: No change to the voltage setpoint is proposed. However, the associated allowable value limits are widened for both voltage and time. The proposed wider allowable value limits will accommodate the incremental change in relay operation, depending on variability of the test point selected on the relay's repeatable characteristic curve. The effect of these proposed incremental changes in allowable value limits of voltage and time on relay operation is minimal, and it is bounded by the assumptions of the current accident analyses. There will be no impact on the Class 1E power distribution system to perform its intended design function.
3. Degraded Voltage High Setting (Function 3) relay: No change to the voltage setpoint is proposed. However, the associated allowable value limits are widened for both voltage and time. The proposed wider allowable value limits will accommodate the incremental change

in relay operation, depending on variability of the test point selected on the relay's repeatable characteristic curve. The effect of these proposed incremental changes in allowable values limits of voltage and time on relay operation is minimal, and it is bounded by the assumptions of the current accident analyses. There will be no impact on the Class 1E power distribution system to perform its intended design function.

4. Degraded Voltage LOCA (Function 4) relay: The voltage setpoint is changed and the associated allowable value limits are widened for both voltage and time. The licensee states that the higher allowable setpoint limit of 3836V would not unnecessarily transfer the 4kV emergency bus to the other offsite source or to the diesel generators during a design basis accident (DBA). The relay time delay settings are such that the relays will detect and respond to an actual sustained degradation of voltage, but will not actuate in response to normal operational voltage fluctuations. On the other hand, the lower setpoint value of 3766V ensures that the minimum required voltage at the worst case Class 1E 480V motor control center is maintained per the current design basis. Since the Voltage Regulation Study is performed utilizing the name plate load data, the proposed setpoint allowable value limits are conservative.
5. Degraded Voltage Non-LOCA (Function 5) relay: The voltage setpoint is changed and the associated allowable values are widened for both voltage and time. The licensee states that the higher allowable setpoint limit of 4186V would not unnecessarily transfer the 4kV emergency bus to the other offsite source or to the diesel generators during a DBA. The relay time delay settings are such that the relays will detect and respond to an actual sustained degradation of voltage, but will not actuate in response to normal operational voltage fluctuations. On the other hand, the lower setpoint value of 4116V ensures that the minimum required voltage of 108V (90%) at the worst case 120V bus is maintained per the current design basis. Since the Voltage Regulation Study is performed utilizing the name plate load data, the proposed setpoint allowable value limits are conservative.
6. For Functions 4 and 5, the current TS has separate entries in Table 3.3.8.1-1 for the relay internal and external time delays. The licensee has proposed to combine these internal and external time delays for simplicity. The licensee states that the aggregate time delay is the important parameter and it is the only time delay that is analyzed. The internal time delay minimizes the relay contact wear and reduces the number of external time delay relay actuations due to transient voltage dips and provides no other output functions. The staff agrees.

The staff concludes that because the proposed LOP relay setpoints were corrected using IISCP methodology to account for relay drift, relay accuracy, potential transformer accuracy, measuring and test equipment accuracy margin, this methodology is an improvement over the old methodology. The effect of the incremental changes in allowable values limits of voltage and time on relay operation is minimal, and it is bounded by the assumptions of the current accident analyses. Further, there will be no impact on the Class 1E power distribution system to perform its intended design function. Based on the above, the staff finds the proposed changes to TS Table 3.3.8.1-1 and the associated Bases to be acceptable.

The licensee requests that the proposed relay settings be implemented in two phases. As part of the first phase, the Function 2 and 3 relay settings will be implemented within 30 days of approval of this TS change. As part of the second phase, the Functions 4 and 5 relay settings will be implemented no later than March 1, 2000, and note (a) which has been temporarily added to TS Table 3.3.8.1-1 will expire upon completion of modification 96-01511, but no later than March 1, 2000. Modifying all relays at one time would require a plant shutdown to change the relay settings. The staff finds the proposed implementation schedule to be acceptable because the existing allowable values and the proposed allowable values for Functions 2, 3, 4, and 5 have been analyzed, and both values satisfy the design limits established in the setpoint calculation and Voltage Regulation Study and are acceptable for operation.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (64 FR 24199). Accordingly, the amendments meet the 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 amendments.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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