



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION SUPPORTING

AMENDMENT NOS. 122 AND 126 TO FACILITY OPERATING

LICENSE NOS. DPR-44 and DPR-56

PHIADELPHIA ELECTRIC 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 letters dated January 22, 1987 and March 30, 1987, Philadelphia Electric Company (PECO), the licensee, requested changes to the Technical Specifications with regard to the Standby Liquid Control System (SLCS). The proposed changes reflect the licensee's plan to enrich the Boron in the sodium pentaborate. This increase in Boron-10 enrichment is proposed to satisfy the requirements of ATWS Rule 10 CFR 50.62(c)(4). The licensee is proposing to include the following equation:

$$\frac{C}{13\% \text{ wt}} * \frac{Q}{86 \text{ gpm}} * \frac{E}{19.8\% \text{ atom}} = 1$$

in the LCO section of the Technical Specifications. Pump flow rate (Q) against a system head of 1225 psig, Boron-10 enrichment (E) and sodium pentaborate concentration (C) are all considered as a group to determine whether Peach Bottom, with a vessel diameter of 251", satisfies the requirements of the ATWS Rule 10 CFR 50.62(c)(4). The three variables give the licensee more flexibility. Since the ATWS Rule is met by satisfying the equation, the individual requirements for each parameter are deleted in the proposed Technical Specifications.

2.0. EVALUATION

The licensee is proposing a major revision of the SLCS Technical Specifications. The description of the changes and reasons for the changes are listed below:

- a. Existing LCO 3.4.A.1 states that the SLCS "need not be operable when the reactor is in the Cold Condition and all control rods are fully inserted and Specification 3.3.A is met. The licensee proposed to remove the words "...and all control rods are fully inserted" because it is superfluous to Specification 3.3.A. Specification 3.3.A specifies the minimum required shutdown reactivity margin. The revised LCO 3.4.A states that the SLCS "need not be operable when the reactor is in the cold condition and specification 3.3.A is met." This is acceptable.

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- t. It is proposed that the requirement to functionally test each pump loop once per month be moved from existing Surveillance Requirement 4.4.A.1 to 4.4.B.3, to "line up" with the location of pump flow rate in the LCO column. Proposed Surveillance Requirement 4.4.B.3 requires that "At least once per month, each pump loop shall be functionally tested by pumping boron solution to the test tank." This requirement differs from the existing requirement, 4.4.A.1, in that the boron solution itself, instead of demineralized water, is pumped. Presently, demineralized water is pumped during the monthly test, in accordance with 4.4.A.1, instead of the boron solution because the boron could precipitate out of the solution if left in the pump loop since the pump discharge piping temperature is not always maintained above the saturation temperature of the solution. This is not a concern with the new solution, however, because its saturation temperature is maintained at 43 degrees F which is below the minimum anticipated ambient and solution temperatures. The Standby Liquid Control System is located in the Reactor Building. As discussed on page 15 of the licensee's January 22, 1987 submittal, the SLCS area is normally maintained at about 65°F. There is an alarm in the control room if the ambient temperature drops to 55°F. Also, the tank is equipped with a heater and there is heat tracing on the lines. Consequently, the requirement to flush the system piping with demineralized water after pumping boron solution, in existing Surveillance Requirement 4.4.A.2.b, is no longer necessary and is being removed. This is acceptable.
- c. It is proposed that existing Surveillance Requirement 4.4.A.2.b be replaced by proposed Surveillance Requirement 4.4.B.3. Existing Surveillance Requirement 4.4.A.2.b requires that the system be manually initiated, except explosive valves, and boron solution be recirculated to the solution tank, and that a "Minimum pump flow rate of 43 gpm against a system head of 1225 psig" be verified at least once per operating cycle. Proposed Surveillance Requirement 4.4.B.3 requires that pump flow rate be checked and recorded at least once per quarter, and that the system be functionally tested by pumping boron solution at least once per month, as compared to the existing once-per-operating-cycle requirement. As discussed in Section 1 of this SER, the value of pump flow rate need not be 43 gpm or greater due to the properties of the new solution. The SLCS can meet its objective and satisfy the requirements of 10 CFR Section 50.62(c)(4) with the new solution at a flow rate of less than 43 gpm as long as the ratio expression of proposed LCO 3.4.A.3 is satisfied. The pump flow rate that will be used in the equation will be the rate determined in the quarterly test. This is acceptable.
- d. Several of the Surveillance Requirements and the types of LCOs presently contained in the section titled "Sodium Pentaborate Solution", 3.4.C and 4.4.C, are proposed to be placed in a new section titled "Normal System Requirements", 3.4.B and 4.4.B. Consequently, it is proposed that the existing material in Sections 3.4.C and 4.4.C be removed. The revised LCOs and Surveillance Requirements reflect the new solution properties. The change in format is being proposed to group all of the operability requirements together (equipment and solution). The changes are discussed individually below. The proposed LCOs and Surveillance Requirements in the new "Normal System Requirements" section ensure that the SLCS is operable, as do existing Specifications 3.4.C and 4.4.C.

1. Presently, LCO 3.4.C.1, by reference to Figure 3.4.1, establishes the volume and sodium pentaborate concentration limits on the control solution to ensure that sufficient Boron-10 is available for injection to meet the system's objectives. Similarly, proposed LCO 3.4.B.1 establishes the minimum mass of Boron-10 that must be available to meet the system's objectives (including a 25% margin). Proposed Surveillance Requirement 4.4.B.1 requires the mass of Boron-10 to be calculated at least once per month. Proposed Surveillance Requirement 4.4.B.5 requires volume to be checked and recorded at least once per day as currently required by Surveillance Requirement 4.4.C.1. Proposed Surveillance Requirement 4.4.B.2 requires sodium pentaborate concentration to be checked and recorded at least once per month, or anytime water or Boron is added to the solution, as currently required by Surveillance Requirement 4.4.C.3. These proposed Surveillance Requirements, combined with proposed Surveillance Requirement 4.4.B.4 concerning Boron-10 enrichment, provide the data to calculate the mass of Boron-10 in the tank. This is acceptable.
2. Proposed LCO 3.4.B.3 establishes an algebraic expression by which operability of the SLCS is determined. Because the new solution is enriched in Boron-10, a new parameter, Boron-10 enrichment, is considered. The expression contains the three system parameters of concern: concentration (C), flow rate (Q), and enrichment (E). Each of these variables is divided by its corresponding value in the criteria set forth in 10 CFR Section 50.62(c)(4) to form an expression of three ratios. 10 CFR Section 50.62(c)(4) requires a SLCS "with a minimum flow capacity and Boron content equivalent in control capacity to 86 gallons per minute of 13 weight percent sodium pentaborate solution." Natural sodium pentaborate solution is 19.8% atom Boron-10. Therefore, the expression is a multiple of ratios as follows:

$$\frac{C}{13\% \text{ wt}} \quad * \quad \frac{Q}{86 \text{ gpm}} \quad * \quad \frac{E}{19.8\% \text{ atom}}$$

If this product is equal to or greater than 1.0, the SLCS satisfies the criteria of 10 CFR Section 50.62(c)(4). For example, (1) if Q = 50 gpm and C = 9.82% weight, the criteria of 10 CFR Section 50.62(c)(4) is satisfied as long as E is equal to or greater than 45.09% atom, or (2) if Q = 40 gpm and C = 9.15% weight, the criteria of 10 CFR 50.62(c)(4) is satisfied as long as E is equal to or greater than 60.49% atom. Thus, it can be seen that the individual value of C, Q or E does not, alone, determine operability of the SLCS. Rather, these variables must be considered as a group. By using the expression of proposed LCO 3.4.B.3, the conditions of the SLCS are directly and accurately compared with the criteria of 10 CFR Section 50.62(c)(4). This is acceptable.

3. Proposed Surveillance Requirement 4.4.B.4 is being added to ensure that the Boron-10 enrichment of the solution is known. Proper Boron-10 enrichment is established by mixing stoichiometric quantities of borax and boric acid, both being of known Boron-10 enrichment. Thorough mixing of the chemicals is ensured by using the "air bubbler" in the tank. Proposed Surveillance Requirement 4.4.B.4 requires that Boron-10 enrichment be calculated following each Boron addition to the solution. A sample will be required to be analyzed within 30 days to provide assurance that the solution was mixed properly and has adequate Boron-10 enrichment. This proposed requirement concerning mass, concentration and volume ensure that sufficient Boron-10 is available to meet the system's objectives. This is acceptable.
4. As discussed before, solution saturation temperature is maintained well below normal ambient temperature by not exceeding 9.82 weight percent sodium pentaborate concentration as required by proposed LCO 3.4.B.2. Therefore, existing LCO 3.4.C.2 and Figure 3.4.2 which establish temperature requirements for the solution are no longer appropriate and can be deleted.
5. The requirement to check and record solution temperature, existing Surveillance Requirement 4.4.C.2, can be deleted because proposed Surveillance Requirement 4.4.B.2, which requires checking and recording sodium pentaborate concentration, assures that the solution saturation temperature remains below normal ambient temperature. Also, the requirement, in existing Surveillance Requirement 4.4.C.3, to check and record sodium pentaborate concentration when solution temperature is below the temperature required in Figure 3.4.2 can be deleted because Figure 3.4.2 is being removed and the monitoring of sodium pentaborate concentration is assured by proposed Surveillance Requirement 4.4.B.2. This is acceptable.
6. Existing LCO 3.4.B.1 is renumbered 3.4.C and an action statement requiring the reactor to be in Hot Shutdown within 12 hours if the redundant component is inoperable for 7 days, and a Cold Shutdown Condition within the following 24 hours is being added. Presently, the action statement of existing LCO 3.4.D, which requires the reactor to be in a Cold Shutdown Condition within 24 hours, applies to this specification. This is acceptable because it is consistent with the standard Technical Specification NUREG-0123, Rev. 3.
7. It is proposed that the action statement of existing LCO 3.4.D be revised to be more consistent with the Standard Technical Specifications for General Electric Boiling Water Reactors, NUREG-0123, Revision 3 (Specification 3.1.5.a). Revised LCO 3.4.D allows 8 hours for restoring the SLCS to an operable status before requiring a shutdown, and the reactor must be in Hot Shutdown within the following 12 hours. For conservatism, the licensee proposed an

additional restriction not included in the Standard Technical Specifications in LCO 3.4.D-namely, that a Cold Shutdown Condition must be achieved within 24 hours following Hot Shutdown. Although this additional conservatism is not considered necessary by the staff, the change was accepted as submitted.

- e. It is proposed that existing Surveillance Requirement 4.4.B.1 be removed. This Specification (4.4.B.1) requires that "When a component is found to be inoperable, its redundant component shall be demonstrated to be operable immediately and daily thereafter" This deletion is consistent with the Standard Technical Specifications for General Electric Boiling Water Reactors, NUREG-0123, Revision 3, and hence is acceptable.

The Bases Section 3.4 was revised to reflect the proposed changes. The revised Bases are acceptable since it adequately explains the bases for the current requirements in the technical specifications.

3.0 ENVIRONMENTAL CONSIDERATIONS

The amendments change requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes the surveillance requirements. The 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. 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.

4.0. CONCLUSION

The Technical Specification changes proposed by the licensee are acceptable because they are consistent with the requirements of 10 CFR 50.62(c)(4). The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations and 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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