10CFR50.90

BOSTON EDISON
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BECo 92-012

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Docket 50-293

Proposed Technical Specification Change
to Reactor Protection System Surveillance
Test Intervals and Allowable Out-of-Service Times

Boston Edison Company (BECo) proposes the attached changes to the Pilgrim Nuclear Power Station (PNPS) Technical Specifications in accordance with 10CFR50.90.

The proposed changes extend Reactor Protection System (RPS) instrumentation surveillance test intervals from one month to three months, provide for 12- and 6-hour allowable out-of-service times for repairs and tests, and delete the water level perturbation requirement. Changes to Control Rod Block and Primary Containment Isolation Systems (PCIS) instrumentation common to RPS are also proposed, as well as appropriate bases changes.

Administrative changes to clarify nomenclature, correct a typographical error and provide information to operators are also proposed.

The proposed changes to the RPS surveillance test intervals and allowable out-of-service times are consistent with General Electric Company (GE) Topical Report NEDC-30851P-A that was reviewed and approved by the NRC generic safety evaluation report dated July 15, 1987. Supplements 1 and 2 to NEDC 30851P-A, dated September 8, 1988, and January 6, 1989, respectively, support the changes to Control Rod Block and Primary Containment Isolation Systems instrumentation common to RPS . A corresponding plant-specific GE Report MDE-31-0286, dated September, 1987, concluded the generic analysis in NEDC-30851P-A is applicable to Pilgrim.

The plant-specific GE Report, MDE-31-0286, was submitted to the NRC by BECo letter dated February 22, 1988, in support of a proposed Technical Specification change (TAC 60465). Because the plant-specific report is a proprietary GE document, it is not attached to this submittal and is incorporated by reference as a previously submitted document.

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The requested changes are described in Attachment A and the revised Technical Specification pages are provided in Attachment B. Attachment C provides existing Technical Specification pages marked-up to show the proposed changes.

R. A. Anderson

GGW/clc/5941

Attachments: A) Proposed Change to RPS Surveillance Test Intervals and Allowable Out-of-Service Times

B) Revised Technical Specification Pages

C) Marked-up Technical Specification Pages

1 signed original and 37 copies

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Then personally appeared before me, Roy A. Anderson, who being duly sworn, did state that he is Senior Vice President - Nuclear of Boston Edison Company and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements in said submittal are true to the best of his knowledge and belief.

My commission expires: APR 0 3 1992
DATE

NOTARY PUBLIC

Gerald G. Whitney
Notary Public
My Commission Expires April 3, 1992

ATTACHMENT A TO BECO 92-012

Proposed Change to RPS Surveillance
Test Intervals and Allowable Out-of-Service Times

A. Purpose of Changes

Studies by General Electric Company (GE) for the Boiling Water Reactor Owners' Group (BWROG) indicate increased Reactor Protection System (RPS) instrument surveillance test intervals can reduce the potential for human error rates during testing and reduce the potential for component wear out caused by testing. The studies also demonstrate increased intervals are expected to reduce inadvertent scrams (and the associated power losses), RPS actuations, and man-hours per year required to perform such testing. This Technical Specification change takes advantage of these benefits by increasing the RPS instrument functional test interval from an effective one-month interval to every 3 months. These benefits are accompanied by a negligible change in RPS failure frequency. Similar changes to test intervals and out of service times for Control Rod Block and Primary containment isolation system (PCIS) instruments common to RPS instrumentation are also being proposed. For purposes of simplicity, in this submittal, when a reference to RPS is made, instruments common to Control Rod Block and PCIS are also referenced.

At Pilgrim Nuclear Power Station (PNPS), calibration of analog trip units is conducted concurrent with functional testing of these devices. Thus, changing the analog trip unit functional test interval also changes the calibration interval.

Specifying a 12-hour allowable out-of-service time for repairs to RPS instrument channels allows sufficient time for technicians to make reasonable repairs without undue stress from deadlines. A more restrictive 6-hour repair time is proposed when inoperable channels exist for a trip function in both trip systems. A shorter allowable out-of-service time in this case is prudent because there is a reduced level of protection with inoperable or tripped channels in both trip systems. A 6-hour allowable out-of-service time for testing was approved by Amendment 119 to the PNPS Technical Specifications on July 8, 1988.

The requirement to perturb reactor water level after functional testing is being deleted to minimize the potential for inadvertent plant transients. This testing is not needed because reactor water level channel checks verify proper instrument valve lineups and sensor response.

As an aid to operators, on Tables 3.1.1, 3.2.A, and 3.2.C-1, a new column regarding available instrument channels, is being inserted adjacent to the presently listed minimum operable instrument channels.

A typographical error is corrected on Table 3.2.F. Instrument number RI 1001-607 is corrected to RI 1001-609.

The Technical Specification Bases are also reformatted and modified to address the proposed changes.

These changes reduce testing at power and are consistent with the intent of SECY-88-304, "Staff Actions to Reduce Testing at Power," dated October 26, 1988.

B. Background

Item 4.5.3 of Generic Letter 83-28 "Requested Action Based on Generic Implications of Salem ATWS Events" requested all licensees and applicants review the existing on-line functional test intervals required by Technical Specification (TS). This review was intended to ensure current and proposed intervals for such testing are consistent with a goal of achieving high Reactor Protection System (RPS) availability. Extensions to surveillance test intervals (STIs) have been granted. Similar extensions to allowable out of service times (AOTs) have also been granted, allowing more suitable times for repair and test procedures. Extending STIs for instrumentation has the potential for reducing wear due to excessive equipment test cycling and better optimizing the use of plant personnel, with resulting improvements in plant safety and operations.

GE performed a reliability analysis as part of the BWROG Technical Specification Improvement Program which identifies improvements to the RPS surveillance test intervals and allowable out-of-service times. This generic study, NEDC-30851P-A, was approved by the NRC via the letter from A. C. Thadani to T. A. Pickens, dated July 15, 1987. An analysis specific to PNPS, MDE-31-0286, dated September 1987, was also performed by GE to confirm the applicability of the generic study to PNPS. This analysis was reviewed by BECo to ensure design configuration differences from the generic study were properly evaluated. Although a slight increase in RPS failure frequency does result, this is more than offset by the expected reduction in inadvertent plant scrams and associated challenges to safe shutdown systems, reduced equipment test cycling wear, and reduced diversion of plant personnel on unnecessary testing. Plant-specific probabilistic risk assessments (PRAs) for similar plant designs (Peach Bottom 2 and Millstone 1) indicate a one to two percent decrease in core damage frequency results.

As follow-on items, the NRC accepted extensions to surveillance test intervals and allowable out-of-service times for Control Rod Block instrumentation and Primary Containment Isolation System (PCIS) instrumentation common to RPS instruments, as documented in NRC Safety Evaluation Reports (SER), dated September 22, 1988 (Supplement 1 - Control Rod Block Instrumentation) and January 6, 1989 (Supplement 2 - Primary Containment Isolation Instrumentation).

Please note that within this proposal, references to NEDC 30851P-A also apply to its supplements.

This proposed amendment consists of changes to instrumentation surveillance test interval and allowable out-of-service times. These changes are based on GE Topical Report NEDC-30851P-A, its supplements, and the corresponding plant-specific GE Report MDE-31-0286. These reports provide the analytical

bases supporting an extension of the functional test interval for instrumentation from monthly to quarterly. The NRC generic safety evaluation report (SER) approving NEDC-30851P was issued on July 15, 1987. The SER required each applicant for proposed RPS instrumentation Technical Specification changes to address three conditions on an individual plant basis.

Boston Edison Company (BECo) responded to the three SER conditions by letter dated February 22, 1988. This letter provided supporting information for a proposed Technical Specification change submitted by BECo letter dated December 23, 1985. These submittals resulted in the NRC granting License Amendment 119, dated July 8, 1988. This amendment added equipment allowable out-of-service times for calibration and testing of the RPS and primary containment isolation system.

Subsequent to the February 22, 1988 BECo letter, the NRC issued a letter, dated April 27, 1988, providing guidance and clarification regarding the NRC's requirement for confirmation of instrument drift allowances. In the safety evaluation issued with Amendment 119, the NRC stated:

> In licensee letter BECO 87-026, dated February 22, 1988, BECO submitted an applicability review of PNPS to the Topical Report NEDC-30851P. The staff reviewed this submittal and has concluded that adequate similarity of PNPS to systems analyzed by NEDC-30851P justifies the use of the recommended six hour out of service time for testing and calibration.

Because the plant-specific analysis for PNPS is a GE proprietary document and its use in a previously submitted Technical Specification change request was acceptable to the NRC, BECo requests GE document MDE-31-0286 be incorporated by reference in this proposed Technical Specification change.

Use of the GE topical reports as the basis for the proposed surveillance frequency changes also requires revision of the associated bases sections. Deletion of the separate bases section referencing the obsolete reliability analysis allows BECo to reformat the RPS bases pages to a single column format.

C. Determination of No Significant Hazards Considerations

The Code of Federal Regulations (10CFR50.91) requires licensees requesting an amendment to provide an analysis, using the standards in 10CFR50.92, that determines whether a significant hazards consideration exists. The following analysis is provided in accordance with 10CFR50.91 and 10CFR50.92 for the proposed amendment.

The proposed changes do not increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the safety analysis report. NRC-accepted studies by GE (NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System", including Supplements 1 and 2, instruments common to Control Rod Block and PCIS functions) indicate that RPS failure frequency will increase

by a small amount by increasing RPS instrument surveillance frequency from one to three months. The increase in core damage frequency due to less frequent testing is less than one percent. However, a decrease in core damage frequency due to the estimated reduction in scram frequency and the effect of reducing unnecessary cycles on RPS equipment due to less frequent testing more than offsets the small increase in RPS failure frequency. Since the Control Rod Block System functions to anticipate and prevent inadvertent rod withdrawals and attendant scrams, less frequent testing can potentially increase scram frequency. Supplement 1, for control rod block, estimates an increase of 0.06% which can be considered negligible. Supplement 2, for PCIS functions, indicates a net increase in the probability of an isolation failure on the order of 0.3% to 1% for increased STIs and 2% for increased AOTs. Again, this is considered insignificant. Therefore, overall core damage frequency is unaffected by this change.

Sensitivity studies were also performed to measure the effects of changes in component failure rates, changes in common cause failure rates, reduced redundancy during testing, human error rates during testing, component wear out rates caused by testing, and changes in test intervals and allowable out-of-service times. These studies indicate common cause failures of the scram contactors are the most significant contributors to RPS failure frequency. Because scram contactors are cycled during testing of each RPS instrument channel, the scram contactors are most susceptible to testing-related wear out. Consequently, the frequency of testing the RPS channel test switch function is changed from once every refuel outage to weekly while other functions are increased to three months. This assures the scram contactors are regularly checked for common mode failure while also reducing the total number of scram contactor tests. All other factors have an insignificant effect on RPS failure frequency over the ranges analyzed.

Because RPS failure frequency is not strongly sensitive to surveillance test intervals and allowable out-of-service times, the current requirements for test intervals and out-of-service times can be extended to the periods specified to allow reasonable test/repair times without placing undue stress on plant personnel that can contribute to human error. The 12-hour and 6-hour allowable out-of-service times were selected consistent with NEDC-30851P-A and its supplements and are considered reasonable for performing repairs and tests. Increasing the surveillance test interval for high reactor pressure, high drywell pressure, reactor low level, and condenser low vacuum instruments to three months results in an increased calibration interval of three months for the associated analog trip units. Setpoint calculations for these devices assume a drift over a six-month period; therefore, setpoint changes to account for drift are not necessary.

Plant-specific analyses for the Pilgrim Nuclear Power Station (PNPS) were performed to evaluate effects on analysis conclusions of RPS design configuration, Technical Specification test method, and component differences between the generic plant and PNPS. The plant specific GE Report MDE-31-0286, documents these differences and concludes the generic study conclusions are applicable to PNPS. Difference in component failure rates are within the ranges used in the sensitivity analyses. Other differences (i.e., PNPS does not have a high reactor level scram, PNPS uses HFA vs. Potter and Brumfield relays in the RPS logic, PNPS has a scram on low condenser vacuum, PNPS has an air dump system, etc.) have been evaluated and have negligible impact on RPS failure frequency.

Although calibration frequency of the average power range monitor (APRM) flow bias is not addressed in the GE Topical Report, the calibration frequency is changed from monthly to quarterly to be consistent with the APRM functional test frequency. This test consists of a calibration of the flow control trip reference. A three month calibration frequency will not significantly increase the likelihood of signal drift. The devices involved with the flow bias signal have required recalibration once in approximately three years for each channel, indicating exceptional circuit stability. These devices are located in an environmentally controlled area thereby assuring continued stability.

Note 7 of Table 4.1.1 is rewritten to reflect 3-month APRM testing and to more clearly specify the APRM testing requirements when entering the RUN mode. Because mode switch interlocks prevent simple functional testing of APRM trips until the RUN mode is entered, this testing will continue to be done after entering RUN mode. A 24 hour limit is imposed to replace the phrase "as soon as practicable" to make the surveillance requirement more definitive.

The flow bias signal calibration requirement, "Internal Power and Flow Test," is reworded to more clearly define the required testing. Also, a new column is added to each of the Tables 3.1.1, 3.2.A, and 3.2.C-1 to inform the operators of the number of available instrument channels for each function. A typographical error is corrected in Table 3.2.F. Plant records list an instrument as RI 1001-609 but Table 3.2.F has it numbered as 1001-607. These changes are not technical changes but, rather, are clarifications to be more consistent with plant nomenclature and to provide aids to the operators.

Note 6 of Table 4.1.1 is deleted because reactor water level perturbations are no longer required after the functional testing of reactor water level instruments. Instrument checks verify the response of these sensors. Instrument checks are performed daily per Note 7 of Table 4.1.2. Purposely perturbing reactor water level is an undesirable test due to the potential for initiating an inadvertent transient. Use of instrument checks is consistent with Standard Technical Specifications, acceptable IEEE-279 on-line sensor check methods, and PNPS design. This change represents a plant safety enhancement by reducing potential plant transients.

Using the above analysis the following determinations are made:

1. The operation of PNPS in accordance with the proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed changes do not affect the design response of plant safety systems to an accident scenario. Since the functions of mitigative systems are not affected, accident analysis results and conclusions are therefore not affected by the proposed changes.

2. The operation of PNPS in accordance with the proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.

   These changes do not result in any physical modifications, changes of instrument setpoints, or changes of PNPS design bases. Therefore, they cannot create the possibility for a new or different accident, transient, or other event.

3. The operation of PNPS in accordance with the proposed amendment will not involve a significant reduction in the margin of safety.

   The only margin of safety affected by the proposed changes is related to their impact on the potential to increase the RPS or isolation failure frequency. Changes in RPS or isolation failure frequency and core damage frequency have been demonstrated to be insignificant.

D. Summary

The proposed changes do not pose any significant hazards considerations as discussed above. This change was reviewed and recommended to the Station Director for approval by the Operations Review Committee and reviewed by the Nuclear Safety Review and Audit Committee.

E. Schedule of Change

This change will be implemented within 30 days following BECo's receipt of approval by the NRC.