10CFR50.90

BOSTON EDISON
Pilgrim Nuclear Power Station
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BECo 90- 034
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U.S. Nuclear Regulatory Commission
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Docket 50-293

PROPOSED CHANGE TO THE
LOGIC SYSTEM FUNCTIONAL TESTING TECHNICAL SPECIFICATIONS

Boston Edison Company proposes the attached changes to Tables 4.2.A, 4.2.B, 4.2.C and 4.2.D of the Pilgrim Nuclear Power Station Technical Specifications in accordance with 10CFR50.90. The proposed changes lengthen the Logic System Functional Testing (LSFT) surveillance interval from 6 months to 18 months. The Bases for Section 4.2 are also changed to reflect the increased interval.

The proposed change to the LSFT interval is consistent with the interval provided in the BWR Standard Technical Specifications (NUREG-0123) and in NEDC-31681, "Improved BWR Technical Specifications" for Boiling Water Reactors (BWR)/4, dated April, 1989.

The requested change is described in Attachment A, the revised Technical Specification pages are in Attachment B, and the current Technical Specification pages, with the changes identified by "balloons", are in Attachment C.

R. G. Bird

PMK/jcp/3514

Attachments
1 Signed Original and 37 Copies

cc: See next page

Commonwealth of Massachusetts)
County of Plymouth)

Then personally appeared before me, Ralph G. Bird, 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 03 1992
DATE

NOTARY PUBLIC

Gerald G. Whitney
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A001
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Attachment A

Proposed Change to LSFT Intervals

Proposed Change

The proposed change increases the Logic System Functional Testing (LSFT) surveillance interval from 6 months to 18 months. The specific changes are to Pilgrim Nuclear Power Station (PNPS) Technical Specifications Tables 4.2.A, 4.2.B, 4.2.C, and 4.2.D. The Bases for Technical Specification Section 4.2 are changed to reflect the surveillance interval change.

Reason for Change

The methods and scope of performing LSFT at Pilgrim were revised during RFO #7. The new surveillances include test modifications that address NRC concerns stated in Information Notice 88-83, "Inadequate Testing of Relay Contacts in Safety Related Logic Systems".

Boston Edison Company (BECo) proposes this amendment to reduce the unavailability of plant systems solely for the purpose of performing logic system functional tests. The LSFT configurations at Pilgrim require the temporary installation of jumpers, lifting of leads, blocking of contacts, and/or bypassing safety functions in order to perform the required surveillances. This testing increases the potential for error and creates unnecessary risk to the plant. The changes will allow off-line testing of most logic systems which is consistent with recent NRC staff actions to reduce testing at power (SECY-88-304, dated 10/26/88).

By considering only the time required of technicians performing these tests, the time the safety systems are out of service for the purpose of testing can be reduced by approximately 1000 hours per cycle. This equates to 41 days per 18 months the station is not operating "at risk" because a safety system is not available due to surveillance testing.

Original PNPS surveillance test intervals were conservatively chosen based on limited operational knowledge of component reliability at the time. Due to this limited knowledge, technical specifications allowed the interval for instrument functional tests to be varied as an inverse square root function of failure rate. As operational data of failure rates was accumulated, technical specifications allowed an increase in instrument functional test intervals if failure rates became appreciably low. This argument can be extended to LSFT intervals since similar components are involved. Studies by General Electric Company (GE) for the BWR Owners Group to support technical specification improvements for BWR Reactor Protection Systems and Emergency Core Cooling Systems (NEDC-30851P-A and NEDC-30936P-A) indicate logic system component (i.e., relay) failure probabilities are low. Reports, such as NUREG/CR-2815, "Probabilistic Safety Analysis Procedures Guide," support this conclusion. Information collected since original test intervals were selected indicate that an increase in LSFT intervals is justifiable.

A search of the document data base for Pilgrim identified ten logic system relay failures during the period 1/1/82 through 4/30/86. The number of relay-hours for this period was calculated to be slightly less than 25 million hours. The resultant failure rate of approximately 4.0E-07 failures per relay hour is consistent with industry assumptions for per hour random coil failure rates. (Ref: NEDE-22056, "Failure Rate Data for GE BWR Components"). As failure trends or a component's susceptibility to failure have been identified at PNPS, steps have been taken to ensure that high reliability is maintained (e.g., replacement of old HFA relays with new Century Series 100 relays per IE Bulletin 84-02, and replacement or rework of GE CR120A relays showing higher than normal failure trends). It is therefore concluded that PNPS safety-related logic system relays have not experienced a failure rate significantly higher than the industry average. Also, BECo attention to industry generic relay issues and PNPS specific relay issues as well as on-going preventive maintenance practices should serve to keep relay failures low.

Safety system unavailability is a function of equipment failure rates, allowable repair times, and the test interval. Studies by GE to support Technical Specification Improvements (NEDC-30851P-A and NEDC 30936P-A) support the statement that the amount of time a circuit is out-of-service due to testing during plant operation is the largest contributor to circuit unavailability. Increasing the test interval decreases the out-of-service time while increasing the likelihood that a failed component may remain in service undetected. For most circuit configurations used in the logic systems affected by these proposed T.S. changes, the overall unavailability decreases by reducing testing from once per 6 months to once per 18 months. The decreases result because contact unavailability is dominated by out-of-service time due to testing. The test-time contribution decreases with increasing testing interval because the total amount of time required for testing during an operating cycle decreases the less often a test is performed. For circuits containing single failure point contacts tested on line contact unavailability is dominated by out of service time due to testing for test intervals up to 6 months. After that, the unavailability caused by undetected contact malfunctions begins to dominate. Circuits of this latter type are common in energize-to-actuate logic systems such as LPCI, Core Spray, ADS, and HPCI. Undetected failures of a relay or relay contact could prevent safety actions such as pump starts or valve actuations. Unavailability of this circuit type could increase by 8% due to the change to 18 months proposed in this request. This increase exceeds the 5% acceptance criteria used by GE determining circuit unavailability.

Nevertheless, an increase in unavailability of this one circuit type is not significant for the following reasons:

- Logic system component failure probabilities are low compared to that of the mechanical components in the safety system. An increase of 8% is not excessively higher than the 5% cutoff and is still dominated by probabilities of mechanical component failures. A significant increase in safety system unavailability is not expected since mechnical component failure contributions mask the changes to logic system failure contributions.

- Contributions to unavailability due to human errors are reduced by testing less frequently. These errors are most important in returning the tested equipment to service. Improper removal of

jumpers or landing of lifted leads, although unlikely under procedural and QA controls, can render a system inoperable in an undetected manner. Also, unnecessary challenges to safety systems are reduced by reducing the potential for inadvertent transients or safety system actuations induced by human errors during testing.

- Many portions of logic systems that contain the single failure contact circuit are regularly tested (monthly) to satisfy other Technical Specification requirements (i.e., channel functional tests). Failures of relays/contacts covered by these other tests would be detected. Also, other portions of the logic systems are annunciated such that a relay/contact failure could be alerted to operators. Some coil failures at PNPS were also quickly identified by operators detecting small amounts of localized fumes. Therefore, many logic system failures will be detected by means other than the testing required by these technical specifications.

- Due to the design of logic systems, a failure of a relay or contact in one train cannot affect the response of components in the other train. In most cases, failure of a relay/contact does not preclude operator control of components. PNPS procedures require that operators verify all automatic functions have occured for a particular accident or transient. Therefore, loss of the system safety function would not necessarily occur due to a relay/contact failure.

This request is consistent with those previously approved for similar BWRs and with those specified in the BWR STS. NUREG-0123 "Standard Technical Specifications for General Electric Boiling Water Reactors" specifies an 18 month frequency for LSFT surveillances. The BWR Owners Group document, NEDC-31681 "Improved BWR Technical Specifications", dated April, 1989, also specifies an 18 month LSFT frequency. Amendments similar to this request to change the LSFT 6 month frequency to 18 months were recently approved for Brown's Ferry (1, 2, and 3), Duane Arnold and Vermont Yankee. A survey of other BWR's indicates that Pilgrim is one of the last remaining plants with a 6 month LSFT frequency. Thus, this amendment will make the Pilgrim technical specifications consistent with industry-wide testing frequencies for logic system functional test surveillances.

The following systems are affected by the proposed change to the extent their LSFT intervals will change:

Core Spray System
Low Pressure Coolant Injection System
Containment Spray System
High Pressure Coolant Injection System
Automatic Depressurization System
Primary Containment and Reactor Vessel Isolation System
Emergency Diesel Generators
Reactor Core Isolation Cooling System
Equipment Area Cooling Systems
Reactor Building Isolation and Standby Gas Treatment System
Control Rod Block System

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 increasing the LSFT surveillance interval from 6 months to 18 months.

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

   The proposed amendment does not directly affect the safety functions of any systems since no physical plant modifications are taking place. However, these changes indirectly affect the automatic logic functions of active safety equipment since the testing of these logics influences safety system availability.

   The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated because lengthening the surveillance interval will not adversely affect the ability of the affected safety systems to perform their intended safety functions. The proposed amendment reduces the amount of time the plant would be vulnerable to challenges to the plant safety systems due to surveillance testing.

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

   The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated because lengthening the surveillance interval will not adversely affect the responses of the affected safety systems to previously evaluated accidents. The increase in surveillance test interval does not require plant modifications or involve any changes in Technical Specification setpoints, plant operation, or automatic safety functions.

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

   The proposed change continues to meet the Technical Specification requirements for performing logic system functional tests to verify the equipment is operable. Pilgrim Station currently tests to the individual relay contact level and will continue to do so.

   Therefore, the proposed amendment will not involve a significant reduction in the margin of safety because system operability and reactor shutdown capability is still assured. The amendment provides an improvement to plant safety because the occurrence of system inoperability due to surveillance testing is reduced. Additionally, the potential for inadvertent safety system actuations and isolations and their resultant transients is reduced by reducing the need for system testing during plant operation.

This change was reviewed and recommended for approval by the Operations Review Committee and reviewed by the Nuclear Safety Review and Audit Committee.

Schedule of Change

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