

UNITED STATES NUCLEAR REGULATORY COMM'SSION WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR PEGULATION RELATING TO STANDBY LIQUID CONTROL SYSTEM BOSTON EDISON COMPANY PILGRIM NUCLEAR POWER STATION DOCKET NO. 50-293

1.0 INTRODUCTION

By letters dated May 29, July 8, July 15, 1987, from R. G. Birnd, Boston Edison Company (BECo), to U. S. Nuclear Regulatory Commission, BECo proposed to change the Technical Specifications (TS) for Pilgrim. The changes address the use of borom, enriched in the isotope B-10, in the sodium pentaborate solution used in the Standby Liquid Control System (SLCS) in order to meet the requirements of the Anticipated Transient Without Scram (ATWS) Rule, 10 CFR 50.62 paragraph (c)(4). The proposed changes are to TS Sections 3.4.A, 3.4.D, 4.4.A, 4.4.C, Figure 3.4-1 and 2, Basis 3.4, 4.4 and Table 6.9.1 all associated with the SLCS.

2.0 EVALUATION

The proposed TS changes for Pilgrim are intended to meet the requirements of the ATWS Rule, 10 CFR 50.62.C.4. The ATWS Rule requires that the SLCS be equivalent in control capacity to a system with an 86 gpm injection rate, using 13 weight percent unenriched sodium pentaborate solution, in a system with a 251 inch diameter reactor vessel. Of the several proposed approaches presented in the General Electric report, Reference 1, and approved in the NRC evaluation, Reference 2, BECo has chosen to use enriched (in E-10) boron. Using the calculation methods of Reference 1 results in a minimum concentration of 8.42 weight percent sodium pentaborate when using an enrichment of 54.5 atom percent B-10 and an injection of 39 gpm and a water mass of 507,850 pounds (227 inch vessel). The new limits are reflected in the revised T/S section 3.4.C.3 and Figure 3.4.1.

8712110264 871209 PDR FDIA SORGI87-644 PDR The temperature/concentration requirements of existing Figure 3.4.2 are no longer required because the curve extends down only to 9.4% sodium pentaborate concentration and is based upon naturally enriched sodium pentaborate. The proposed revised concentration limits, in proposed TS Figure 3.4-1. allow a maximum concentration of 9.22% enriched sodium pertaborate. At 9.22% enriched sodium pentaborate concentration, the temperature required to preclude sodium pentaborate precipitation (with a 10°F margin) is 48°F (he controlled building temperatures provide assurance that it will be difficult for the SLCS solution to approach this limit, and system alarms provide operator notification of such a potential event. Because of the 10°F margin to potential sodium pentaborate precipitation at monitored concentration levels, the 48°F temperature limit provides equavalent protection to that considered in the original safety evaluation. The 48°F temperature limit, which is included in the proposed TS, preempts the previous temperature - concentration curve provided in Figure 3.4.2. Accordingly, the staff finds the proposed TS Section 3.4.C.2 and deletion of Figure 3.4.2 to be acceptable.

Having selected the enriched boron option of compliance with the ATWS Rule, BECo, following an approved approach, has elected to have the sodium pentaborate formulated at the chemical vendor's facility. The boron enrichment test will therefore be done prior to the acceptance for use on the site. The boron enrichment test also will be done anytime boron is added to the solution and each refueling outage. If the enrichment level is less than 53.5 atom percent, a period of seven days is allowed to bring the boron enrichment into compliance. If at the end of the seven day period, compliance can not be assured, the license is required to submit a report, within seven days, to the NRC advising the licensee's plan to comply with the ATWS Rule. These are all acceptable procedures. They have been agreed upon as elements of an appropriate approach for compliance with the ATWS Rule in discussions between the staff and industry (BWR Owners Group ATWS Committee, Ref. 3). The proposed changes in T/S Sections 4.4.C.4 and 3.4.D.1.2.3 to implement these procedures are acceptable.

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The bases to technical specification 3.4. and 4.4 were revised to reflect the proposed changes. The revised bases are acceptable since it adequately explains the bases for the proposed requirements in the technical specifications.

3.0 CONCLUSIONS

BECo has requested TS changes for Pilgrim which would provide for the use of enriched boron in the SLCS to meet the requirements of 10 CFR 50.62.C.4. The approach selected by BECo and the associated TS are acceptable. 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 reguations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

REFERENCES

- "Anticipated Transients Without Scram: Response to NRC ATWS Rule, 10 CFR 50.62", NEDE-31096-P, December 1985.
- "Safety Evaluation of Topical Report (NEDE-31096-P) 'Anticipated Transients Without Scram: Response to ATWS Rule, 10 CFR 50.62'", letter from G. Lainas (NRC) October 21, 1986.
- Minutes of BWR Owner's Group informal meeting on April 1, 1987 with NRC to discuss ATWS Technical Specification Bases, Bethesda, MD, April 3, 1987.

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ENCLOSURE 2 BOSTON EDISON COMPANY PILGRIM NUCLEAR POWER STATION SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Functional Areas

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- Management Involvement in Assuring Quality. Technical review of the submittal indicates that the management reviews are not satisfactory. In the submittal, Pilgrim Reactor Pressure Tessel diameter was given as 218" instead of the actual diameter of 227". Rating: Category 3
- Approach to Resolution of Technical Issues from a Safety Standpoint. The licensee showed a general understanding of the technical issue amd used acceptable approaches. Rating: Category 2
- Responsiveness to NRC Initiatives The licensee responded favorably to NRC initiatives. Rating: Category 2
- Staffing (including management) N/A
- Reporting and analyses of reportable events N/A
- Training and effectiveness and qualification N/A
- 7. Overall rating for functional area: 2
- * Reference: NRC Manual Appendix 0516 Systematic Assessment of Licensee Performance