



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 129 TO

FACILITY OPERATING LICENSE NO. NPF-38

ENERGY OPERATIONS, INC.

WATERFORD STEAM ELECTRIC STATION, UNIT 3

DOCKET NO. 50-382

1.0 INTRODUCTION

By application dated February 5, 1997, as supplemented by letter dated March 26, 1997, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3, (Waterford 3), Technical Specifications (TSs). The requested changes would revise Technical Specifications 3.1.2.7, 3.1.2.8, 3.5.1, 3.5.4, 3.9.1, and Bases 3/4.1.2. The changes will increase the minimum boron concentration in the Safety Injection Tanks (SIT) and the Refueling Water Storage Pool (RWSP) from 1720 to 2050 ppm. The proposed change will ensure that the minimum boron concentration required by the TS, is consistent with the safety analysis for the Waterford 3, Fuel Cycle 9. The staff concurs that the proposed TS change is consistent with the Technical Specification Improvement Program as supported in the implemented NUREG-1366 "Improvements to Technical Specification Surveillance Requirements" and NUREG-1432 "Standard Technical Specifications Combustion Engineering Plants".

The March 26, 1997, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination or expand the scope of the original Federal Register notice.

2.0 EVALUATION

2.1 Description of the SIT and the RWSP

The Safety Injection Tank is a passive injection system containing borated water under a pressurized nitrogen cover. No outside operator action is required for operation. The SITs are connected to the reactor coolant system (RCS) cold leg by a line containing two check valves that isolate the tanks from the RCS during normal operations. When the RCS pressure falls below the tank pressure, the check valves open, discharging the contents of the SITs into the RCS.

The function of the tanks is to reflood the core following a large break loss of coolant accident (LBLOCA). Adequate borated water is supplied in the four tanks to flood the core assuming the contents of one of the tanks is lost

The RWSP is used to store borated water for use in both the Safety Injection and the Containment Spray Systems. The RWSP is designed to be the main source of borated water to the Engineered Safeguard Feature (ESF) pumps, prior to reaching a low-level switchover to the Safety Injection Sump for recirculation. The minimum boron concentration of the RWSP guarantees that the core will remain subcritical in a cold condition following a mixing of the RWSP and the RCS water volumes with all the control rods inserted except for the most reactive control assembly which conservatively is assumed to be in a fully withdrawn position. The upper TS limit of 2300 ppm is a maximum boron concentration requirement based upon boric acid precipitation rates in the reactor core in post LOCA conditions. No change is being proposed for this limit.

2.2 LBLOCA Analysis

In the analysis of the LBLOCA, it is assumed that the RCS depressurizes to the point at which the SIT discharges into the RCS. During the initial stages of reflooding, heavily borated water from the SIT provides core cooling and reactivity control. In the event that there is a need to make an addition to the SITs, the makeup source is the RWSP.

If makeup to the RWSP is required, the operators should have no trouble in providing the necessary makeup. However, it should be pointed out that the proposed change will result in a much tighter band on the boron concentration in the RWSP. This is a minor impact on operator actions because the frequency of changes required to adjust both the SIT and RWSP is relatively low.

2.3 Technical Specification Changes

The proposed change in the boron concentration in the SITs and the RWSP from 1720 ppm to 2050 ppm, is necessitated by Waterford 3 going to a longer cycle (for upcoming Cycle 9), an increase in the fuel enrichment, and a reduction in rod shimming. The reduction in rod shimming is caused by licensee's decision to use Erbium as the integral poison. Use of Erbium has been documented by ABB in ABB topical report CEN-382-P-A, "Methodology for Core Designs Containing Erbium Burnable Absorbers," ABB Combustion Engineering Nuclear Fuel, August 1993. The change to Erbium is the driving factor in changing the above mentioned TS, because Erbium is not as effective as B_4C in holding down boron concentrations as seen by the results of the maximum critical boron concentration calculation.

The minimum SIT/RWSP boron concentration which will be sufficient to maintain the core at 1 percent shutdown, was conservatively calculated by licensee to be 2001.4 ppm. Consequently, any value of SIT concentration lower than 2001.4 ppm would result in the plant being less than 1 percent shutdown. The licensee has chosen the value of 2050 ppm as the TSs limit for further conservatism.

The proposed increase in boron concentration will not effect the results of the Mode 5 boron dilution event. Analysis by the licensee shows that for various combinations of K_{eff} , RCS conditions, and number of charging pumps in operation, the minimum possible time to criticality is greater than 90 minutes. For all other combinations of K_{eff} , RCS conditions and charging pumps, the same analysis shows that the time to loss of shutdown margin is greater than 55 minutes. This maintains the minimum of 55 minutes to criticality for the refueling mode boron dilution event analysis.

The proposed change to TS 3.9.1 continues to preserve the condition that during Mode 6 refueling operations, the more restrictive reactivity condition of either a K_{eff} of 0.95 or a boron concentration of 2050 ppm is met. The Core Operating Limits Report (COLR) Section 3.9.1 will also be revised by licensee to reflect the boron concentration change from 1720 ppm to 2050 ppm. The licensee proposed to revise the action statement in TS 3.9.1 to clarify the action requirements to restore boron concentration to within COLR limits. This change is consistent with the Standard Technical Specifications for CE plants.

No change is made to the boron concentration upper limit of 2300 ppm. This continues to ensure that there will not be an unacceptably high concentration of boric acid in the core resulting in precipitation during the long term cooling phase following a LOCA.

As discussed above, the staff has reviewed the licensee's proposed TS changes for Waterford 3 Fuel Cycle 9. Based on the staff's evaluation of the information provided by licensee, the staff approves the change in the boron concentration from 1720 to 2050 ppm for the SIT and the RWSP, and the change to the corresponding TS, because the change will make the boron concentration consistent with the safety analysis for the Waterford 3 Fuel Cycle 9 and it is shown to be conservative.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Louisiana State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration and there has been no public comment on such finding (62 FR 14461). Accordingly, the amendment meets 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 amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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