



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 55 TO

FACILITY OPERATING LICENSE NO. DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

Introduction

By application dated December 27, 1979, Northeast Nuclear Energy Company (NNECO or the licensee) proposed low temperature testing to identify turbine generator efficiency losses at Millstone Nuclear Power Station, Unit No. 2 (Millstone-2). This proposed testing would require a change to Facility Operating License No. DPR-65.

Discussion and Evaluation

Currently, Millstone-2 operates with three of its four turbine control valves fully open and the fourth valve partially open. In an effort to quantify losses in secondary plant performance, the licensee wishes to fully open the fourth turbine control valve and thereby determine the throttling loss across the valve. Since this test will be conducted at 100% power, the increased steam flow will be offset by a reduction in steam enthalpy and hence, steam temperature. The reduction in secondary system temperature will result in a reduction in primary system temperature of approximately 10°F according to the licensee. This reduction in core inlet temperature during the test is such that the inlet temperature will not be bounded by docketed safety analyses.

The following areas are evaluated to address the effects of the test and the steps taken to assure conservatism with respect to the existing safety analyses.

Boron Dilution

Conditions during this test will not exceed the bounds of the existing safety analysis.

Control Element Assembly (CEA) Withdrawal

The parameters of interest for this particular transient are Departure from Nucleate Boiling (DNB) and high power level following withdrawal. Due to the lower temperature there is a DNB credit and the Moderator Temperature Coefficient (MTC) is within the analysis bounds; therefore, the consequences of this transient initiated from test conditions would be within the bounds of the analysis.

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Loss of Load

The effects of this transient, if initiated from test conditions, would be delayed due to the increased energy required to heat the Reactor Coolant System (RCS). Therefore, test conditions would not worsen the transient and it is considered to be within the analysis bounds.

Loss of Feedwater

The current safety analysis conservatively assumes that reactor trip on low steam generator level is bypassed. Evaluation of the thermal-hydraulic consequences of this event are done by taking credit for the second trip signal, high RCS pressure. According to the licensee, a separate analysis was done to show that an excess of 10 minutes exists for the operator to initiate auxiliary feedwater. Initiation of this event from a lower temperature does not change this conclusion and as with the Loss of Load event, reactor trip could be delayed with minimal effects on the analysis.

CEA Ejection

Due to the lower RCS temperature, the stored energy in the fuel and clad will be less. Therefore, for the same ejected CEA, the total enthalpy of the fuel and clad following the incident will be lower than in the current analysis.

Steamline Break

Initiation of this transient from test conditions may slightly increase the cooldown rate because the latent heat of vaporization is higher at the lower steam generator pressure. This non-conservatism is offset for the following reasons. First, the return to criticality concerns brought on by an increased cooldown are bounded by the zero power case which starts at a lower temperature than the test. Second, the more rapid RCS pressure decrease will allow sooner delivery of boron from the High Pressure Safety Injection (HPSI) pumps. Third, the charging system, which is a qualified Emergency Core Cooling System (ECCS) subsystem, is not credited in the analysis. This system can begin immediate boronation once the Safety Injection Actuation Signal (SIAS) is generated. These three reasons mitigate the return to criticality concerns caused by an increased cooldown and the consequences of this event remain bounded by the current analysis.

Loss of Coolant Accident (LOCA)

NNECO states that previously approved sensitivity studies for the Calvert Cliffs Unit No. 1 ECCS analysis (Amendment No. 52 to Facility Operating License No. DPR-53, dated September 9, 1977) showed that for a 1°F reduction in inlet temperature there could be up to a 4°F increase in peak clad temperature (PCT). Calvert Cliffs Unit No. 1 is a sister plant to Millstone-2. The Millstone-2 ECCS analysis has enough margin to PCT to accommodate such an increase, however, the limits of the Calvert Cliffs analysis will be adhered to so as to provide additional conservatism. Specifically, the Linear Heat Rate (LHR) limit will be reduced from 15.6 Kw/ft to 14.2 Kw/ft and the inlet temperature will not be allowed to drop below 537°F. The appli-

cation of these limits to Millstone-2 during this test will assure that the consequences of a LOCA initiated from test conditions will be no more limiting than currently demonstrated.

It has been determined from the review of the safety analyses that accidents and transients which may be initiated from a lower temperature than previously analyzed will in fact be bounded by the results of the current safety analyses. In addition, the short duration of the test significantly reduced the probability of occurrence of any of these events during the test interval. However, the following restraints should be adhered to:

- ° Test duration not to exceed 24 hours
- ° Minimum inlet temperature $\geq 537^{\circ}\text{F}$
- ° Maximum LHR ≤ 14.2 Kw/ft
- ° Pressurizer level will not be varied with the reduced average temperature

We have concluded, based on the considerations discussed above, that this test may be performed safely and with no adverse consequences and does not involve a significant decrease in safety margin provided Technical Specification Figure 3.2.1 is modified to impose the above limits during the testing.

Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations 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.

Dated: April 29, 1980