DOCKET NO. 50-336

ATTACHMENT 2

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

LOW TEMPERATURE TESTING

SAFETY ANALYSIS REVIEW

1742 034

NOVEMBER, 1979

SAFETY ANALYSIS REVIEW

The performance of the test will reduce the inlet temperature such that the temperature will be outside of the region normally analyzed. For this reason, NNECO has determined that the test constitutes an unreviewed safety question as defined in 10CFR50.59. The following paragraphs address the effects of the short duration test and the steps that will be taken to assure conservatism with respect to the existing safety analyses.

CEA Withdrawal

The parameters of concern for this transient are high power level following withdrawal and DNB. Since the MTC is within the analysis bounds and the lower temperature is a DNB credit, consequences of this transient initiated from test conditions would be within the analysis bounds.

Boron Dilution

The test conditions do not exceed the bounds of this analysis.

Excess Load and Excess Heat Removal Due to Feedwater Malfunction

Since the steam flow during the test is higher than normal, the potential mismatch between the primary and secondary system caused by these events is proportionally smaller than that assumed in the analysis. Thus, these transients are bounded by the current analysis.

Loss of Load

Initiation of this transient from a lower temperature could possibly delay reactor trip due to the increased energy required to heat the RCS. This would not worsen the effects of this transient, but rather just delay them.

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. As with the Loss of Load event, reactor trip could be delayed with minimal effects on the analysis. Also, a separate analysis was done to show that in excess of 10 minutes exist for the operator to initiate auxiliary feedwater. Initiation of this event from a lower temperature does not change this conclusion.

RCS Depressurization, Loss of Flow, CEA Drop, Loss of Load to One Steam Generator and Seized Rotor

The DNB credit obtained by operating at a lower temperature will keep the results of these transients within the bounds of the current analysis. Quantification of the magnitude of the DNB credit is not presented because the additional credit is conservative with respect to the docketed analyses. The lower temperature would result in a DNBR value greater than that previously calculated.

CEA Ejection

Since the RCS will be at a lower temperature, there will be less stored energy in the fuel and clad. Thus, for the same ejected CEA, the total enthalpy of the fuel and clad following ejection will be less than that shown 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 HPSI pumps. Third, the charging system which is a qualified ECCS subsystem is not credited in the analysis. This system can begin immediate boration once the 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.

Steam Generator Tube Rupture

This accident initiated from test conditions would result in more primary coolant transport to the secondary side. This is a result of the larger pressure differential between the primary and secondary side and the greater subcooling of the primary side fluid. However, the current analysis assumed that the RCS pressure is 2300 psia, 50 psi above normal operating pressure. This conservatism offsets the effect of reduced steam generator pressure and keeps the consequences of this event within analysis bounds.

LOCA

An ECCS analysis performed for Calvert Cliffs 1 (Reference (1)), a sister plant to Millstone Unit No. 2, showed that a 1°F reduction in inlet temperature could produce up to a 4°F increase in peak clad temperature. Although Millstone Unit No. 2 has PCT margin to accommodate such an increase, the limits of the Calvert Cliffs analysis will be applied to Millstone during the test to provide additional conservatism. Specifically, the inlet temperature will not be allowed to drop below 537°F, a 12°F maximum decrease and the Linear Heat Rate limit will be reduced from 15.6 Kw/ft to 14.2 Kw/ft. Application of these limits during the test will assure that the consequences of a LOCA initiated from test conditions will be no more limiting than currently shown.