



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 36 TO LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

I. INTRODUCTION

In conjunction with the Short Term Program (STP) evaluation of Boiling Water Reactor facilities with the Mark I containment system, the Northern States Power Company (the licensee) submitted a Plant Unique Analysis (PUA) for the Monticello Nuclear Generating Plant. This analysis was performed to confirm the structural and functional capability of the containment suppression chamber and attached piping, to withstand newly-identified suppression pool hydrodynamic loading conditions which had not been explicitly considered in the original design analysis for the plant. As part of the STP evaluation, specific loading conditions were developed for each Mark I facility, to account for the change in the magnitude of the loads due to plant-specific variations from the reference plant design for which the basic loading conditions were developed.

The results of the NRC staff's review of the hydrodynamic load definition techniques and the Mark I containment plant unique analyses are described in the "Mark I Containment Short Term Program Safety Evaluation Report," NUREG-0408, December 1977. As discussed in this report, the NRC staff has concluded that each Mark I containment system would maintain its integrity and functional capability in the unlikely event of a design basis loss-of-coolant accident (LOCA) and, therefore, that licensed Mark I BWR facilities can continue to operate safely, without undue risk to the health and safety of the public, during an interim period of approximately two years, while a methodical, comprehensive Long Term Program is conducted.

As discussed in Section III.C of NUREG-0408, of all of the plant parameters that were considered in the development of the hydrodynamic loads for the STP, only two parameters are expected to vary during normal plant operation; these are (1) the drywell-wetwell differential pressure; and (2) the suppression chamber (torus) water level. Subsequent to the submittal of the PUA, the licensee was requested to submit proposed Technical Specifications which assure that the allowable range of these two parameters during facility operation would be in accordance with the values utilized in the PUA.

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The licensee has been operating this facility with differential pressure control to enhance the safety margins of the containment structure since early 1976. This evaluation provides a more detailed basis for establishing the allowable range of drywell-wetwell differential pressure and torus water level, in order to quantify containment safety margins. This amendment incorporates these parameters into the Technical Specifications with the associated limiting conditions for operation and surveillance requirements.

By letters dated November 5, 1976 and April 15, 1977, as supplemented August 29, 1977, the licensee proposed changes to the facility Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for differential pressure control and torus water level. Our evaluation of these proposed changes follows:

II. EVALUATION

The licensee has proposed certain Technical Specification requirements for the purpose of assuring that the normal plant operating conditions are within the envelope of conditions considered in their PUA. These Technical Specification changes establish (1) limiting condition for operation (LCOs) for drywell to torus differential pressure and torus water level, and (2) associated surveillance requirements. All other initial conditions utilized in the PUA are either presently included in the Technical Specifications or are configurational conditions which have been confirmed by the licensee and will not change during normal operation.

As indicated on Table III-1 of NUREG-0408, the licensee has submitted a request to allow operation without drywell/torus differential pressure control. In this document, Northern States Power Company (NSP) provided information on the peak stresses in the torus ring and shell, and the peak compressive forces in the torus support columns, without a differential pressure being maintained between the drywell and the wetwell. The peak stress intensities in the torus ring and shell, and the peak compressive forces in the torus support columns are presented for both the minimum and the maximum torus water levels. They are presented with and without the 33 percent increase in the hydrodynamically induced portion of these stresses and forces, as stipulated for the Short Term Program (STP). The justification for dropping the 33 percent increase is that the pool swell loads resulting from the recent GE one quarter scale tests are approximately 80 percent of the values reported in the Short Term Program Report. Pool swell, dead and seismic loadings are considered in the calculation of the stress intensities and loads and these are presented for the torus ring and shell, and torus support columns, respectively, along with the corresponding strength ratios and the comparisons with the Code allowables.

Two additional modifications have been performed to the existing structures. The first modification consisted of the reinforcement of the torus support column to shell connections. These capacities have increased the code allowable loads from 765K to 940K, while the ultimate capacity was lowered from 3150K to 2820K. The second modification consisted of adding reinforcement to the vent header support columns to increase their code allowable capacities from 74K to 132K and their ultimate capacities from 276K to 413K.

With the reinforcing of the vent header support columns, the code allowable capacity is greater than the STP loading of 131K. In addition, the strength ratio is 0.32 which is less than the 0.50 ratio allowed for the STP.

For the case of dead and seismic loadings superimposed upon the pool swell loadings without the drywell-wetwell ΔP and increased by 33 percent, at the maximum torus water level (the case which results in the highest pool swell loads), the inside column loads, and the local primary plus the secondary stresses in the ring and shell meet the code allowables. All the strength ratios are less than the 0.50 permitted under the STP.

For the case of dead and seismic loadings superimposed upon the pool swell loadings without ΔP and not increased by 33 percent, at the maximum water level the code allowables are satisfied everywhere except for the loads on the outside column shell and pin connections, and for the local primary stresses in the torus ring. In these locations, code allowables are only exceeded by 14, 8 and 6 percent, respectively, which is within the error band of the conservatively estimated pool swell loading function. However, all strength ratios are less than 0.50.

Based upon the above information, we find that sufficient margins of safety against failure currently exist in the torus and torus support columns to withstand the effects of dead, seismic, and pool swell loadings without the drywell-wetwell pressure differential. Therefore, the staff concludes that the controls on the maintenance of the drywell-wetwell pressure differential at the Monticello Nuclear Generating Plant may be safely removed.

The torus water level is not expected to vary significantly during normal operation, unless certain systems connected to the suppression pool are activated. The torus water level would normally be monitored whenever such systems are in use. Therefore, we find that inclusion of periodic torus water level surveillance requirements in the Technical Specifications is not required.

We have reviewed the torus water level monitoring instrumentation system proposed by the licensee with regard to the number of available channels and the instrumentation accuracy. This type of instrumentation is typically calibrated at six-month intervals. To assure proper operation during such intervals, two monitoring channels for torus water level have been provided, such that a comparison of the readings will indicate when one of the channels is inoperative or drifting. The errors in the instrumentation are sufficiently small relative to the magnitude of the measurement (i.e., a maximum torus water level measurement error of 10% of the difference between the maximum and minimum torus water level) that they may be neglected, based on the expected load variation with torus water level.

III. 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 Section 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.

IV. CONCLUSION

The proposed Technical Specifications will provide the necessary assurance that the plant's operating conditions remain within the envelope of the conditions assumed in the Plant Unique Analysis (PUA) performed in conjunction with the Mark I Containment Short Term Program. The PUA supplements the facility's Final Safety Analysis Report (FSAR) in that it demonstrates the plant's capability to withstand the suppression pool hydrodynamic loads which were not explicitly considered in the FSAR. We therefore conclude that the proposed changes to the Technical Specifications are acceptable.

We further conclude, 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: October 30, 1978