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NORTHEAST NUCLEAR ENERGY COMPANY

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November 10, 1982
Docket No. 50-245
B10605

Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 1
Core Spray Sparger Analysis

During a meeting with the NRC Staff on October 29, 1982 in the Bethesda offices, personnel from Northeast Nuclear Energy Company (NNECO) discussed reportable indications discovered near the sparger junction box welds of Junction Box "D" of Core Spray System (CSS) "A" of Millstone Unit No. 1 and presented the corrective measure to be employed to prevent the complete separatic.. of the sparger arm from the junction box.

This measure is a clamp which was installed on the junction box to minimize the potential for further crack propagation. However, in the event that this break propagates around the sparger arm circumference, this clamp will keep the sparger arm aligned with the junction box and limit the crack width to 3/32 -inch (crack area = 1.045 in^2).

The purpose of this analysis is to assess the performance of the CSS assuming the upper limit on crack size as mentioned above. Specifically, the CSS flow rate per spray nozzle has been calculated and compared to the design requirements for this system. Assessment of CSS performance, under cracked and uncracked spray sparger conditions, was performed using a hand calculation. An assessment of CSS performance using the RELAP 5 transient thermal hydraulic blowdown code is also in progress to verify the results of our calculations.

In the calculation, the CSS was modeled as a resistance circuit. Modeling the system in this way, the pump was calculated to produce 4125 gpm flow to the CSS, exceeding the design flow of 3600 gpm by 14.5%. This flow was calculated by using the pump performance curve for a Millstone Unit No. 1 core spray pump compared to the system head loss versus flow curve. The prestartup test data for the CSS were used to calculate the system head loss versus flow curve. The flow rate per nozzle in this case was calculated to be 36.8 gpm (vs. 32.14 gpm per nozzle to meet design conditions).

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The presence of the 1.045 in^2 crack in the sparger arm resulted in a pump flow increase and a CSS flow of 4175 gpm. The flow rate through the crack under these conditions was calculated to be 255 gpm. Spray flow rates from the sparger arm near the break (the most affected nozzles) were calculated to be 34.6 gpm per nozzle. These flows are 6.0% below the no break flow but still 7.6% above the design requirement of 32.14 gpm/nozzle. This analysis shows that core spray performance is not degraded even with the postulated worst-case break. Thus design basis requirements for ECCS performance remain fulfilled. We are evaluating the appropriateness of changing the surveillance test procedure to reflect the altered flows with the postulated worst-case break. The results of this review will be the subject of future correspondence.

With the docketing of this submittal, it is NNECO's understanding that all information required to support startup from the current refueling outage has been supplied to the Staff. We of course remain available to respond to any inquires you may have on these or other matters associated with plant startup.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil

W. G. Counsil
Senior Vice President

J. P. Cagnetta

By: J. P. Cagnetta
Vice President Nuclear and
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