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Docket No. 50-336
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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Potential Failure of Low Pressure Safety Injection System Piping

While performing a fault tree analysis in support of the Millstone Unit No. 2 internal events Probabilistic Risk Assessment (PRA), a potential failure mechanism was identified that could lead to the overpressurization of low pressure safety injection (LPSI) system piping. We have performed an assessment of this concern for reportability under 10CFR50.72 and 10CFR50.73, and concluded that this condition does not satisfy the reporting threshold of either criteria. Nonetheless, in light of our policy to keep the NRC informed of matters below reporting thresholds, we are bringing this matter to your attention.

Discussion

While performing a fault tree analysis in support of the Millsione Unit No. 2 Internal Events Probabilistic Risk Assessment, it was determined that a failure of the cold leg injection line check valves 2-SI-114, 124, 134, or 144 to close, under certain conditions, could result in the overpressurization of LPSI system piping (See Figure attached). The following scenario was assumed to lead to overpressurization of LPSI system piping upstream of LPSI injection motor operated valves (MOVs) 2-SI-615, 625, 635 and 645 (these MOVs define a piping class boundary):

> Given a safety injection actuation signal (SIAS) with reactor coolant system (RCS) pressure conditions above 500 psig, the high pressure safety injection (HPSI) and LPSI pumps would start and the LPSI injection MOVs would open. At these pressures, the LPSI pumps would enter into the minimum flow recirculation mode. The scenario subsequently involves hypothesizing that one or more of the LPSI injection check valves 2-SI-114, 124, 134 or 144 fail to fully close following a previous opening and allow significant reverse flow leakage. This would result in the potential to lift the LPSI thermal expansion relief valve 2-SI-439 and pressurize LPSI system piping beyond its design pressure of 500 psig and up to the shutoff head of the HPSI pumps plus any static head due to elevation differences (approximately 1230 psig). Pressurization could occur despite the lifting of relief valve 2-SI-439 because of its limited capacity.

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Because these check valves do not serve as containment isolation valves nor RCS pressure isolation valves, leak rate testing is not performed on these valves. As a consequence, the failure probability for each check valve to close is assumed to be relatively high. Notwithstanding this conservative assumption, the LPSI injection check valves are in the Millstone Unit No. 2 maintenance/inspection check valve program, resulting in one of these four check valves being disassembled and inspected every cycle. However, given this assumption, in combination with a relatively high frequency of events that result in a SIAS at RCS pressures greater than 500 psig, it is assumed that LPSI overpressurizations could potentially occur at a frequency that we believe warrants further attention. As an example, a preliminary quantification of the Millstone Unit No. 2 Internal Events PRA shows that the contribution to core melt frequency (CMF) sequences, involving cutsets where significant reverse flow leakage through one or more of the above valves results in LPSI system pipe rupture, is 12% of the overall CMF. In reaching this figure, the PRA assumed a finite probability of pipe rupture, given LPSI system overpressurization, consistent with methods used in other PRA studies sponsored by industry and the NRC.

In evaluating the safety significance of the above scenario, an estimate of the LPSI piping stress upstream of the LPSI injection MOVs was performed. This evaluation shows that overpressurization of LPSI system piping to the HPSI pump shutoff head results in a stress level below the yield point and therefore indicates, with high confidence, that the piping pressure boundary would remain intact. However, due to the potential consequences of this scenario and due to the frequency of this event being estimated at 4E-3 times per year, a reverse flow/backseat test of the LPSI injection check valves will be conducted no later than the 1992 refueling outage. This reverse flow testing will be conducted during each subsequent refueling outage.

This information, while similar to that contained within NRC Information Notice No. 89-36, is being provided in the spirit of keeping the NRC Staff apprised of issues of some safety importance which are below reporting thresholds. Additionally, it could be of greater significance to other licensees with a similar configuration but larger LPSI piping relief capability (this could result in a significant flow diversion path) or a significantly greater differential pressure between high and low pressure injection pumps. No specific action is being requested of the NRC by submittal of this information.

Please contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E. J. Mroczka
Senior Vice President

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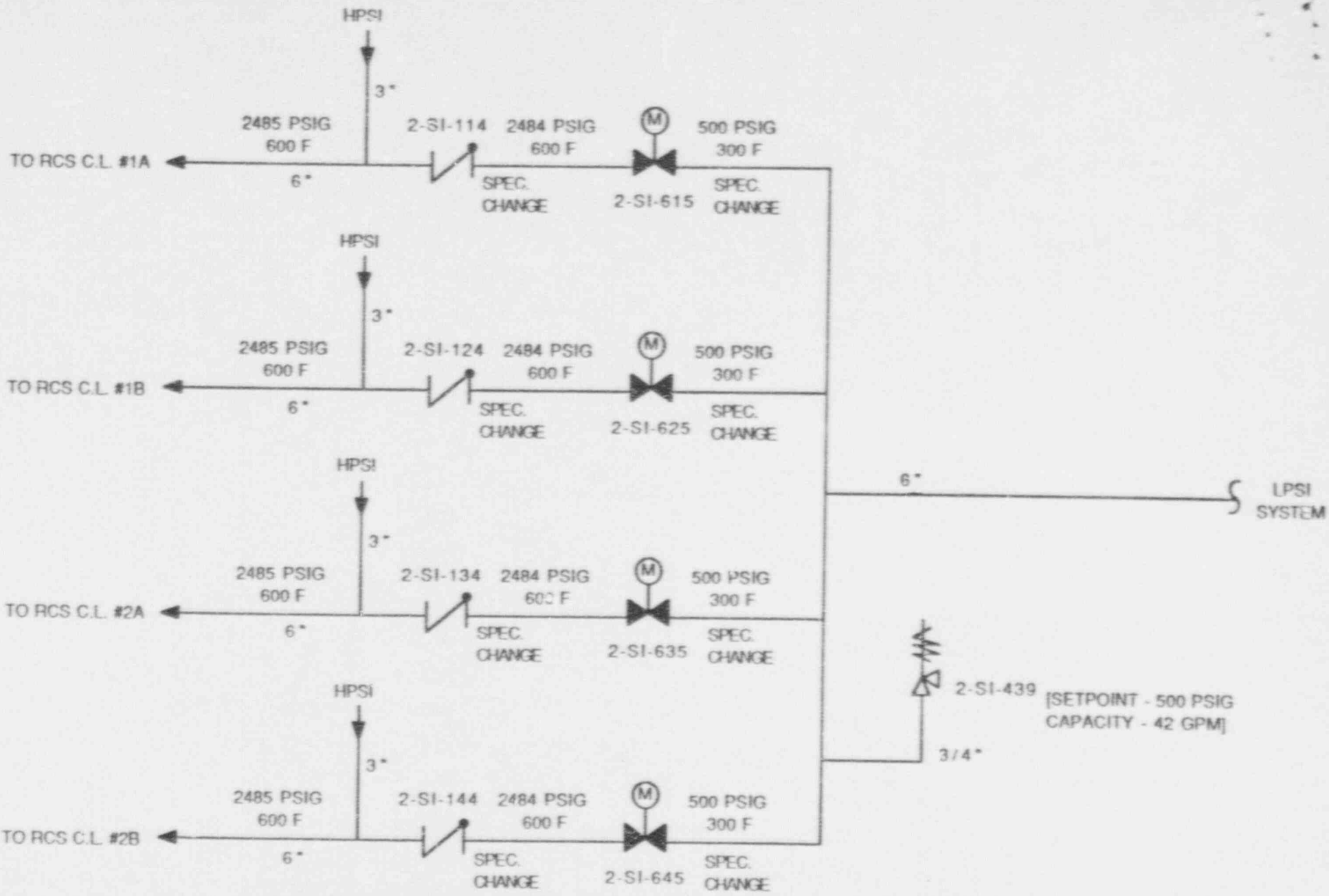

FIGURE 1 Portions of Safety Injection Piping