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

SAFETY EVALUATION
CONTAINMENT PURGING AND VENTING
MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2
DOCKET NO. 50-336

I. INTRODUCTION

A number of events have occurred over the past several years which directly relate to the practice of containment purging and venting during normal plant operation. These events have raised concerns relative to potential failures affecting the purge penetrations which could lead to degradation in containment integrity, and, for PWRs, a degradation in ECCS performance. By letter dated November 28, 1978, the Commission (NRC) requested all licensees of operating reactors to respond to certain generic concerns about containment purging or venting during normal plant operation. The generic concerns were twofold:

(1) Events had occurred where licensees overroad or bypassed the safety actuation isolation signals to the containment isolation valves. These events were determined to be abnormal occurrences and were so characterized in our report to Congress in January 1979.

(2) Recent licensing reviews have required tests or analyses to show that containment purge or vent valves would shut without degrading containment integrity during the dynamic loads of a design basis loss of coolant accident (DBA-LOCA).

The NRC position of the November 1978 letter requested licensees to cease purging (or venting) of containment or limit purging (or venting) to an absolute minimum. Licensees who elected to purge (or vent) the containment were requested to demonstrate that the containment purge (or vent) system design met the criteria outlined in the NRC Standard Review Plan (SRP) 6.2.4, Revision 1, and the associated Branch Technical Position (BTP) CSB 6-4, Revision 1.

II. DISCUSSION AND EVALUATION

The Containment Purge System at Millstone Nuclear Power Station, Unit 2, utilizes two 42-inch butterfly-type isolation valves in series in the purge supply line and two 42-inch butterfly-type isolation valves in series in the purge exhaust line. Two 6-inch hydrogen purge lines utilizing butterfly-type valves for containment isolation are also available.

The licensee responded to the NRC position letter of November 1978, by requesting (in a letter dated April 27, 1979) a change to their Technical Specification No. 3.6.1.7, which would require that the 42-inch containment purge supply and exhaust isolation valves be kept locked-closed whenever the plant is operating in modes 1 through 4. Amendment No. 61, issued October 6, 1980, imposed these requirements.

The licensee did not address the 6-inch butterfly-type isolation valves used for containment ventilation.

III. CONCLUSIONS AND RECOMMENDATIONS

We have reviewed the submittals regarding the Millstone Nuclear Power Station, Unit 2, Containment Purge/Ventilation System against the guidelines of BTP CSB 6-4, Revision 1, "Containment Purging During Normal Plant Operations." Although the 6-inch hydrogen purge line meets the requirements of Section B.1.c of BTP CSB 6-4, Revision 1, our view is that venting should be limited. The plant is inherently safer with closed purge/vent isolation valves than with open lines which require valve action to provide containment integrity. We, therefore, recommend that the licensee be requested to commit to limiting the use of the hydrogen purge line to a specified annual time that is commensurate with identified plant safety needs.

We have been recommending debris screens be provided for the containment purge/vent systems at operating plants. The debris screens should be of Seismic Category I design and installed about one-pipe-diameter away from the inner side of the inboard isolation valve. The piping between the debris screens and the isolation valves should also meet Seismic Category I design standards. However, for Millstone-2 with the 42-inch purge valves closed per TS in modes 1 through 4 and with the suction location for the 6-inch hydrogen purge lines at the top of containment (over 70 feet above any lagged pipes), we find no need to require debris screens.

In addition, as a result of numerous reports on the unsatisfactory performance of resilient seals in butterfly-type isolation valves due to seal deterioration, periodic leakage integrity tests of the 6- and 42-inch butterfly isolation valves in the purge/vent systems are necessary; see Enclosure 5 for background criteria. Therefore, the licensee should also propose a Technical Specification for testing the valves in accordance with the following testing frequency:

> "The leakage integrity tests of the 6-inch isolation valves in the hydrogen purge lines shall be conducted at least once every three months.
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> The leakage integrity tests of the 42-inch isolation valves in the containment purge lines shall be conducted at least once every six months."

The purpose of the leakage integrity tests of the isolation valves in the containment purge and vent lines is to identify excessive degradation of the resilient seals for these valves. Therefore, they need not be conducted with the provision required for the Type C isolation valve test in 10 CFR Part 50, Appendix J. These tests would be performed in addition to the

quantitative Type C tests required by Appendix J, and would not relieve the licensee of the responsibility to conform to the requirements of Appendix J.

Subject to successful implementation of the above recommended actions, we find the purge/vent system design and operating practices for Millstone-2 to be acceptable.