**NORTHEAST UTILITIES**

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
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October 16, 1985

Docket No. 50-245
B11822

Director of Nuclear Reactor Regulation
Attn: Mr. Christopher I. Grimes, Chief
Systematic Evaluation Program Branch
U. S. Nuclear Regulatory Commission
Wasington, D. C. 20555

References: (1) J. F. Opeka letter to C. I. Grimes, dated May 17, 1985.

(2) H. L. Thompson letter to J. F. Opeka, dated July 31, 1985.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 1
Integrated Safety Assessment Program

In Reference (1), Northeast Nuclear Energy Company (NNECO) provided a proposed scope for the Integrated Safety Assessment Program (ISAP) review of Millstone Unit No. 1. In Reference (2), the Staff formally issued the results of the ISAP screening review process, establishing the scope of ISAP for Millstone Unit No. 1 and initiating issue-specific evaluations. Reference (1) also indicated that for each issue or topic included in ISAP, NNECO would provide a discussion of the safety objective and an evaluation of the plant design with respect to the issue being addressed to identify specific items to be considered in the integrated assessment. In accordance with this commitment, reviews for the following ISAP topics are attached.

- ISAP Topic 1.42 - "MSL Leakage Control System"

If you have any questions concerning the attached review, please contact us.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Senior Vice President

By: C. F. Sears
Vice President

cc: J. A. Zwolinski



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# ISAP TOPIC NO. 1.42

# MSL LEAKAGE CONTROL SYSTEMS

October, 1985

ISAP Topic No. 1.42
MSL Leakage Control Systems

I. Introduction

General Design Criterion 54 of 10CFR50, Appendix A requires, in part, that piping systems penetrating primary containment be provided with leak detection, isolation, and containment capability having redundancy, reliability, and performance capabilities that reflect the importance of isolating these piping systems. Implementation of General Design Criterion 54 ensures that total site radiological effects do not exceed 10CFR100 guidelines in the event of a postulated loss-of-coolant accident (LOCA).

In May, 1975, the NRC issued Revision 0 of Regulatory Guide 1.96, Design of Main Steam Isolation Valve Leakage Control Systems for Boiling Water Reactor Nuclear Power Plants." Reg. Guide 1.96 describes a method acceptable to the NRC for implementing General Design Criterion 54.

However, dose calculations performed by the NRC in 1975 indicated that operation of the main steam isolation valve leakage control system (MSIVLCS) required for some BWRS might result in higher offsite accident doses than if the system is not used and the integrity of the steam lines and condenser is maintained. As stated in NUREG-0933 (Reference 2): "The dose calculations performed by AAB at that time, assumed nonoperation of the MSIVLCS and took credit for cold trapping of iodine and volatiles in the steam lines and condenser. In addition, long hold-up times and release either through stack filters via the waste gas treatment system or leakage from the steam systems was assumed. Leakage from the main steam condenser system would be small because normal operation requires that leakage be maintained at a low level. Integrity of these systems is not assured during earthquakes since they are not designed for SSE. However, the probability of failure of both the fuel and these systems due to earthquake is small. By contrast, the MSIVLCS draws a negative pressure downstream of the MSIVs to collect leakage past the valve seats and processes the collected leakage through a safety grade filtration system for release to the environment. Relatively little cold trapping or holdup time occurs when the MSIVLCS is used. Therefore, the calculated doses for releases through the MSIVLCS are greater than the calculated doses for releases through the steam system unless the integrity of the steam system is lost."

As previously stated, calculations performed by the NRC in 1975 for postulated design basis accidents indicated a potential increase in offsite releases of iodine by two to three orders of magnitude for proper operation of MSIVLCS, when compared to the calculations of releases assuming the steam system is intact and MSIV leakage is eventually released through the condenser. However, the above calculations assumed a relatively low rate of MSIV leakage. A survey conducted by the NRC in July 1982 (References 4 and 5) indicated a high frequency of measured MSIV leakage at some operating plants which may be in excess of the Technical specification limit of 11.5 SCFH by more than two orders of magnitude. The NRC indicated in Reference 5 that they were considering the need for improved MSIV maintenance, more frequent MSIV testing or installation of MSIVLCS.

To address the above concerns, NUREG-0471 (Reference 3) Task C-8 was initiated to investigate whether:

- o the MSIVLCS currently recommended in Reg. Guide. 1.96, Revision 1 (June 1976) is acceptable; and
- o MSIVLCS should be backfitted to BWRs that do not have such systems.

The purpose of this topic is to address the applicability of Task C-8 to Millstone Unit No. 1.

II. Review Criteria

1. 10CFR50, Appendix A, General Design Criterion 54
2. Regulatory Guide 1.96
3. I&E Bulletin 82-23

III. Related Topics/Interfaces

1. ISAP Topic 1.03, "Containment Isolation - Appendix A Modifications"
2. ISAP Topic 1.14, "Appendix J Modifications"

IV. Evaluation

Millstone Unit No. 1 does not employ a MSIVLCS. Main steam isolation valve leakage is limited to 11.5 SCFH in accordance with Technical Specification 4.7.f.2.C. A review of Millstone Unit No. 1 performance for the period 1970 to the present (approximately fifteen years) indicated that the MSIVs have failed to meet the limiting condition for operation during surveillance tests on several occasions. This same review evidenced no individual MSIV leakage rate in excess of 40SCFH. The causes for such leakage included packing leaks, damaged pilot and main discs, and worn discs and seats.

The situation at Millstone Unit No. 1 is in sharp contrast to other plants (Reference 5) where MSIV leakage rates in excess of 3400 SCFH have been experienced.

As discussed in Reference 2, NRC estimates of dose consequences related to MSIV leakage unrealistically assume that:

- o two MSIVs in series, which would both be expected to have high leakage, would pass the large leakage expected for each valve. In actuality, this would result in a cascading leakage path and a reduction in through-leakage by a factor of 2 or 3.
- o for those scenarios in which high MSIV leakage is expected and the SWGTS is unavailable due to the loss of emergency AC power, MSIV leakage would be released directly for the duration of the accident. In reality, direct releases might be prevented by isolation of the

steam line by non-safety valving. Also, the SWGTS would have a high likelihood of being recovered upon recovery of AC power and releases could be again intercepted before the accident had run its full course.

## V. Conclusions

Since Millstone Unit No. 1 does not employ a MSIVLCS, concerns regarding adverse impact of system operation on dose consequences in the event of a postulated design basis accident are not applicable to Millstone Unit No. 1. Further, although excessive MSIV leakage rates have been experienced at some nuclear power plants, that is not the case for Millstone Unit No. 1. Existing maintenance practices are adequate to ensure valve operability and limit MSIV leakage.

In most, cases, MSIV maintenance involves preventative refurbishment of the valve seat and poppet. Surveillances conducted monthly serve to demonstrate proper valve operation.

Based on the above information, NNECO maintains that no need exists for addition of a MSIVLCS at Millstone Unit No. 1.

## VI. References

1. Regulatory Guide 1.96, "Design of Main Steam Isolation Valve Leakage Control Systems for Boiling Water Reactor Power Plants," U. S. Nuclear Regulatory Commission, June 1976.

2. NUREG-0933, "A Prioritization of Generic Safety Issues," U. S. Nuclear Regulatory Commission, June 1985.

3. NUREG-0471, "Generic Task Problem Descriptions (Categories B, C, and D)," U. S. Nuclear Regulatory Commission, June 1978.

4. Memorandum for D. Eisenhut from E. Jordan, "Main Steam Isolation Valve (MSIV) Survey," July 1, 1982.

5. I&E Bulletin 82-23, "Main Steam Isolation Valve (MSIV) Leakage," July 16, 1982.