NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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TITLE (4)

Failure to Perform Applicable 10CFR50 Appendix J Tests to Satisfy Technical Specifications

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	27	96	96	046	04	04	17	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	[X] 50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION	MONTH	DAY	YEAR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE).	[X] NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 27, 1996, with the plant shut down and the reactor in the COLD SHUTDOWN condition, a self assessment program review determined that several containment penetrations did not have adequate local leak rate tests (LLRTs) performed pursuant to the requirements of 10CFR50 Appendix J. Not all testable connections were tested on ten 18" atmospheric control system valves, and there are no testable flanges on two 2" atmospheric control system valves. Additionally, a piping flange in the head spray system is not appropriately tested. On March 18, 1997, with the plant shut down and the reactor in the COLD SHUTDOWN condition, a review of existing Appendix J test procedures identified that the Traversing Incore Probe (TIP) system has had inadequate LLRTs. The affected penetrations are X-35A, B, C, D and E. The cause of this condition was due to significant deficiencies in the Appendix J Program resulting in a lack of adequate program implementation and a non-conservative interpretation of Appendix J requirements, in that the "as-built" systems and equipment configuration were not identified as needing modifications when the 10CFR50, Appendix J criteria were implemented at Millstone Unit No. 1. The three root causes are: 1) Management commitment to the Appendix J program was weak; 2) There was a lack of support for conservative decision making at Millstone Unit No. 1; 3) Appendix J training was not consistent with the Millstone Unit No. 1 system configurations. The failure to perform individual Type B leakage tests in accordance with the requirements of 10CFR50 Appendix J results in the inability to adequately demonstrate primary containment integrity, which is required to be maintained by Millstone Unit No. 1 Technical Specification 3.7.A.3. This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications. Procedure revisions and modifications to make the penetrations testable and subsequent testing will be completed prior to startup from the current refueling outage. There were no safety consequences as a result of this event.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

I. Description of Event

On June 27, 1996, with the plant shut down and the reactor in the COLD SHUTDOWN condition, a self assessment program review determined that several containment penetrations did not have adequate LLRTs performed pursuant to the requirements of 10CFR50 Appendix J. Not all testable connections were tested on ten 18" atmospheric control system valves, and there are no testable flanges on two 2" atmospheric control system valves. Additionally, a piping flange in the head spray system is not appropriately tested.

On March 18, 1997, with the plant shut down and the reactor in the COLD SHUTDOWN condition, a review of existing Appendix J test procedures identified that the TIP system has had inadequate LLRTs. The TIP system containment penetrations are unique in that they consist of a piping penetration within a flanged guard pipe that is open to the containment. This configuration provides both a Type C leakage path through the TIP guide tubes and a Type B leakage path through the flanged guard pipe seals. The affected penetrations are X-35A, B, C, D and E.

The failure to perform individual Type B leakage tests in accordance with the requirements of 10CFR50 Appendix J results in the inability to adequately demonstrate primary containment integrity, which is required to be maintained by Millstone Unit 1 Technical Specification 3.7.A.3. This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications. There were no safety consequences as a result of this event.

II. Cause of Event

Based on the completion of the root cause evaluation and the Appendix J Self-Assessment, the cause of the event is modified as follows:

The cause of this condition was due to significant deficiencies in the Appendix J Program resulting in a lack of adequate program implementation and a non-conservative interpretation of Appendix J requirements, in that the "as-built" systems and equipment configuration were not identified as needing modifications when the 10CFR50, Appendix J criteria were implemented at Millstone Unit No. 1. The three root causes are:

1. Management commitment to the Appendix J program was weak.
2. There was a lack of support for conservative decision making at Millstone Unit No. 1.
3. Appendix J training was not consistent with the Millstone Unit No. 1 system configurations.

The cause of inadequate testing of the TIP system is the same as above. The cause of not having determined this deficiency during the Appendix J Program Self-Assessment and the previous investigation for the LER 96-046-03, is a personnel error. The previous reviews did identify the flanges as containment barriers, however, it was incorrectly determined that they were included in the leak test of the outboard valves.

III. Analysis of Event

Atmospheric Control Vacuum Breakers 1-AC-1A- J; Penetration X-202A - H

The self actuated check valves (vacuum breakers) of the drywell to torus penetrations form a part of the atmospheric control system and the valve components are part of the reactor building boundary. Five testable gasketed joints exist on each of the valves, namely the flanged body cover, and the shaft packing

gland and the stuffing box located at both ends of the disc shaft. Each of these containment boundaries is testable and should receive a Type B LLRT in accordance with Appendix J. However, only the double gasketed flanged body cover was appropriately tested per Appendix J. The shaft packing gland and stuffing box (at each shaft end) utilize pipe plugs to communicate between the inner and outer barrier at the lantern gland and between the o-rings respectively. These boundaries have not been LLRT tested. When the pipe plugs are removed, a Type B test can be performed to verify the leak tightness of these potential leak paths. This configuration exists on all ten of the Atwood & Morrill Co., 18 inch Vacuum Breakers used in the Torus to drywell penetrations.

Since three of the five Type B tests are performed on static seals, it is unlikely that seal degradation would lead to a sufficient loss of leak tightness to result in a failed test. The review of the historical data of Type B test results of the body flange for all vacuum breakers has shown consistent leak tightness. The flange seals have shown continued acceptable leak tightness as indicated by LLRT results. Vacuum breakers are manually exercised quarterly to confirm operability. Furthermore, two vacuum breakers have been overhauled each refueling outage since 1985. The overhaul includes replacement of the packing and o-rings, and a complete inspection of all internal parts. The ILRT does challenge all the leakage barriers of the valves including the shaft seals, and no measurable leakage was observed at these locations.

Torus Exhaust Bypass Valve 1-AC-9 & 1-AC-12 (X-25/202D)

The torus exhaust bypass valves are 2" air operated containment isolation valves located on a branch line from drywell vent penetration X-25/202D. Valves 1-AC-9 & 1-AC-12 exhibit standard fiber gasket material on both the upstream and down stream flange connections and do not exhibit testable flanges in either the upstream or downstream direction. The gaskets in the downstream direction (outside of containment) are tested during Type C testing of the system valves; however the inboard gaskets are only tested during the Type A ILRT of the overall containment. Consecutive ILRTs have been performed during 1991 (RFO13), 1994 (RFO14) and is scheduled for current RFO15. No measurable leakage has been observed at these locations. Since the previous ILRTs have been identified as being potentially invalid (LER 96-026-01), resulting from the inability to perform Type C testing on several penetrations, any reference to historical ILRTs as a basis for acceptance has been eliminated where appropriate.

Head Spray System Flange X-17

A piping system flange exists between the inboard containment isolation check valve 1-HS-5 and the outboard motor operated containment isolation valve 1-HS-4 to allow removal of the head spray piping when removing the reactor head cover. It was previously thought that the containment boundary which includes the flange is subjected to the test pressure during Type A ILRT of the overall containment. Subsequent review of the configuration identified that the flange is not independently tested as part of the ILRT. The existing test configuration does not provide for an appropriate Type B LLRT of this flange. An alternate test configuration will provide for an appropriate Type B LLRT of this flange.

TIP System Penetrations X-35A, B, C, D and E

The TIP system containment penetrations X-35A, B, C, D and E exhibit flanged connections with double o-ring seals outboard on each of the drywell penetrations, which have not been Type B tested.

The TIP system exhibits blind flanges which the system piping passes through the center. The flanges communicate directly with the containment atmosphere. The blind flanges exhibit double o-ring seals and are bolted to a weld neck flange at each of the outboard drywell penetrations X-35A, B, C, D, and E. The

five penetrations are located at each of the TIP drives and the nitrogen supply line to the TIP indexing units. During the self assessment review and review of the existing LLRT procedure, it was considered that the procedure captured testing of these joints. However, closer scrutiny of the configuration as a result of knowledge gained from another utility, and validated while upgrading the local leak rate test procedure for the TIP system, revealed the lack of Type B testing of the double o-ring seals. Implementing the Type B tests to challenge the o-ring seals will allow conformity to the requirements of Appendix J. The o-ring joints have seen Type A testing during performance of each of the ILRT tests.

This condition was identified as a result of a questioning attitude while updating the LLRT procedures for these penetrations. A contractor independent of the Appendix J Program Self-Assessment effort who was supporting the review of LLRT/ILRT procedures was able to identify this condition due to a similar design that he observed at another plant.

The failure to adequately perform Appendix J testing on these penetrations calls into question the ability to demonstrate the operability of the primary containment during the past operating cycles. Since Millstone has failed to adequately demonstrate primary containment integrity, as required by Technical Specification 3.7.A.3, this event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications.

Appendix J Program Self-Assessment Results

A self-assessment of the Appendix J program, including a review of all containment penetrations and associated drawings, LLRT procedures and the ILRT procedure was completed. The following summarizes the reportable issues identified;

1. Several system penetrations did not have their Type B or Type C minimum pathway penalty applied to the ILRT test result. The penetrations are identified as X-9A/B, X-10A, X-11B, X-14, X-15, X-16A/B, X-17, X-18, X-19 X- 23, X-24, X-25, X-30f, X-34f, X-35A-E, X-36, X-37A-D, X-38A-D, X-39A/B, X-42, X-43, X-47, X-200B, X-202G, X-205 and X-211A/B. The impact on the ILRTs performed since 1980 can be completely assessed once the modifications are made to containment penetrations X-9A/B and the ILRT is performed. This activity has been addressed in LER 96-026.

2. Type C testing of the Main Steam Isolation Valves (MSIV) is performed at a reduced pressure at 25 psig and added to the total of all Type B and Type C tests, and compared to the Technical Specification limit of 0.6 La. The measured leakage at 25 psig is not corrected to the equivalent leakage of 43 psig as identified in Inspection Report 50-245/77-05, dated April 18, 1977. Failure to correct equivalent leakage prohibits proper summation of Type B and Type C tests.

3. Millstone Unit No. 1 Technical Specifications do not state a separate acceptance criteria for the air lock testing. Paragraph III.D.2.(b).(iv) of Appendix J states "The acceptance criteria for air lock testing shall be stated in the Technical Specifications". The surveillance procedure identifies an administrative limit rather than an acceptance criteria.

4. Area temperature survey, in accordance with ANSI N45.4-1972, is required in advance of ILRTs to verify containment temperature is adequately acquired with the specific test configuration. No documentation identified to indicate that a temperature survey has been done.

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5. The LLRT performed on Main Steam drain valve, 1-MS-5, is in the reverse direction and considered a non conservative test. No evidence or justification has been identified to verify the validity of the reverse direction test.

6. The ILRT containment air pressure and verification flow connections on containment penetrations X-37A and X-38A were not tested after the ILRT for addition to the 1994 ILRT results, since the configuration does not allow Type C testing.

7. Containment penetration X-35E, TIP Purge, has only one containment isolation valve at the penetration where two barriers are required per Appendix A design criteria. The one containment isolation valve is Type C tested.

8. For penetrations X-25 and X-202D, containment isolation valves 1-AC-9 and 1-AC-12 have exemptions for reverse direction testing based on these valves being butterfly valves, however these valves are plug valves and the reverse direction testing is non-conservative.

9. For penetration X-30f and X-34f, 1-RR-111A/B did not have test connections to allow Type C test.

10. For penetration X-30f and X-34f, test configuration for 1-RR-25A/B did not allow for adequate draining of water for Type C test.

11. For the following containment penetrations, the existing procedures do not allow adequate draining and/or venting of the penetration piping thus has resulted in an invalid Type C test of the valve. Any modifications or adjustments to these valves may inhibit our ability to assess the impact of the improper test configuration, thus these issues are included as reportable:

X-211A	Post Accident Sampling	1-PAS-24, 1-PAS-25
X-14	RWCU	1-CU-2A
X-16A/B	Core Spray	1-CS-5A/B
X-42	Standby Liquid Control	1-SL-7
X-47	Reactor Recirculation	1-RR-37

IV. Corrective Action

The Appendix J program review has been completed and additional discrepancies which affect the LLRTs and ILRTs have been included in this LER supplement.

As a result of the root cause investigation of this event that has been completed, the following are revised corrective actions:

Northeast Nuclear Energy Company (NNECO) will complete by May 31, 1997 (prior to performing the next ILRT), the program administrative control document, "Containment Leak Rate Testing Program Administration," which will identify the specific roles and responsibilities of implementing and maintaining the program. This document will also list the primary containment isolation barriers with associated basis for each penetration.

NNECO will determine Appendix J Program staffing requirements and obtain program management approval by May 31, 1997.

NNECO will develop an Appendix J action plan which will identify the importance of conservative decision making regarding implementation of Appendix J requirements from all perspectives including design, operation and engineering. NNECO will incorporate this plan into an administrative procedure, "Containment Leak Rate Testing Program Administration," by May 31, 1997.

NNECO will determine Appendix J programmatic enhancement training requirements and include in administrative procedure, "Containment Leak Rate Testing Program Administration," by May 31, 1997. NNECO will implement this training by September 30, 1997.

Modifications will be made to the procedure for performing the local leak rate test on the vacuum breakers to include testing of the shaft packing and stuffing box. LLRTs will be performed before the overall containment Type A ILRT, and prior to startup for operating cycle 16.

Modifications will be made to the containment side bolting flange of valves 1-AC-9 & 1-AC-12, and changes will be made to the procedure to perform the LLRT on the bolting flange between valves 1-HS-4 and 1-HS-5 during refueling outage 15. LLRTs will be performed before the overall containment Type A ILRT, and prior to startup for operating cycle 16.

The LLRT procedure will be revised to perform Type B testing of each flanged connection at penetrations X-35A, B, C, D and E prior to the next required LLRT during the current outage.

The Appendix J Program is being reviewed as part of the ongoing 10CFR50.54(f) review effort.

All personnel associated with the Appendix J program reviews are now aware of the event identified on March 18, 1997, and have heightened sensitivity for this potential as the Appendix J Self-Assessment review findings are dispositioned.

The containment penetration barriers defined from the Appendix J Program Self-Assessment has been re-verified by an independent reviewer as a result of the condition identified on March 18, 1997.

Additional Corrective Actions From Appendix J Program Self-Assessment

The following corrective actions, to be completed prior to startup for operating Cycle 16, are the result of reportable items identified during the Appendix J program review.

- All LLRT surveillance procedures, which require revision to provide a valid LLRT, will be revised prior to performance of the as-left LLRT prior to startup for operating Cycle 16.
- Evaluate the need to modify Millstone Unit No. 1 Technical Specifications to include air lock leakage acceptance criteria.
- Revise ILRT procedure to include correct containment penetration valve lineup for each containment penetration and include containment temperature survey in accordance with ANSI N45-4 -1972 prior to performance of ILRT for RFO 15.

- Modify containment penetrations X-30f and X-34f to allow valid Type C test of isolation valves 1-RR-111A/B and 1-RR-25A/B.
- Modify surveillance procedures for the following penetrations to allow valid Type C test:

X-211A	Post Accident Sampling	1-PAS-24, 1-PAS-25
X-14	RWCU	1-CU-2A
X-16A/B	Core Spray	1-CS-5A/B
X-42	Standby Liquid Control	1-SL-7
X-47	Reactor Recirculation	1-RR-37

- Revise ILRT procedure to provide LLRT for containment air pressure and verification flow connections on containment penetrations prior to performance of ILRT prior to startup for operating Cycle 16.
- Revise MSIV LLRT procedure to correct leakage to accident pressure of 43 psig.
- Modify containment penetration X-8 to allow valid LLRT on 1-MS-5 (committed to in LER 96-026-01 Commitment No. B15675-1).
- Modify containment penetration X-35E by installing an additional containment isolation valve and associated test connections. Revise LLRT procedure to test the new containment isolation valve and implement testing.
- Modify penetrations X-25 and X-202D to allow valid Type C test.

V. Additional Information

Similar Events

LER 96-026-01

Manufacturer Data

None.