



POLICY ISSUE **(Information)**

January 20, 1995

SECY-95-011

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: FINAL STATUS REPORT ON THE MARK I CONTAINMENT PERFORMANCE
IMPROVEMENT PROGRAM

PURPOSE:

As stated in SECY-93-240 of August 25, 1993, the Containment Performance Improvement (CPI) program is reaching conclusion. Therefore, in this final report to the Commission, the staff summarizes the status of the CPI program.

BACKGROUND:

The Mark I CPI program was implemented in response to the Commission's directives in the staff requirements memorandum (SRM) of July 11, 1989. Since that time, the staff has periodically reported the status of the CPI program to the Commission in SECY-90-023, SECY-90-206, SECY-91-036, SECY-91-261, SECY-92-054, SECY-92-288, and SECY-93-240.

DISCUSSION:

In the SRM of July 11, 1989, the Commission approved the Mark I CPI program and gave the staff five directives for action. The Commission directives and the staff actions in response to the requirements in the SRM are summarized as follows.

- (1) "The staff should approve the immediate installation of a hardened vent by any Mark I licensee who chooses to do so under Section 50.59 of the Commission's rules."

Response: All licensees for the operating Mark I plants that did not originally have hardened wetwell vent paths, with the exception of Browns Ferry Units 1 and 3, have completed the modifications under Section 50.59 of the Commission's rules. Browns Ferry 1 and 3 have been in extended

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shutdown. The licensee for Browns Ferry 1 and 3 has committed to complete the modifications before restarting the plants.

The staff has developed Temporary Instruction (TI) 2515/121 (Attachment 1) which is being used to inspect and verify the adequacy of the hardened wetwell vent modifications.

- (2) "The staff is directed to initiate plant-specific backfit analyses for each of the Mark I plants to evaluate the efficacy of requiring the installation of hardened vents at such plants. This should be accomplished taking into consideration the individual plant designs and their respective capabilities to withstand overpressurization events. Where the backfit analysis supports imposition of such a requirement, and after consideration of information from licensees, the staff should proceed accordingly with the imposition of a requirement that such plant install a reliable, hardened vent. The objective should be to complete this process, including installation of hardened vents where justified, within three years. The staff's backfitting schedule should include consideration of the refueling outage schedule for each plant in order to ensure that reasonable plant implementation dates are met."

Response: The staff performed plant-specific backfit analyses for those Mark I plants whose licensees initially declined to make hardened wetwell vent modifications under Section 50.59 of the Commission's rules. The plant-specific analyses supported the imposition of the backfit requirement. However, the staff did not issue orders imposing the requirements, because the licensees subsequently agreed and made the modifications voluntarily under Section 50.59 of the Commission's rules. The staff will inspect and verify the adequacy of the modifications, using TI 2515/121.

- (3) "For any plant which installs a hardened venting system, the staff should assure that appropriate operational and emergency procedures and training are in place to ensure effectiveness in maintaining containment integrity and in ensuring that venting pathway options and the authority for usage are clearly delineated."

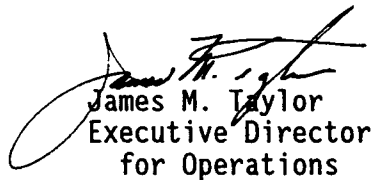
Response: The licensees for Mark I plants have adopted the staff's approved emergency procedures guidelines for developing plant-specific emergency operating procedures (EOPs) and training. The staff will verify that the plant operations personnel have implemented the EOPs and training regarding containment venting in a manner that ensures the containment integrity and illustrates a clear understanding of venting pathway options and usage authority.

- (4) "The staff should expedite its actions in the implementing of the Station Blackout Rule for Mark I plants."

Response: The staff completed its reviews of Mark I plant licensees' implementation of the Station Blackout Rule. The staff found that all Mark I plant licensees are in compliance with the rule.

- (5) "The staff should forward to each Mark I owner the information regarding the other Mark I containment performance improvements the staff has identified for consideration during implementation of the Individual Plant Examination (IPE) program. All Commissioners strongly encourage the staff and industry to take the necessary steps to implement the IPE program in an expeditious fashion."

Response: The staff considered the following additional Mark I CPI program improvements: (1) providing an alternate supply of water, (2) enhancing reactor pressure vessel automatic depressurization system (ADS) capability, and (3) implementing the emergency procedures guidelines. The staff informed licensees of Mark I containment plants about these improvements in Supplement 1 to Generic Letter 88-20, "Individual Plant Examinations for Severe Accident Vulnerabilities - 10 CFR 50.54(f)." The staff has received responses from the licensees of Mark I containment plants. The actions proposed by the licensees are summarized in Attachment 2. The staff will continue its reviews of the actions proposed in Attachment 2 until satisfactory resolutions are reached and documented in the safety evaluations of the licensees' submittals in response to Generic Letter 88-20.


James M. Taylor
Executive Director
for Operations

- Attachments: 1. Temporary Instruction 2515/121
2. Summary of Mark I Features from IPE Submittals

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NRC INSPECTION MANUAL

SCSB

TEMPORARY INSTRUCTION 2515/121

VERIFICATION OF MARK I HARDENED VENT MODIFICATIONS (GL 89-16)

SALP FUNCTIONAL AREA: PLANT OPERATIONS (SOOPS)

APPLICABILITY: ALL BWR MARK I SITES (EXCEPT PILGRIM AND PEACH BOTTOM)

2515/121-01 OBJECTIVES

To determine the licensee's compliance to commitments made in response to Generic Letter 89-16, "Installation of Hardened Wetwell Vent."

2515/121-02 BACKGROUND

The hardened vent program is an element of the Mark I Containment Performance Improvement Program. The GL 89-16 actions are identified as Multi-Plant Action (MPA) Item B-112. This TI implements a SECY-91-261 commitment by the staff to conduct verification inspections.

As a result of the Mark I Containment Performance Improvement Program, the Commission directed the staff to approve the immediate installation of a hardened vent by any Mark I licensee who chooses to do so under 10 CFR §50.59 (Ref: Staff Requirements Memorandum, dated July 11, 1989). The directive also stated that the staff should ensure that appropriate operational and emergency procedures and training are in place to ensure effectiveness in maintaining containment integrity and in ensuring that venting pathway options and authority for usage are clearly delineated.

GL 89-16 was issued on September 1, 1989. In response to this letter, Mark I licensees committed to design and implement hardened vent systems under the provisions of 10 CFR 50.59. The BWR Owners' Group (BWROG) proposed general design criteria (S.D. Floyd letter dated March 30, 1990) which were reviewed by the staff. The staff approved the Owners' Group criteria (with clarifications) in a letter to Mr. Floyd dated April 16, 1990. A copy of the approved criteria is attached (Appendix A).

A hardened vent was installed and inspected at Pilgrim prior to the issuance of GL 89-16. Also, an inspection has been completed at Peach Bottom 2 & 3. These facilities need not be reinspected.

2515/121-03 INSPECTION REQUIREMENTS

03.01 Review the licensee's commitments made in response to GL 89-16.

03.02 Verify that the licensee's modification package documentation conforms to 10 CFR 50.59 requirements.

03.03 Walk down accessible system piping to verify that the as-built installation conforms to the licensee's design criteria.

03.04 Verify that plant operations personnel have implemented plant procedures and training regarding emergency venting of the containment for protection against failure due to overpressure.

2515/121-04 INSPECTION GUIDANCE

General

In preparation for the inspection, review the system design as described in the modification documentation (10 CFR 50.59), and compare it to the approved BWROG guidance, commitments made by the licensee in response to GL 89-16, and the supplemental information of Appendix B enclosed with this TI.

Specific

04.01 Review the contents of GL 89-16, the licensee's written response(s), any relevant NRR acknowledgements sent back to the licensee, and the NRR-approved general design criteria, Appendix A to this TI.

04.02 Assure that the licensee's plant design change modification documentation is consistent with 10 CFR 50.59 administrative requirements, and properly addresses Unresolved Safety Question criteria. Pay particular concern to verifying that the licensee has determined that the modification does not degrade the performance or reliability of pre-existing safety systems.

04.03. Walk down the actual vent path, to the extent practical, verifying that as-built piping is sized and arranged in accordance with the requirements of the modification documentation.

04.04 Review the plant emergency operating procedures (EOPs) and documents relating to post-accident use of the hardened vent. Meet with training personnel and/or plant operators to confirm that the operators are familiar with the modification and associated new or changed procedures. In addition, ensure that there are no inconsistencies between the Emergency Plan and the EOPs regarding emergency containment venting.

2515/121-05 REPORTING REQUIREMENTS

Document inspection findings in a routine inspection report.

2515/121-06 COMPLETION SCHEDULE

The inspection activities described by this TI are to be completed by May 12, 1996.

Start the inspection after the licensee has acknowledged completion of the modification.

2515/121-07 EXPIRATION

This Temporary Instruction will expire on May 12, 1996.

2515/121-08 CONTACTS

Direct any questions regarding this TI to Mohan Thadani, NRR at 301-504-1476.

2515/121-09 STATISTICAL DATA REPORTING

For RITS input, the actual inspection effort should be recorded against 2515/121.

For SIMS reporting, the MPA number for this TI is MPA-112.

2515/121-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility. The Containment Systems and Severe Accident Branch initiated this TI.

10.02 Resource Estimate. It is expected that 32 hours of direct inspection effort will be required to complete this TI (two inspectors for two days). Request the assistance of the NRR project manager for performing this TI. The project manager's inspection effort may be combined with the periodic performance of the 10 CFR 50.59 inspection (Inspection Procedure 37001).

10.03 Parallel Inspection. Procedure IP 37001 may be performed in parallel.

10.04 Training. There are no special training requirements identified for this TI.

2515/121-11 REFERENCES

Generic Letter 89-16, "Installation of a Hardened Wetwell Vent (microfiche 51145-331).

Letter from A. Thadani to S. Floyd, chairman BWR Owners Group, dated 04/16/90 (microfiche 70254-091).

END

Enclosures:

Appendix A, Hardened Vent General Design Criteria
For Mark I Containments

Appendix B, Supplemental Information

APPENDIX A

HARDENED VENT GENERAL DESIGN CRITERIA FOR MARK I CONTAINMENT

The hardened vent will provide the BWR Mark I containment with an exhaust line from the wetwell vapor space to a suitable release point; e.g., stack, reactor building or turbine building roof, etc. The basic design objective shall be to mitigate the TW (loss of decay heat removal) sequence. This "hard vent" system shall meet the following criteria:

- a. The vent shall be sized such that under conditions of: 1) constant heat input at a rate equal to 1% of rated thermal power (unless lower limit justified by analysis), and 2) containment pressure equal to the primary containment pressure limit (PCPL)*, the exhaust flow through the vent is sufficient to prevent the containment pressure from increasing.
- b. The hardened vent shall be capable of operating up to the PCPL. It shall not compromise the existing containment design basis.
- c. The hardened vent shall be designed to operate during conditions associated with the TW sequence. The need for station blackout venting will be addressed during the individual plant examination (IPE).
- d. The hardened vent shall include a means to prevent inadvertent actuation.
- e. The vent path up to and including the second containment isolation barrier shall be designed consistent with the design basis of the plant.
- f. The vent path shall be capable of withstanding, without loss of functional capability, expected venting conditions associated with the TW sequence.
- g. Radiation monitoring shall be provided to alert control room operators of radioactive releases during venting.
- h. The hardened vent shall ensure that no ignition sources are present in the pipe way.

*PCPL - If the PCPL was established due to the limitations of the containment isolation valves being below the containment design pressure, then a reevaluation of the PCPL for the hardened vent flow path should be reconsidered if the existing valves no longer proved to be the limitation.

END

APPENDIX B SUPPLEMENTAL INFORMATION

Remote Control

Although capability for initiation of venting via the hard vent pathway from the control room is provided, capability for termination of venting from the control room is not necessarily provided.

Capability to Open Vent Path at Low Containment Pressure

The rupture disk will have been selected to have a design blowout pressure less than the containment wetwell and drywell maximum pressure capability and greater than the containment automatic isolation pressure setpoint and peak design basis accident pressure. If it serves as one of the two required containment penetration isolation barriers, it must be capable of being tested to P_a (calculated peak containment internal pressure related to the design basis accident and specified either in the Technical Specifications or associated Bases).

It is desirable (but not a requirement) that the rupture disk have provisions to enable it to be intentionally blown-out at lower containment pressures by local manual application of compressed air.

Pre-existing Automatic Controls

The hard vent will originate at (a) its own new torus penetration, (b) a branch off a pre-existing penetration inboard of two pre-existing containment isolation valves, (c) a branch off a pre-existing penetration between two pre-existing isolation valves, or (d) a branch off a pre-existing line outboard of two pre-existing isolation valves. In the (c) case, a pre-existing containment isolation valve is part of the hard vent path. This valve is typically a containment vent/purge valve.

Pre-existing vent purge valves may have automatic closure on high radiation instrumentation [TMI Item II.E.4.2(7)], in addition to automatic closure on Group isolation signal, with keylock switch override capability. Such automatic control features remain functional.

AC Power Dependence

It is desirable, (but not a requirement) that the hard vent isolation valves be capable of being opened from the control room under station blackout conditions. It is recognized that the air compressors for air motor operators may be lost under station blackout conditions. A bottled air or nitrogen source, or local manual operation capability provides means to open valves in the event air receivers are exhausted.

Low Point Drains

Piping low points where rainwater or condensation could collect in a manner that would result in unacceptable waterhammer loads in the event the vent is opened at the Primary Containment Pressure Limit (PCPL) will have provisions for periodic drainage to a waste removal system.

Piping Classification

The piping downstream of the second isolation device need not be safety-grade. However, if a new penetration is created or an existing penetration is shared with the hard vent, part of the piping may be subject to the special mechanical engineering design criteria for torus-attached piping specified in a "Plant Unique Analysis Report," as part of the Mark-I Containment Long Term Program.

Line Sizing

The hardened vent path is designed to pass steam flow equivalent to 1% decay heat power assuming a pressure at the PCPL in the containment. Although vent flow would initially be a mixture of steam and nitrogen, pipe sizing calculations may be based on pure steam flow. The licensee's modification design package will include a piping pressure drop analysis.

Fuse Pulling

Hard vent isolation valves which are not part of pre-existing systems are normally de-energized by having their operator (but not position indicator) fuses pulled.

Position Indication

Continuous position indication is provided for any new containment isolation valves and any other valves used to control hard vent flow. The position indication will be available regardless of whether or not the valve operator is energized.

Appendix J and IST Test Capability

Containment penetrations and associated isolation devices are subject to the requirements of 10 CFR 54(o) for local leak rate testing and 10 CFR 50.55a(f) for inservice testing. Plant procedures are provided for such tests. A valve which is deactivated by fuse removal is considered a passive barrier and is not subject to periodic IST valve full-stroke cycling requirements.

Technical Specifications

The hard vent system has no LCO or surveillance requirements related to the hard vent. Pre-existing TS for containment isolation valves and containment integrity are applicable to the torus hard vent penetration.

EOPs

BWROG EPGs Rev 4 and the Plant Specific Technical Guidelines (PSTGs) developed from the EPGs provide guidance for the development of EOPs. Rev 4 (the latest revision) of the EPGs was issued prior to GL 89-16, and thus does not provide definitive guidance on vent path selection and use of the hard vent. Thus, the EOPs might not provide clear guidance on hard vent use.

END

Summary of Mark I Features from IPE Submittals

Plant Name	EPG REV 4?	Hard Wetwell Vent	Alt. Water Supply	Enhanced ADS?
Peach Bottom	Yes	Yes	Yes	No
Browns Ferry	*	Yes(Unit 2 only)	*	*
Brunswick	Yes	Yes	Yes	Yes
Cooper	Yes	Yes	No**	No
Dresden	Yes	Yes	Yes	No
Duane Arnold	*	Yes	Yes	*
Fermi 2	Yes	Yes	Not Needed***	Not Needed***
Fitzpatrick	Yes	Yes	Yes	N ₂ only
Hatch	Yes	Yes	Yes	No
Hope Creek	*	Yes	Yes	*
Millstone 1	Yes	Yes	Yes	No
Monticello	*	Yes	Yes	No
Nine Mile Pt 1	*	Yes	Yes	*
Oyster Creek	Yes	Yes	Yes	No
Pilgrim	Yes	Yes	Yes	Yes
Quad Cities	Yes	Yes	Yes	No
Vermont Yankee	Yes	Yes	Yes	Yes

* Response to this item was not provided in the licensee's response to Generic Letter 88-20

** This issue was raised with the licensee in NRC letter of 10/21/94, as a part of IPE review.

*** Fermi 2 is connected to two independent power grids, one of which has the two plant divisional power. The third grid provides power to an independent shutdown system located completely outside of the nuclear power blocks. With this system, the only operator action required inside the nuclear power blocks is to scram the reactor. Cold shutdown conditions can be achieved using this system. Furthermore, the power for this system can be provided by a black start combustion gas turbine located next to the shutdown facility. Thus, the staff concluded that these two CPI enhancements are "not needed."