UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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

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