

NRC INSPECTION MANUAL

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INSPECTION PROCEDURE 61715

VERIFICATION OF CONTAINMENT INTEGRITY

PROGRAM APPLICABILITY: 2515 (BASIC*)

61715-01 INSPECTION OBJECTIVES

*01.01 Verify that the licensee has established containment integrity prior to commencing heatup of the reactor coolant system (RCS) above 200°F.

01.02 Evaluate the adequacy and implementation of the licensee's procedures designed to ensure and maintain containment integrity.

01.03 Evaluate the adequacy and implementation of the licensee's procedures designed to mitigate contamination release in the event of a loss of containment integrity following a loss-of-coolant accident (LOCA).

61715-02 INSPECTION REQUIREMENTS

*02.01 Perform the following containment integrity checks:

- *a. Verify through local observation the proper positioning of all electrical or mechanical barriers and isolation valves associated with at least 10 separate containment penetrations.
- *b. Witness the air lock local leak rate test performed after final containment closure.
- *c. Walk down a system designed to maintain containment integrity or to mitigate contamination release in the event of a LOCA.

02.02 Perform the following containment integrity checks:

- a. Verify through local observation the proper positioning of all electrical or mechanical barriers and isolation valves associated with at least 20 separate containment penetrations.

* Asterisk annotated sections are performed by the resident inspector only, prior to the commencement of heatup of the reactor coolant system above 200°F, as required in the minimum inspection program of IE MC 2515.

- b. Determine if the 20 penetrations reviewed above meet the required General Design Criteria (GDC 55, 56, or 57) of 10 CFR Appendix A.

- c. Walk down a system designed to maintain containment integrity or to mitigate contamination release in the event of a LOCA.

02.03 Review the licensee's records of the periodic surveillances of primary containment integrity as required by Technical Specifications (TS). This review should cover surveillances performed during the previous 6 months of unit operation with RCS temperature above 200°F. At a minimum, the following periodic surveillances shall be included in the test records reviewed:

- a. verification of the proper alignment, operability, and isolation time, as applicable, for all primary containment penetrations with the exception of air locks
- b. demonstration of air lock operability
- c. verification of the main steam isolation valve leakage control system operability

02.04 Verify that the combined local leakage rate for all Type B and C tested containment penetrations was determined to be within specifications if any of these containment penetrations were opened following the current (or last) Type A, B, or C test.

02.05 Determine if post-maintenance operability was verified during the past 6 months for containment air locks and five primary or secondary containment isolation valves prior to RCS heatup above 200°F.

02.06 Review the licensee records for the past 6 months of unit operation with RCS temperature above 200°F to ensure that TS required surveillances were performed in the following categories:

- a. verification of licensee operation within the required containment pressure and temperature limits
- b. demonstration of the operability of containment pressure and temperature reducing systems
- c. verification of the operability of the combustible gases monitoring and control systems
- d. control of containment building venting and purging operations

02.07 Review the licensee records for the past 6 months of unit operation with RCS temperature above 200°F to ensure that TS required surveillances were performed to demonstrate the integrity and/or operability of one of the following systems:

- a. spray additive system
- b. iodine removal system (PWRs)/standby gas treatment system (BWRs)
- c. penetration room exhaust air cleanup system

d. secondary containment/shield building and associated systems

02.08 Review maintenance requests, equipment operability records, and licensee event reports applicable to containment penetration boundaries, LOCA pressure reduction systems, and LOCA contamination release mitigation systems for a month of unit operation with RCS temperature above 200°F. Verify that all appropriate TS required actions were performed as necessary and that the maintenance/modification requests contained adequate information regarding restoration of the containment boundary.

61715-03 INSPECTION GUIDANCE

General Guidance

- a. Containment integrity must be maintained whenever RCS temperature is above 200°F to ensure in the event of a LOCA that contamination would not be released in unacceptable quantities to the outside environs. One measure of this integrity is taken through the performance of containment integrated leakage rate tests (CILRTs). The CILRT ensures that at peak LOCA pressures, containment leakage would not result in an unacceptable release. However, satisfactory completion of the CILRT does not guarantee that containment integrity is or would remain intact during plant heatup, operation above 200°F, or in the event of a LOCA. This procedure is designed to assist in evaluating the licensee's normal state of containment integrity and the operability of the containment support systems, exclusive of the containment leakage rate requirements examined in IE MCs 61720, 70307, 70313, and 70323. Programmatic inspection emphasis shall be placed on verifying that containment integrity was established before RCS heatup after each cold shutdown outage because the majority of containment breaches occur at this time.
- b. The requirements of this inspection procedure are generally applicable to all boiling water reactors (BWRs) and pressurized water reactors (PWRs). The inspector should use this procedure as is applicable to the facility being inspected; making inspection modifications as necessary to ensure the adequate verification of all containment integrity requirements and commitments.
- c. Specific details on each individual TS surveillance are not provided in this procedure as they often vary widely depending on the type of containment, the vendor, and licensee-specific TS requirements.

03.01 Specific Guidance

- *a. Inspection Requirement 02.01. This inspection requirement shall be performed during each unit cold shutdown outage before final containment closeout in preparation for RCS heatup above 200°F. The only exception to this requirement would be when such an inspection was previously performed within the last 31 days.

- *b. Inspection Requirement 02.01a. Each performance of this requirement fulfills the biweekly inspection requirement of section 02.03f of IE MC 71707.

- c. Inspection Requirements 02.01c and 02.02b
 - 1. The walkdowns conducted should cover the following types of systems:
 - (a) containment penetration isolation actuation systems (not including the actual isolation valves)
 - (b) containment penetration pressurization systems
 - (c) containment pressure and temperature reduction systems
 - (d) combustible gases monitoring and control systems
 - (e) contamination (e.g., iodine) removal systems
 - (f) secondary containment and associated support systems
 - (g) ice condenser
 - 2. The inspector shall verify the proper alignment of each component in the containment support system inspected.
 - 3. Each performance of this requirement fulfills the weekly inspection requirement of section 02.02a of IE MC 71707.

- d. Inspection Requirement 02.03a. The inspector shall evaluate the following licensee surveillance test records for the past 6 months of unit operation with RCS temperature above 200°F:
 - 1. Monthly alignment check of each penetration that is required to be closed for a LOCA and is not capable of being closed by operable automatic isolation valves. This check is not required for any closed penetration located inside containment if that penetration is locked, sealed, or otherwise secured in the closed position. However, these penetrations shall be verified closed during each cold shutdown at least every 92 days.
 - 2. Demonstration of the operability of TS specified containment isolation valves
 - (a) by verifying actuation upon initiation of a containment isolation test signal during cold shutdown or refueling at least once per 18 months.
 - (b) by verifying that the valve isolation time is within TS limits at the frequency prescribed by the ASME Boiler and Pressure Vessel Code and applicable Addenda.

(c) (subatmospheric containments only) by cycling each weight or spring loaded check valve through one complete cycle and verifying that the check valve responds appropriately to changing differential pressures. Valves testable during plant operation with RCS temperature above 200°F shall be verified operable at least every 92 days, whereas, those not testable shall be tested during cold shutdown or refueling at least once per 18 months.

3. Demonstration of the operability of each TS specified reactor instrumentation line excess flow check valve at least every 18 months (BWRs only).
4. Verification of the operability and alignment of the containment purge supply and exhaust isolation valves (PWRs) or the drywell and suppression chamber purge supply and exhaust isolation valves (BWRs).
5. Verification of the operability and alignment of the containment vacuum relief valves (PWRs) or the suppression chamber - drywell vacuum breakers and the reactor building - suppression chamber vacuum breakers (Mark I BWRs).
6. Determination that all required containment and drywell penetrations are isolated before conducting containment purge system operability checks; verification that purge flow is maintained below 5000 cfm during this operability check (BWRs only).

e. Inspection Requirement 02.04

1. The total combined local leakage rate shall be less than or equal to 0.60 La, where:

La is the maximum allowable leakage rate when measured at Pa.

Pa is the calculated peak internal containment pressure related to the design-basis accident and is specified in the TS or associated bases.

All local leakage rate tests must be performed at a pressure not less than Pa.

2. If the combined local leakage rate is greater than 0.60 La when operating above 200°F, the containment integrity must be restored within an hour or the unit must be placed in the cold shutdown operational mode. If already in cold shutdown, the containment integrity must be reestablished before increasing RCS temperature above 200°F.

f. Inspection Requirement 02.06b. The pressure and temperature reducing system surveillance records reviewed shall include those conducted during the previous year for the following:

1. containment spray systems
2. containment cooling fans (N/A to BWRs or subatmospheric PWRs)
3. ice condenser and related systems and components including the following:
 - (a) ice bed
 - (b) ice bed temperature monitoring system
 - (c) ice condenser doors
 - (d) inlet door operation monitoring system
 - (e) personnel access doors and equipment hatches between the upper and lower containment compartments
 - (f) air recirculation system
 - (g) ice condenser floor drains
 - (h) refueling canal drains
 - (i) divider barrier seal
4. steam jet ejectors and mechanical vacuum pumps (subatmospheric PWRs only)
5. suppression pool and cooling system; drywell - suppression pool differential pressure and monitoring instrumentation (BWRs only)

61715-04 REFERENCES

10 CFR 50, Appendix J

Standard Technical Specifications

END