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1. Persons Contacted

D. Carver, Volumetrics Consulting Engineer
K. Dahlberg, Site Maintenance Superintendent
*W. Drews, Superintendent of Technical Services
P. Duggan, Consulting Engineer, Bechtel
T. Perkins, General Superintendent
*T. Roman, Station Superintendent
J. Shea, Asst. Supervisor of Operations
*M. Silliman, Technical Superintendent
B. Taylor, Supervisor of Instrument and Control

*Denotes those present at the exit interview.

The inspector also interviewed other members of the operations, instrument and control, engineering, and maintenance staffs.

2. Previous Inspection Item Update

(open) Inspection Items (50-220/75-21-01 and 06): These items relate to the licensee's compliance with 10 CFR 50, Appendix J (App. J). Due to the plant's design configuration, the licensee is unable to fully conform to the requirements of App. J. He has documented these areas in correspondence to the NRC and is awaiting disposition of his exemption requests.

(closed) Unresolved Item (50-220/79-03-01): This item was also reviewed in inspection report 79-06. The only remaining open aspect relates to test length. In both 1979 and 1981 the licensee conducted a 24 hour integrated leak rate test in accordance with his Technical Specifications (TS). A TS change request has been submitted to allow an eight hour test, but, until that is approved, the licensee will continue to perform the 24 hour test. This item is closed.

(closed) Unresolved Item (50-220/79-03-02): This item was also reviewed in inspection report 79-06. The only remaining open aspect relates to the Drywell and Recirculation Pumps' Cooling Penetration. Plant design does not permit full App. J testing of these penetrations. They are addressed in unresolved item (50-220/75-21-01) and are part of the Appendix J exemption request package under review by the NRC. This item is therefore closed.

(open) Unresolved Item (50-220/77-01-03): Reverse Direction Testing: The licensee tests a number of containment isolation valves with differential pressure in the reverse direction as compared to the post-accident case. In Inspection 77-01, the inspector asked for a list of penetrations so tested and documentation as to the conservatism of these tests. The licensee's representative stated that an engineering review was performed and the results of it would be provided. This item remains open pending receipt and review of the data.



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(closed) Unresolved Item (50-220/78-07-03): In a letter dated 3/2/77 to the NRC the licensee committed to testing the containment spray heat exchangers each cycle in conjunction with the local leak rate test program. This testing is a result of identified leakage through these heat exchangers causing the initial 1975 CILRT to fail. In 1979 the initial attempt of the CILRT again failed, this time due primarily to leakage through the containment spray - raw water system intertie valves. These valves have now also been added to the licensee's local leak rate test program. The inspector reviewed the test procedure and test data from the last two refueling outages (1979 and 1981). No discrepancies were identified. This item is closed.

3. IE Bulletins

Bulletin 78-09, BWR Drywell Leakage Paths Associated with Inadequate Drywell Closures, describes instances where drywell closures, such as the drywell head and hatches, have lifted off during Type A integrated leak rate tests and leaked excessively, even though previously passing Type B leak rate tests. The Bulletin calls for additional controls to ensure that drywell closures are made in a reproducible manner. Containment integrity, which is proved during the Type A test, is then assured for subsequent closures. The inspector reviewed procedures: M.P. 1.8, "Installation of Containment Head", Rev. 1 and Rev. 2; M.P. 2.2, "Maintenance of the Equipment Hatch", Rev. 2; and instruction manual, "Operating and Maintenance Instructions for Air Locks and Closures, NMP-1" by Chicago Bridge and Iron Company dated 2/21/66. The licensee's controls for the drywell head installation meet the Bulletin's guidelines except that no torque values are used. Additionally, equivalent guarantees are not provided to ensure that the head is reproducibly installed. The licensee's representative stated that a new hydraulic tensioner was being fabricated and that consideration would be given to establishing its torque values. The inspector further noted that there are several other drywell closures that unseat with accident pressure and which have no torque values specified for their installation; for example, the drywell head manway and torus manways. This Bulletin remains open pending establishment of controls to ensure that all containment closures are made in a reproducible manner.

4. Containment Integrated Leak Rate Test (CILRT)

a. Procedure Review

(1) Documents Reviewed

- "Integrated Leak Rate Test of Primary Containment. PCILRT (Type A Test)." Rev. 8 and Rev. 9
- Technical Supplement to Petition for Conversion from Provisional Operating License to Full Term Operating License and Amendment 1 to the same.
- Reports of Primary Containment Leak Rate Tests from 1969, 1970 and 1979.



-- 10 CFR 50, Appendix J (App.J)

-- ANSI N45.4-72, "Leakage-Rate Testing of Containment Structures for Nuclear Reactors"

-- ANSI/ANS-56.8-1981, "Containment System Leakage Testing Requirements"

(2) Findings

The inspector reviewed the CILRT procedure to determine compliance with regulatory requirements. Based on this review, the inspector provided comments to the licensee's representatives in the following areas:

- (i) The main steam lines were not drained as required by App. J, paragraph III.A.1.(d);
- (ii) There was no procedural guidance on leakage surveys or actions to be taken if excessive leakage was identified during the test as discussed in App. J, paragraph III.A.1.(a);
- (iii) The procedure did not provide for proper radiological monitoring of the containment atmosphere prior to depressurization;

The licensee's representative acknowledged these comments and addressed them in Revision 9 to the CILRT Procedure, which was approved 6/8/81.

b. Instrumentation

(1) Documents Reviewed

- Procedure No. N1-ICP-ILRT, "Integrated Leak Rate Test Instrument Calibration", Rev. 0 and completed data from procedure dated 5/81.
- Instrument Calibration Records of Volumetrics, Inc.
- Audit of Instrument Calibration performed by Bechtel, Inc.
- ANSI/ANS-56.8-1981, "Containment System Leakage Testing Requirements"

(2) Findings

The inspector reviewed the instrumentation system and instrument calibration records to verify instrument accuracy, repeatability and calibration traceability to the National Bureau of Standards. The inspector noted that calibrations had been performed to the more stringent requirements of the newly approved standard ANSI/ANS-56.8-1981.



The inspector also observed the operation of various pieces of instrumentation during the test. The inspector noted that the high range reactor vessel level instrument used for the test but not during normal operations had not been calibrated. The licensee wrote a calibration procedure and completed a calibration of the level instrument prior to beginning the CILRT.

c. Test Preparations

The inspector witnessed a sampling of test preparations and prerequisite performances. Items witnessed included:

- Drywell Head Installation, bolt tightening with the use of an air impact wrench supplied by station air;
- Computer program check out;
- Valve lineups and tagging;
- Containment inspection for structural integrity and prohibited items inside the drywell; and
- Repairs to Recirculation Pumps to limit leakage into containment during the CILRT.

d. Test Witness

The inspector in conjunction with the NRC site resident, witnessed various portions of the CILRT. During the tests the inspector noted that:

- the test procedure was approved for performance as required;
- test procedure was in use by personnel performing the test;
- test personnel were suitably qualified;
- test exceptions were appropriately approved and documented;
- test instrumentation was properly calibrated; and
- data was properly logged.

Pressurization for the CILRT commenced at approximately midnight, 6/9/81 and was completed at 6:15 a.m. on 6/10/81 with pressure slightly above the test pressure of 22 psig. The test is a 24 hour reduced pressure test (accident pressure, Pa; is 35 psig). During the first several hours of the test, two improper but conservative valve line ups were identified by the inspectors and corrected. This reduced the initially high leak rate somewhat. By 3:00 p.m. 6/10/81, valid leak calculations could begin.



Leakage was still indicating high and during extensive leakage surveys the licensee identified the following leak paths: air leaks from the shafts of the containment vacuum breakers and through the containment spray heat exchanger tubes, and water leaks from the shutdown cooling lines and the feedwater lines. During the 21 3/4 hours from 3:00 p.m., 6/10 to 12:45 p.m., 6/11 leakage was measured by the CILRT instrumentation as being slightly above 1.5%/Day using the mass point method. This is in excess of the test acceptance criterion of 0.82%/Day and indicates a failure of the initial attempt of the CILRT. The licensee then repacked the shafts of the vacuum breakers, but was unable to take local leakage measurements prior to repacking. In order to correct the containment spray system leaks, a number of tubes in each heat exchanger were plugged. Finally, the licensee isolated the feedwater system from the test and obtained a leak rate of 0.65%/Day at the 95% upper confidence level, which is less than the acceptance criterion of 0.82%/Day. The licensee must repair the feedwater line containment isolation valves and include their post-repair leakage with the other Type C leakage penalties to be added to the Type A (CILRT) test results.

e. Future Activities

The inspector noted that the initial attempts of the 1975, 1979 and 1981 CILRT's had failed to meet the acceptance criteria. Hence, in accordance with paragraph III.A.6.(b) of App. J, the next CILRT is due at the next refueling shutdown or approximately December, 1982, whichever occurs first. The purpose of the Containment Leak Rate Testing Program is to assure containment leaktight integrity throughout the operating cycle. The inspector stated that due to the number of leakage paths identified during the current CILRT and due to the number of failures over the years (of both Type A and Type C tests), an engineering evaluation needs to be made. This evaluation should address whether additional actions (more frequent testing, system design modification, etc.) need to be taken to ensure containment leaktight integrity during the next operating cycle. The licensee acknowledged the need for such an evaluation. This item is unresolved and is designated as item no. (220/81-14-03).

5. Local Leak Rate Testing (LLRT)

a. Documents Reviewed

- Procedure No. N1-ISP 25.2, "Primary Containment Isolation Valves".
- Procedure No. N1-ISP 25.3, "Containment Spray/Raw Water Heat Exchanger Leak Rate Test".
- Completed Test Results from 1981 refueling outage for above two procedures.
- Letter from Schneider to Rusche dated 3/2/77.
- Letter from Dise to Lear dated 5/31/78.
- Documentation of LLRT results during 1977 and 1979 refueling outage.



b. Findings

The inspector performed a brief review of the above documents and witnessed portions of the local leak rate testing for the drywell personnel access hatch and the Emergency Condensor steam line drain valves. Based on this information, the inspector had the following two findings:

- Procedure N1-ISP 25.2 and the other LLRT procedures used at the facility allow testing at below Pa, which is 35 psig. Specifically the test procedures call for testing at 35 ± 1.0 psig. This is not permitted by Technical Specifications or App. J. This item is unresolved pending a conversion of test results for this outage to equivalent 35 psig leakage and revision of test procedures. The item is designated item no. (220/81-14-01); and
- The Leak Rate History Book which is used to demonstrate compliance with Technical Specifications (T.S.) and App. J, is not procedurally controlled per T.S. 6.8.1. This item is unresolved and is designated as item no. (220/81-14-02) pending establishment of formal procedural controls for the book.

6. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in paragraphs 4.e and 5.b of this report.

7. Management Meeting

At the conclusion of the inspection, a meeting was held with plant management (denoted in paragraph 1) to discuss the scope and findings of this inspection. The unresolved items were identified. The NRC resident inspector also attended the meeting.

