



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-327/90-10 and 50-328/90-10

Licensee: Tennessee Valley Authority
6N38 A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-327 and 50-328

License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah 1 and 2

Inspection Conducted: March 5 - 9, 1990

Inspector: John Zeiler 3/26/90
J. Zeiler Date Signed

Approved by: G. A. Bellisle 3/27/90
G. A. Bellisle, Chief Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine unannounced inspection was conducted in the areas of containment local leak rate testing, verification of containment integrity, and review of previous inspection findings.

Results:

The licensee's local leak rate test program was found to meet all NRC requirements. Detailed test procedures and controls have been developed and implemented accordingly. Ongoing leak rate tests for the containment purge valves and airlock door seals were witnessed. Conservative leak rate test practices were being followed and test personnel appeared knowledgeable of test requirements and the use of test instrumentation. Two minor discrepancies were identified from a review of test data from the most recent Unit 1 outage testing, but this was not indicative of programmatic weaknesses.

A limited review was conducted in the area of containment integrity. Startup procedures contained adequate measures and controls to ensure that containment integrity is established and maintained. Technical specification required surveillance procedures and records for the containment airlock, spray system, and vent coolers were reviewed. These systems appeared to be reliable in that operability problems were not identified in the tests reviewed.

A non-cited violation was identified concerning the March 1988 inadvertent issuance of boric acid from Power Stores, paragraph 4.b. The boric acid was issued prior to Quality Control receipt inspection.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *F. Bodine, Engineering Support
- *J. Bynum, Vice President, Nuclear Power Production
- *C. Vondra, Plant Manager
- *M. Burzynski, Site Licensing Manager
- *M. Cooper, Compliance Licensing Manager
- *J. Gates, Technical Support Manager
- *W. Lagergren, Jr., Operations Superintendent
- *S. Spencer, Licensing Engineer
- J. Wheeler, Materials and Procurement Manager

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

NRC Resident Inspectors

- *P. Harmon, Senior Resident Inspector
- K. Jenison, Senior Resident Inspector
- *D. Loveless, Resident Inspector

*Attended exit interview

Acronyms and initialisms used in this report are listed in the last paragraph.

2. Containment Local Leak Rate Testing (61720)

The purpose of the inspection activities in this area was to determine if the licensee's LLRT program was being conducted in compliance with NRC requirements and applicable industry standards.

The following surveillance instructions which control and implement the licensee's LLRT program were examined:

- SI-158.1 Containment Isolation Valve Leak Rate Test, Rev. 29
- SI-159.1.1 Personnel Airlock Pen-X2A Operability and Overall Leakage Test, Rev. 1
- SI-159.1.2 Personnel Airlock Pen-X2B Operability and Overall Leakage Test, Rev. 1
- SI-159.2.1 Airlock Resilient Seal Leak Rate Test, Rev. 0
- SI-159.4.1 Personnel Airlock Operability, Rev. 0
- SI-160 Primary Containment Local Leak Rate Summary, Rev. 4

The inspector verified that the following attributes were included in these procedures to ensure that adequate leak rate tests were conducted:

- (1) All required containment penetration boundaries and CIVs were included in the LLRT program.
- (2) LLRTs were performed at CILRT peak design pressure.
- (3) The LLRT program utilized approved methods for testing containment penetration boundaries and CIVs.
- (4) Penetration leakage rates were determined using the maximum pathway leakage.
- (5) The criteria and response for LLRTs and combined leakage rate failure were incorporated in the test program procedures.

Using procedure SI-159.1, a detailed review was performed for Type C classified CIVs in the following penetrations:

Penetration X-15	Chemical and Volume Control System
Penetration X-30	Safety Injection System
Penetration X-44	Chemical and Volume Control System
Penetration X-51	Fire Protection
Penetration X-64	ERCW
Penetration X-76	Compressed Air System
Penetration X-77	Demineralized Water System
Penetration X-110	Upper Head Injection

The inspector verified that adequate alignments for venting and draining existed, and that adequate valve boundary alignments were provided for each valve tested. The inspector verified that the penetration valve configurations described in the procedure agreed with that of current plant drawings. In addition, the inspector verified that these penetrations conformed to 10 CFR 50, Appendix A, GDC 55, 56, and 57.

The inspector reviewed a sample of completed "As-Found" and "As-Left" Type B and C LLRT results since the beginning of the last outage for Unit 1. Particular attention was devoted to verify that corrective maintenance work was performed for valve test failures and that retests were performed as required. The following two minor discrepancies were identified:

- A July 29, 1988, "As-Found" leak rate test for isolation valve 61-193 located in penetration X-47B was tested at approximately double the required test pressure. The test performer was unable to pressurize the test volume at the required 12.0 psig. The test pressure was increased to 25 psig in order to get a flow rate reading within the range of the one-inch tube rotometer used for the test. The measured leak rate was 754.4 SCFH which exceeded the leak rate acceptance

value of 0.24 SCFH for the valve. The test was declared a failure, maintenance was performed to repair the valve, and a retest was conducted as required. The inspector concluded that the licensee would have performed the same corrective action regardless, had the correct test pressure been used since the measured leakage was so grossly over both the individual valve limit and the overall 0.6La limit of 135.1 SCFH. However, the test performer should have recorded that the valve would not pressurize as opposed to testing at the higher pressure. This appeared to be an isolated event and not a common practice among test personnel. All test personnel were counseled by the licensee to reinforce testing at the correct pressure at all times.

- After maintenance was conducted on Unit 1 valves 30-47 and 30-572, an "As-Left" leak rate test was performed on September 17, 1988. However, the licensee failed to record the leakage result of 0.595 SCFH in procedure SI-158.1, Appendix A, Data Summary Sheet. Consequently, this leakage was not included in the summation of Type B and C leakage as recorded in procedure SI-160. The inspector considered this an isolated event and was not indicative of programmatic weaknesses in the licensee's LLRT program.

The inspector witnessed various aspects of ongoing licensee leak rate testing for the containment purge valves and the personnel airlock door seals. The purge valves are required to be tested by TS every three months and the airlock door seals are tested by the licensee every three days, regardless of whether a containment entry has been made or not. The inspector verified that test personnel followed approved test procedures and that qualified test equipment were used. Personnel conducting the tests demonstrated a good understanding of the test equipment and were knowledgeable of test requirements. The results for all tests conducted met the acceptance criteria specified in the test procedures.

Within the areas inspected, violations or deviations were not identified.

3. Verification of Containment Integrity (61715)

The purpose of the inspection activities in this area was to verify the adequacy and implementation of procedures and controls designed to maintain containment integrity and to mitigate contamination releases in the event containment integrity is lost following a LOCA.

a. Primary Containment Integrity Controls

The inspector reviewed procedures GOI-1, Plant Startup from Cold Shutdown to Hot Standby, and GOI-1.1, Technical Support Surveillance Instructions Required for Modes 4 or 3. Together, these procedures ensure that all necessary plant conditions are established for plant startup. The inspector verified that the procedures included the minimum provisions as specified in TS Section 1.7 for ensuring

primary containment integrity exists before the plant enters operational modes which require containment integrity.

The inspector also reviewed Unit 1 procedure SI-14.1, Verification of Containment Integrity, which provides assurance of primary containment isolation by visual verification that all manual CIVs and inside and outside vent/drain valves located between CIVs are closed. The inspector verified that the procedure included all applicable containment isolation barriers. Completed surveillance records for procedure SI-14.1 were reviewed for the past four months of Unit 1 operation.

b. Containment Systems Designed to Mitigate the Consequences of a LOCA

The following containment related systems or mechanisms designed to mitigate the consequences of contamination releases following a LOCA were reviewed for compliance with TS requirements:

- Containment airlocks
- Containment temperature and pressure limits
- Containment spray
- Containment vent coolers

The inspector reviewed the following surveillance procedures which demonstrate the operability of the above systems:

SI-159.1.1	Personnel Airlock Pen-X2A Operability and Overall Leakage Test, Rev. 1
SI-159.1.2	Personnel Airlock Pen-X2B Operability and Overall Leakage Test, Rev. 1
SI-159.2.1	Airlock Resilient Seal Leak Rate Test, Rev. 0
SI-3	Daily, Weekly, and Monthly Logs, Rev. 70
SI-34	Containment Spray System Valve Position Verification, Rev. 8
SI-37.1	Containment Spray Pump 1A-A Quarterly Operability Test, Rev. 1
SI-37.2	Containment Spray Pump 1B-B Quarterly Operability Test, Rev. 2
SI-68	Functional Test of Containment Spray Pumps and Associated Valves, Rev. 5
SI-738	Lower Containment Ventilation Coolers Operability, Rev. 1
SI-739	Lower Containment Ventilation Coolers Flow Verification Test, Rev. 3

The inspector verified that the procedures complied with applicable TS requirements, that adequate information and instructions were provided, and that adequate acceptance criteria and limits were specified.

The inspector reviewed the completed surveillance records listed in Table 1 and verified that the surveillances were performed at the required frequencies, test results met acceptance criteria or limits, and appropriate sign-offs, test reviews, and test concurrences were performed.

Table 1

<u>Containment System</u>	<u>Procedure No.</u>	<u>Records Reviewed</u>	<u>TS</u>
Airlocks	SI-159.1.1	07/19/89 to 12/14/89	4.6.1.3.b
	SI-159.1.2	07/20/89 to 12/19/89	4.6.1.3.b
	SI-159.2.1	12/05/89 to 02/21/90	4.6.1.3.a
Temperature and Pressure	SI-3	Month of February 1990	4.6.1.4 4.6.1.5.1/2
Containment Spray	SI-34	12/14/89 to 02/07/90	4.6.2.1.1.a
	SI-37.1	02/22/89 to 08/09/89	4.6.2.1.1.b
	SI-37.2	02/17/89 and 05/08/89	4.6.2.1.1.b
	SI-68	09/05/88	4.6.2.1.1.c
Vent Coolers	SI-738	12/06/89 to 03/02/90	4.6.2.2.a
	SI-739	05/04/88	4.6.2.2.b

Based on this sample review, the inspector concluded that, for these systems, the licensee has established and implemented surveillance tests to ensure their operability as required by TS.

Within the areas inspected, violations or deviations were not identified.

4. Followup on Previous Inspection Findings (92701, 92702)

- a. (Closed) URI (50-327, 328/88-60-02): QC Acceptance of Boric Acid Which did not Conform to Receipt Specifications

The licensee's performance of startup physics test RTI-4, Boron Endpoint Determination and Isothermal Temperature Coefficient, completed November 8, 1988, for Unit 1, resulted in an ARO critical boron concentration which was outside the acceptance criteria. Upon evaluation by the licensee, it was discovered that boric acid purchased earlier in the year had been incorrectly accepted by QC receipt inspectors. The boron-10 content of the boric acid slightly exceeded the 19.6 ± 0.3 atom percent specified in the receipt specification requirements. Subsequently, the licensee initiated an evaluation of the acceptance and use of boric acid not meeting the boron-10 content requirements specified above. Westinghouse determined the range of boron-10 content that can be accepted in boric acid at Sequoyah for the current fuel cycle without

impacting safety limits to be 19.75 to 20.3 atom percent. Samples of the boric acid from Contract No. 88NDA-47787A were analyzed and the content of boron-10 was found to be between 20.02 and 20.09 atom percent. This was within the safety margin for boron-10 content as specified by Westinghouse. The actual safety significance of the boron concentration discrepancy was therefore minimal.

This matter was addressed in the licensee's response to Example No. 3 of NRC Violation 50-327, 328/88-60-01. The violation addressed the licensee's failure to promptly initiate corrective action upon identifying that on April 7, 1988, a licensee QC inspector had approved the receipt of boric acid which did not conform to the receipt specifications of SQA-159, Standards and Guides for Quality Assurance Level III Items. As discussed in the licensee's response dated April 10, 1989, the incident was an isolated case of QC inspector's failing to follow procedures. The licensee conducted training sessions with their QC inspectors to discuss the inadequate receipt inspections, explain the importance of verifying each specification before acceptance, and provide direction in obtaining assistance from quality engineering personnel to resolve problems. The inspector determined that this matter was adequately addressed in the licensee's corrective action for NRC Violation 50-327, 328/88-60-01.

- b. (Closed) URI (50-327, 328/88-60-03): Release of Boric Acid from Power Stores Prior to QC Receipt Inspection

NRC Inspection Report No. 50-327, 328/88-60 reported that the licensee had indicated that boric acid purchased under Contract No. 88NDA-47787A was released from Power Stores prior to QC inspection. This matter was not addressed by the licensee in their response to NRC Violation 50-327, 328/88-60-01.

Boric acid purchased under Contract No. 88NDA-47787A was received by the licensee on March 22, 1988. As described in paragraph 4.a, the boric acid contained a slightly higher boron-10 content than specified in the receipt specifications of SQA-159. The boric acid was tagged with Power Stores labels which identify each item and provides traceability to the contract and was segregated pending QC receipt inspection. On March 31, 1988, Power Stores personnel issued 16 drums of the boric acid not knowing it had not been inspected by QC. The licensee reported that this occurred due to the practice of tagging incoming material before QC inspection. Power Stores has discontinued the practice of tagging material prior to QC receipt inspection. The inspector reviewed Administrative Instruction AI-11, Receipt Inspection and Nonconforming Items, which was revised by the licensee on May 11, 1989, to restrict the tagging of material until after the material has been found acceptable through receipt inspection. The licensee stated that their review did not identify any other material that was not receipt-inspected due to segregation during that time frame, so the boric acid release appeared to be an isolated case.

Because the licensee identified the issue and because the corrective action had already been taken by the licensee, this violation is not being cited. The criteria specified in Section V.G.1 of the NRC Enforcement Policy were satisfied. This matter will be tracked as NCV 50-327, 328/90-10-01. No response to this item is required and the item is considered closed.

- c. (Closed) IFI (50-327, 328/89-16-01): Commitment to Add the Acceptance Criterion of 1 PCM/°F Span for Agreement Among the Measurements Used in Determining the Average ITC

During an NRC inspection of Unit 2, Cycle 4 initial criticality, a weakness was noted in startup procedure RTI-4, Boron Endpoint Determination and Isothermal Temperature Coefficient Measurement. The procedure did not have acceptance criterion for agreement between the ITC measurements at ARO during heatup and cooldown. At most Westinghouse plants, the acceptance criterion is 1 pcm/°F agreement between the two values. At the exit interview, the licensee committed to add the acceptance criterion to the procedure.

The inspector reviewed procedure RTI-4, Rev. 5, which added the requirement for the heatup and cooldown ITC measurements to agree with less than or equal 1 pcm/°F difference between them.

- d. (Closed) Violation (50-327, 328/89-16-02): Inadequate Surveillance Procedure to Determine RCS Leakage

During a previous NRC inspection of the licensee's measurement of RCS leakage, an inadequacy was identified in the licensee's performance of SI-137.2, Reactor Coolant System Inventory. For the test conducted on May 8, 1989, the total unidentified leakage resulted in a negative value. This was accepted by the licensee without further review or documented justification regarding the negative result. Negative unidentified leakage is a physical impossibility and could be indicative of non-RCS inleakage that could be masking the true value.

The licensee response dated June 20, 1989, was considered acceptable by the NRC. The inspector reviewed procedure 137.2 which was revised to include appropriate licensee action if the calculated unidentified leakage is determined to be negative.

The inspector concluded that the licensee had determined the full extent of the violation, taken action to correct current conditions, and developed corrective actions needed to preclude recurrence of similar problems. Corrective actions stated in the licensee response have been implemented. A Violation 50-327, 328/89-25-01, for failure to follow SI-137.2 was closed by the Resident Inspectors in NRC Inspection Report No. 50-327, 328/90-06.

5. Exit Interview (30703)

The inspection scope and findings were summarized on March 9, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed the inspection findings listed below. Proprietary information is not contained in this report. No dissenting comments were received by the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
50-327, 328/90-10-01	NCV - Release of Boric Acid from Power Stores Prior to QC Receipt Inspection, paragraph 4.b.

6. Acronyms and Initialisms

ARO - all rods out
 CFR - Code of Federal Regulations
 CILRT - containment integrated leak rate test
 CIV - containment isolation valve
 ERCW - essential raw cooling water
 GDC - General Design Criteria
 GOI - general operating procedure
 IFI - inspector followup item
 ITC - isothermal temperature coefficient
 La - maximum allowable containment leakage rate
 LLRT - local leak rate test
 LOCA - loss-of-coolant accident
 NCV - non-cited violation
 NRC - Nuclear Regulatory Commission
 pcm - percent millirho
 psig - pounds per square inch gauge
 QC - Quality Control
 RCS - reactor coolant system
 Rev. - revision
 RTI - refueling test instruction
 SCFH - standard cubic feet per hour
 SI - surveillance instruction
 TS - technical specifications
 URI - unresolved item