



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

Report Nos.: 50-327/88-09 and 50-328/88-09

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: January 25-29, February 16-18, March 2, 10 and 14-17,
1988

Inspector: _____

J. J. Lenahan

5/5/88

Date Signed

Approved by: _____

F. Jape, Section Chief
Test Programs Section
Division of Reactor Safety

5/4/88

Date Signed

SUMMARY

Scope: This routine, unannounced inspection was in the areas of the snubber surveillance program, piping thermal expansion, IEN 85-45, testing of the main steam safety relief valves, IEB 80-11, and licensee action on a previous inspection finding.

Results: Two violations were identified. Installation of Improper Bolts During Modification of the Movable In Core Flux Mapping System, Paragraph 8, and Improper Storage of Quality Assurance Records, Paragraph 9.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- L. D. Alexander, Modification Group B Supervisor
- *R. N. Butler, QA Evaluator, Site QA Group
- *L. Bryant, Mechanical Maintenance Engineering Supervisor
- J. Casey, Mechanical Maintenance Engineer
- C. R. Farreau, Snubber Engineer, TVA Nuclear Maintenance Division
- *B. T. Hensley, Restart Test Unit Supervisor
- *M. K. Jones, Restart Test Manager
- *G. B. Kirk, Compliance Licensing Manager
- R. Landis, Modification Engineer
- *W. H. Lee, Civil Engineer
- K. Mogg, Supervisor, Civil Engineering Unit, Office of Engineering
- P. C. Murray, Engineering Aid, Mechanical Maintenance
- *R. W. Olsen, Modification Manager
- T. Sanders, Mechanical Engineer, Maintenance
- W. Snathers, Unit Supervisor, Civil Engineering Unit
- P. B. Turner, Modifications Engineer
- *C. H. Whittemore, Licensing Engineer

Other licensee employees contacted included civil, mechanical and startup engineers.

Other Organizations

- *D. Hale, Restart Test Engineer, Stone & Webster
- R. Rhiner, Stress Analyst, Gilbert Associates

NRC Resident Inspectors

- K. Jension, Senior Resident Inspector
- P. Harman, Resident Inspector
- M. Branch, Senior Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 17, 1988, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. The following new items were identified.

- a. Violation 327, 328/88-09-01, Installation of Improper Type of Bolts During Modifications of the Movable Incore Flux Mapping System, Paragraph 8.
- b. Violation 327, 328/88-09-02, Failure to Take Prompt Correction Action in Regard to Improper Storage of Quality Assurance Records, Paragraph 9.

The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection. Dissenting comments were received from the licensee regarding violation item 327, 328/88-09-02. These comments are further discussed in Paragraph 9.

3. Licensee Action on Previous Enforcement Matters

(Open) Unresolved Item 327/86-24-02, Load Ratings of Mechanical Snubbers. The inspector examined procedure SMI-0-317-28, Collection of Name Plate Data for Mechanical Snubbers. This is the procedure used to determine locations (pipe supports) where Pre-NF snubbers are installed in Unit 1. The inspector examined the data collected as of the inspection date. Approximately 400 Pre-NF snubbers have been identified. Due to lost or misplaced design calculations for some Unit 1 pipe supports, the licensee is re-constructing the missing calculations. The Pre-NF snubbers will be evaluated during this redesign effort to determine if any Pre-NF supports need to be replaced with a NF snubber. The inspector examined Sequoyah Design Criteria No. SQN-DC-V-24.2, Supports for Rigorously Analyzed Category I Piping. Review of the design criteria and discussions with responsible design engineers disclosed that the design capacity of the Pre-NF snubbers used for faulted load is twice the load rating on the name plates (i.e. twice the normal rated load). The inspector questioned licensee engineers regarding the basis of these values. These discussions disclosed that the snubber manufacturer, Pacific Scientific, provided the design data in a September 4, 1987 letter to TVA in which they stated that the Pre-NF snubbers had a one-time load capacity of twice the rated load and that this value could be used for faulted loads. The inspector questioned the meaning of a one-time load and whether this is acceptable for use in design. The inspector will examine the basis for these design loads in a future inspection. UNR 327/86-24-02 will remain open pending completion of the Unit 1 pipe support redesign effort.

4. Unresolved Items

Unresolved Items were not identified during this inspection.

5. Snubber Surveillance Program - Unit 1 and 2 (70370)

The inspector examined procedures and quality records related to the snubber surveillance program and inspected snubbers on safety-related piping systems. Acceptance criteria utilized by the inspector appear in Technical Specification (TS) 3/4.7.9.

a. Review of Snubber Surveillance Procedure (Units 1 and 2)

The inspector examined the following procedure which control Unit 1 and 2 snubber surveillance activities:

- (1) Surveillance Instruction SI-162.1, Visual Examination of Snubbers
- (2) Surveillance Instruction SI-162.2 Snubber Functional Testing (Hydraulic and Mechanical)

b. Inspection of Snubbers: (Unit 2)

The inspector performed a visual inspection of selected snubbers installed on safety-related piping systems inside the Unit 2 containment building. This inspection was conducted while the reactor coolant system was at ambient temperature and during the heatup process to normal operating temperature. During the inspection, the inspector verified that the snubbers were not damaged, and that attachment of the snubbers to the supporting structure and piping was secure.

c. Review of Quality Records: (Unit 2)

The inspector performed a detailed review of the results of functional testing conducted on Unit 2 safety-related mechanical snubbers. Three of 71 snubbers tested in the initial lot failed to meet the snubber functional test acceptance criteria. Therefore, in accordance with TS 4.7.9.f, an additional lot (first subsequent lot) equal to one-half of the initial sample size was selected for functional testing. One of these snubbers failed to meet the functional test acceptance criteria. However, no additional samples were selected for testing since the TS permits one test failure in each subsequent test lot. The inspector examined the functional test performed on snubbers placed in locations (pipe supports) where the previous functional test was not acceptable and verified that all snubbers placed in these locations had been tested. The inspector also examined calculation titled SI-162.2 Evaluation, Problem No. N2-SI-162.2-MISC. This calculation was performed to determine if inoperable snubbers adversely affected the components restrained by the snubbers per the requirements of TS 4.7.9.g. Results of the calculation indicated that the load imposed on the components by the inoperable snubbers were well below design allowable limits.

Within the areas inspected, no violations or deviations were identified.

6. Testing of Main Steam Safety Valves Unit 2 (Module 61701)

The inspector examined the test procedure and results of testing and setting of the Unit 2 main steam safety relief valves. A portion of the actual valve testing was witnessed by the NRC resident inspectors. Acceptance criteria utilized by the inspector appear in Technical Specification 3/4.7.1 and a NRC letter dated October 23, 1987, to TVA clarifying commitments pertaining to relief valve testing. The licensee committed to test all 20 main steam safety relief valves. The inspector examined Surveillance Instruction SI-111, Testing and Setting of Main Steam Safety Valves, Revision 8, and Instruction Change Forms, ICF 88-360, 88-445, 88-580, and 88-603. The ICFs were written to change Revision 8 of SI-111 and will be incorporated into the next general procedure revision. The procedures cover relief valve testing requirements including prerequisites, test holdpoints, precautions, special test equipment, detailed test instructions, test acceptance criteria, data sheets, and test equipment calibration requirements. The inspector examined the test results. The lift setting of 15 of the valves was within the test acceptance criteria and Technical Specification limits when initially tested. The remaining five were slightly outside the plus or minus one percent tolerance when initially tested and required minor adjustments to be within the specified lift setting limits. Initial test results versus specified test range of the five valves which did not meet the specified range on the initial test are summarized below

Summary of Main Steam Relief Valve Tests Which Fell Outside of Acceptance Range

<u>Valve Number</u>	<u>Specified Test Range (psig)</u>	<u>Initial Test Results (psig)</u>
2-1-513	1066.23 - 1087.77	1064.5
2-1-515	1091.97 - 1114.03	1087.7
2-1-517	1053.36 - 1074.64	1081
2-1-527	1053.36 - 1074.64	1053.2
2-1-526	1105.83 - 1128.17	Erratic Data, but Slightly Low

The above deficiencies were documented on test deficiency numbers, ON-1 through ON-5.

Within the areas inspected, no violations or deviations were identified.

7. Thermal Expansion Test Unit 2 (70370)

During a previous inspection, the inspector reviewed the thermal expansion test procedures and the results of inspections conducted by the licensee to identify potential interferences which could restrict movement of piping systems during heatup to normal operating temperature. The results

of this inspection are summarized on Page 20 of NRC Inspection Report Numbers 50-327/87-73 and 50-328,87-73. During the current inspection the inspector walked down various piping systems in the reactor building, examined the potential interferences, and reviewed the licensee's actions to correct these interference while the reactor coolant system was at ambient temperature. The inspector also examined the crossover leg whip restraints while the temperature of the reactor coolant system was at 450°F. The clearance requirements for the whip restraints are specified on Drawing Number 48N430R20, Structural Steel Equipment Supports, Crossover Leg Restraints. The gap for one of two of the Loop 2 restraints was less than the specified clearances. This problem was corrected by removing a shim in the support and reinstalling a new shim fabricated to meet the specified clearances. The new shim was fabricated based on dimensions obtained during several gap measurements made at various intervals during heatup to 535°F. The inspector accompanied licensee engineers and walked down selected piping systems when the reactor coolant system was at normal operating temperature. Examination of the eight crossover leg whip restraints showed that gaps between the piping and the restraint met the specified criteria. Two minor interferences were detected by licensee personnel. The inspector examined the interferences. One of these occurred on relief line piping on top of the Loop 2 steam generator, and another occurred in small diameter RC piping adjacent to the Loop 3 reactor coolant pump. The licensee was in process of repairing these deficiencies at the conclusion of the inspection.

Within the areas inspected, no deviations or violations were identified.

8. IE Information Notice 85-45, Potential Seismic Interaction Involving the Movable In-core Flux Mapping System Weld in Westinghouse Design Plants

IN 85-45 provided information to licensees regarding possible interaction during a seismic event between the nonsafety-related portions of the flux mapping system and the seal table in Westinghouse designed plants event. The potential interactions existed because portions of the flux mapping system that had been seismically designed were located directly above the incore instrumentation tubing and seal table. In a letter to TVA dated June 7, 1988, Westinghouse recommended that TVA investigate this problem. The licensee performed a design evaluation of the movable incore transfer device and determined that it should be restrained from moving during a seismic event. ECN L6447 was issued to add seismic restraints to the movable incore transfer device. This modification consisted of replacing 5/16 inch diameter bolts of unknown properties with 3/4 inch diameter A-325 high strength bolts, replacing 3/8 inch diameter bolts of unknown properties with 3/8 inch diameter A-193, bolts, and adding two seismic restraints. The modification was implemented under Work Plan Number 11672. Two additional seismic restraints were added under ECN L6548. This modification was implemented under Work Plan 11929. The inspector examined the completed modifications on the Units 1 and 2 Seal Tables and

the quality records documenting completion and inspection of the modifications. Examination of the completed modifications disclosed 12 A-307 bolts had been installed in the Unit 2 seal table and eight A-307 bolts were installed in the Unit 1 seal table in locations where WP 11672 called for A-325 bolts. Also, the quality records documenting installation and QC inspection of the bolts indicated that the type of bolts specified on the drawings had been installed. The failure to install the correct bolts when completing the seal table modification and the failure of the QC inspectors to identify the discrepancy was identified to the licensee as Violation Item 327, 328/88-09-01, Installation of Improper Type of Bolts During Modification of Movable Incore Flux Mapping System. This violation involved failure to control safety related materials (bolts), installation of the wrong type of bolts by the craft personnel, and an inadequate inspection of the completed modification by QC inspector personnel. The licensee implemented immediate corrective action by replacing the 12 A-307 bolts in the Unit 2 seal table with A-325 bolts. These bolts were installed under Work Request B 273600. The inspector examined the modification and verified that the A-307 bolts had been replaced with A-325 bolts. The A-307 bolts in the Unit 1 seal table will be replaced prior to restart of Unit 1.

9. (Open) IE Bulletin 80-11, Masonry Wall Design - Units 1 and 2

IEB 80-11 was previously inspected during inspections documented in NRC Inspection Report Nos. 50-327/81-05, 50-328/81-04, 50-327/86-24 and 50-328/86-24. The inspector examined supports which were added to two walls in the Unit 1 and 2 Elevation 690 Sample Rooms. This work was specified by ECN L5703, and implemented under WP 11952. Two additional sample room walls were removed per ECN 6741 under WP 12178. The inspector examined quality records attached to WP 11952 which document inspection of the modifications and traceability of materials used for the modifications. Inspections included reviewing the installation of expansion anchors, weld fit up and the completed welds.

During examination of WP 11952, the inspector noted that this document, and approximately 200 others were stored on open shelves in Trailer 9. The storage facility provided by the trailer does not meet the licensee's QA Procedure NQAM III, Section 4.1 and referenced ANSI N45.2.9-1974 which requires quality assurance records to be stored in facilities which will protect the records from possible destruction by causes such as fire, flooding, tornadoes, insects, rodents, and extreme variation in temperature and humidity. The Trailer 9 storage facility did not provide the required protection for records. Further discussions with licensee personnel disclosed that a similar problem was initially identified by the licensee's QA staff in an audit conducted in the Spring of 1986.

CAR 86-024 was issued on May 12, 1986, to document and disposition this problem. In an attempt to correct the CAR, licensee personnel had identified improper storage of the records in Trailer 9 as an item needing

resolution. However, questions as to what constitutes a "QA record" have delayed implementation of corrective actions. The inspector identified the failure to promptly correct CAR 86-024 and the improper storage of QA records (work plan packages) stored in Trailer 9 as Violation item 327, 328/88-09-02, Failure to Take Prompt Corrective Action in Regard to Improper Storage of Quality Records. During the inspection and exit interview, members of the licensee's staff disagreed with the inspector concerning the violation. This disagreement was based on fact that TVA does not consider a document to be quality record until the final signature is made on the cover-sheet of the WP. The signature lacking was that designating that updated ("As-Built") drawings had been completed to show implementation of the modification. In response to CAR 86-024, the licensee revised NQAM III, Section 4.1, to cover temporary storage of "In Process" records. The revised procedure (Revision 2 to NQAM III, Section 4.1) was issued and became effective on December 31, 1987. Appendix B of the revised procedure gives guidelines for control of in-process QA Document. The guidelines state that in-process records can be stored in facilities which do not meet the requirements ANSI N45.2.9 for up to 30 days. The 30 day limit from the effective procedure date had been exceeded by 13 days on February 12, 1988, when the inspector initially identified the problem. Licensee personnel stated to the inspector that the Appendix B of NQAM III Section 4.1 is only a suggested guideline and thus is optional. In response to the inspector's concern, the licensee relocated the records to a concrete structure on or about February 16, 1988, which was to serve as a fire resistant storage facility meeting the requirements of ANSI N45.2.9. This structure had been under construction in response to CAR 86-024 and was to serve as a long term storage facility. The inspector examined the new storage facility on March 15, 1988. This examination disclosed that this facility did not meet the "suggestions" of Appendix B to NQAM III, Section 4.1, or the requirements of ANSI N45.2.9. The new facility lacked a fire suppression system, the doors to the "vault" had a 2 to 3 inch gap under them when they were closed and thus humidity was not controlled, and records were not protected from rodents or fire since the records were still stored on open shelves in the new facility. These actions document further the inadequate and delayed corrective action to CAR 86-024. The inspector's basis for citing this item as a violation was the fact that documents attached to the WP document physically completed modifications to various safety-related structures, systems, and components. These documents contain quality assurance records which furnish evidence of activities affecting quality, e.g. completed inspections, material traceability and control of special process. The inspector agrees with the licensee that "in-process" documents are difficult to store in approved facilities while work is in progress, and that some relaxation of the storage requirements is necessary during completion of plant modifications under the work plans. However, the majority of the quality assurance records stored in the trailer had been there in excess of six months, and there is evidence that some had been stored there for up to one year pending completion of "as built" drawings to update plant drawings. The fact that the final

authorized signature had not been affixed to the work plan cover sheet to indicate completion of the total work plan, does not negate the importance of preservation of the individual documents (quality assurance records) within the work plan packages.

Prior to this inspection, NRC personnel identified an IDI deficiency pertaining to missing masonry block wall calculations. During resolution of this problem, the licensee identified a construction deficiency where angles supporting the top of the block wall had been omitted during construction. CAQR SQT88-0177 was written to document and correct this problem. Discussions with licensee personnel disclosed that the angles had been installed on the walls considered critical to restart of Unit 2. Installation of the remaining angles is proceeding under WP0000-04. The licensee is reanalyzing the block walls to reconstruct the missing calculations. Review of the new calculations is being performed by personnel from the NRC Office of Nuclear Reactor Regulation and Office of Special Projects.

IE Bulletins 80-11 will remain open pending review of the design calculations and closeout of WP0000-04.

10. Temporary Instruction (TI) Closeout (Units 1 and 2)

(Closed) Temporary Instruction (TI) 2500/16 - Inspection to Determine if a Potential Seismic Interaction Exists Between Movable Incore Flux Mapping System and Seal Table at Westinghouse Designed Facilities of Similar Design. This TI defined the NRC inspection requirements for IE Information Notice 85-45. The inspector completed the inspection requirements detailed in the TI during this inspection (see Paragraph 9). A Violation Item 327,328/88-09-01 was identified pertaining to the movable incore flux mapping system modification.