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

Report Nos.: 50-327/86-43 and 50-328/86-43

Licensee: Tennessee Valley Authority
6N38 A Lookout Place
1101 Market Street
Chattanooga, TN 37401

Docket Nos.: 50-327 and 50-328 License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah Units 1 and 2

Inspection Conducted: July 28, 1986 - August 1, 1986

Inspectors: R E Carroll Jr for — 8/26/86
M. W. Branch, Inspection Team Leader — Date Signed

R E Carroll Jr — 8/26/86
R. E. Carroll, Jr., Project Engineer — Date Signed

R E Carroll Jr for — 8/26/86
G. Paulk, Sr., Resident Inspector (Browns Ferry) — Date Signed

R E Carroll Jr for — 8/26/86
J. Mathis, Reactor Inspector — Date Signed

Approved by: B Debs — 8/27
B. Debs, Section Chief — Date Signed
Division of Reactor Projects

SUMMARY

Scope: This special, announced inspection was conducted in the area of Modification Testing (MT) with a concentration on testing associated with Environmentally Qualified (EQ) equipment modifications. This inspection involved a review of major or complicated Post Modification Tests (PMT), as well as a review of Post Modification Functional Tests (PMFT). Additionally, a followup of associated Inspector Identified Items, discussed in paragraph 9 of Inspection Report 327, 328/86-20, was performed.

Results: In the areas inspected, two violations were identified. The first violation, discussed in paragraph 6, involved multiple examples of failure to properly implement the requirements of Administrative Instruction (AI)-19, Part IV, "Plant Modifications After Licensing" and Surveillance Instruction (SI)-166.6, "Post Maintenance Testing of Category A and B Valves." The second violation, also discussed in paragraph 6, involved a failure to properly change plant approved procedures.

REPORT DETAILS

1. Licensee Employee Contacted

*P. R. Wallace, Plant Manager
L. M. Nobles, Operations and Engineering Superintendent
*B. M. Patterson, Maintenance Superintendent
*N. E. Andrews, Site Quality Manager
*D. C. Craven, Quality Assurance Manager
*G. B. Kirk, Compliance Licensing Supervisor
*R. W. Olson, Modifications Branch Manager
*M. R. Sedlacik, Electrical Section Manager, Modifications Branch
*R. M. Mooney, Systems Engineering Supervisor
*J. A. McPherson, Mechanical Test Supervisor
*R. W. Fortenberry, Technical Support Supervisor
*R. V. Pierce, Mechanical Maintenance Supervisor
*H. D. Elkins Jr., Instrument Maintenance Supervisor
*M. A. Skarzinsk., Electrical Maintenance Supervisor
*R. H. Smith, Project Management
*J. H. Sullivan, Regulatory Engineering Supervisor
*P. H. Buckholz, Sequoyah Site Representative
S. D. Gilley, Modification Engineer
E. L. Legg, Modification Engineer
J. Edwards, Instrument Maintenance
T. L. Rutledge, Modification Engineer
D. R. Branham, Modification Engineer

Other licensee employees contacted included technicians, operators, shift engineers and maintenance personnel.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on August 1, 1986, with those persons indicated by an asterisk in paragraph one above. The following new items were discussed:

a. Violation for failure to properly implement the requirements of AI-19, Part IV and SI-166.6 in the area of functional testing.

b. Violation for failure to properly change plant approved procedures. This item was initially categorized as an unresolved item then upgraded after additional discussion with NRC personnel.

The licensee acknowledged the inspection findings. The licensee did not identify as proprietary any material provided to the inspectors during the inspection. At no time during the inspection period did the inspectors provide written material to the licensee.

3. Followup On Inspector Identified Items

a. (Closed) IFI 327, 328/86-20-03; Review of modifications to Limitorque Valves to determine effect, if any, of improper wiring. The issue was originally addressed in paragraph nine of inspection report 327, 328/86-20 and dealt with the rewiring of approximately 214 Limitorque Operators to establish EQ qualifications as well as simplifying and correcting limit and/or torque switch discrepancies. The inspector was concerned with the possibility that the improper wiring of limit/torque switches could have had an effect on valve operation.

During the review of Work Plan (WP) 11866 (unit 1) and WP 11853 (unit 2), which rewired the limitorque valves, the inspector's concern was re-addressed. It was determined that some of the previous torque/limit switch combinations did, under certain circumstances, have the potential of preventing the fulfillment of valve function. However, the inspector determined that these valves are part of the ASME Section XI Article IWV valve test program and are tested for operability on a routine basis per that program.

b. (Closed) IFI 327, 328/86-20-11; Use of terminology of "perform the applicable portions of a Plant Operations Review Committee (PORC) approved procedure". This item is being combined with a related item associated with changes to approved procedures. Both items will be resolved as part of that issue which is identified as Violation 327, 328/86-43-02 and discussed in detail in Paragraph 6 of this report.

4. Unresolved Items

No Unresolved Items were identified during this inspection.

5. Design, Design Changes, and Modifications (37700)

Although the major objective of this inspection was to determine the adequacy of Modification Testing, the inspectors did review several of the modification Work Plans (WPs) for technical adequacy, proper review and approval, adequacy of safety evaluation as well as drawing and procedure updates. Work Plans reviewed as well as inspection findings are as follow:

a. Containment Pressure Transmitter Modifications

Engineering Change Notice (ECN) 6554 and WP 11912 replaces the existing containment pressure transmitters 1 & 2-PDT-30-42 and 1 & 2-PDT-30-43 with qualified Foxboro transmitters per NUREG 0588. These transmitters provide input to containment isolation and containment spray logic. The replacement transmitters are functionally and electrically equivalent. All functional and operability tests were performed with revised Surveillance Instructions and Instrument Maintenance Instructions (IMI). An error in documentation was noted on IMI-135 (Foxboro Instrument N-E13DM Assembly Instruction) Appendix C data sheet page 1 of 4, Rev. 5 for 2-PDT-30-42 instrument. The work plan

documentation indicated that lubricant (P/N NO114AA) was used whereas the correct lubricant should have been P/N XO114AA. A review of power store procurement records indicated that P/N XO114AA was used for the assembly installation. The cognizant engineer was made aware of this documentation error. The inspector further reviewed all greases, sealants, and lubricants used in Work Plan 11912 for traceability and proper usage. No deficiencies were noted other than this documentation error.

The inspector reviewed Work Plan 11912 closeout package for adequacy with regulatory requirements and commitments. The work plan subsections reviewed included a sampling of the work plan control section, the work plan specification section, the modification authorization section, the data inspection sheet section, the material traceability section, and the vendor information section. No deficiencies were noted.

b. Reactor Coolant System Transmitters Removal to Outside the Crane Wall

ECN L6439 and WP 11750 moves existing reactor coolant system transmitters 1 & 2 LT-68-320, 1 & 2 PT-68-522 and 1 & 2 PT-68-523 to outside the polar crane wall. The work plan was reviewed to determine if regulatory requirements were being met. The work plan status currently was under the implementation and closeout phases. Some portions of the work plan documentation was not yet complete. Work instructions and in-process signoffs were adequate as completed. The Accountability of Modification Material forms, required for level I and II materials (AI-19, Part IV, Attachment 16), were missing from the work package. This traceability form is required when material ordered for one ECN is used instead for another ECN. Material ordered for ECN 6533, 6550 was used on this work package, ECN 6439. The cognizant engineer noted that the required forms will be included when the work plan is closed out. No other deficiencies were noted during the sample review.

c. Instrument Setpoint Changes Due to Environmental Consideration in Various Systems

ECN L6551 and WP 11916 revises setpoints for various safety-related instruments to allow for instrument inaccuracies due to harsh environments resulting from a high energy line break. The work plan documentation was reviewed for regulatory adherence and completeness All instruments in the work plan are 10 CFR Part 50.49 devices. The setpoints were changed using existing plant procedures. No deficiencies were noted.

d. Upper Head Injection Water Tank Level Switch Replacement

ECN L6359 and WP 11751 replaces the four Barton Model 288A level switches on the upper head injection water tank with more reliable switches. The switches function to close the UHI isolation valves on

low level in the tank. The closure of these valves prevents introduction of nitrogen gas into the RCS following the injection of borated water into the RCS. Under the ECN, the Barton level switches were replaced with functionally equivalent switches.

After the initial completion of work on this work plan it was noted that a design error existed in the connection wiring drawings. A field change request (FCR4335) was initiated to rework the design errors and this rework has not been completed to date; therefore, this work plan is still in the implementation work phase. The work plan, procedural step 15, related to plant housekeeping after maintenance was not signed off as complete although the initial work was completed in September 1985. The signoff for the foreman to verify cleanliness should occur after each work phase to assure adequate work controls and plant housekeeping. No other comments can be currently made about this work plan since it is still in process. The cognizant engineer was informed of all inspector concerns.

6. Modification Testing (72701)

The inspectors selected for review several WPs in the areas of Mechanical Modification, Electrical Modification and Instrument Modification. The WPs selected were those initiated between August 1985 and present, with an attempt to concentrate on modifications in the area of EQ upgrade. The WPs selected, including those discussed in paragraph five, included the following:

- 11750 (Relocate level transmitter 1 & 2-LT-68-320 & 1 & 2-PT-68-522 & 523), Units 1 & 2
- 11751 (Replace Barton level switch on UHI tank), Unit 1
- 11762 (PMT 52), Unit 1
- 11773 (Replace bolted bonnet valves), Unit 1
- 11834 (Install flange on various component cooling lines), Unit 2
- 11853 (Replace wiring on limitorque operators), Unit 2
- 11866 (Replace wiring on limitorque operators), Unit 1
- 11890 (PMT 74 Auto Shut Trip), Unit 2
- 11893 (Relocate PT-68-322 & 323 & LT-68-320), Unit 2
- 11897 (Replace solenoid vlvs), Units 1 & 2
- 11906 (Replace motors on FCV-2-074-001 & 002), Unit 2

- 11912 (Replace 1, 2-PDT-30-42 & 43), Units 1 & 2

- 11916 (Change setpoints on various safety-related WST), Unit 2

- 11928 (Replace NAMCO limit switches sys 30, 63, 77, 81 & 68), Units 1 & 2

- 12040 (Replace Rework & Reroute PP-711B power feed for DG 2BB), Unit 2

- 12074 (Replace Nozzles on Steam generators), Unit 2

The review of the above work plans concentrated on the MT aspects of the Modification Packages. A brief description of the Sequoyah MT program, as previously discussed in Inspection Report 327, 328/86-20, is provided to clarify the licensee's terminology and program description. AI-19, Part IV, Revision 18, is the controling document and specifies the MT process. This instruction requires a PMT if the modification was major and the Division of Nuclear Engineering (DNE) required it through issuance of a test scoping document. However, the majority of testing associated with modifications falls into the category of post modification functional test (PMFT). When a PMFT is required, AI-19, Part IV requires this test be specified in the WP. The WP that requires a PMFT must list all checks or tests necessary to be performed before returning the equipment to service. This functional test is required to be comprehensive enough to ensure that the new components perform their intended function and that the work did not inadvertently degrade an operating system or component.

Specifics of the Work Plans reviewed and the inspectors' findings are provided as follows:

a. Main Steam and Feedwater Root Valves Replacement

ECN 6183 and WP 11773 replaced Hancock 5500 valves with Voght 800 in portions of Main Steam and Main Auxiliary Feedwater System where design temperature and pressure caused leakage. This work (replacement) was exempt from ASME Section XI, hydrostatic testing since all piping, valves and fittings were one-inch or smaller. As a matter of prudence, the cognizant engineer indicated that the affected valves and piping would be inspected for leaks. Inspection will be either at hydrostatic or operating conditions. No deficiencies were identified.

b. Installation of Flanges

ECN 6499 and WP 11834 install flanges in the component cooling water inlet, outlet and relief valve lines to the vent condenser heat exchanger associated with the Boric Acid Evaporator, Package "B". Functional testing consisted of a hydrostatic test per SI-265, "Hydrostatic Testing Following Repairs and Modifications". The purpose of the Hydro was to test the newly installed flanges and welds. Test pressure was 165 psig. In addition to a visible examination of the welds, a liquid penetrant examination was performed by the licensee. No deficiencies were identified.

c. Pressurizer Level Transmitter Relocation

ECN 6439 and WP 11893 relocates level transmitters from inside the crane wall to outside the crane wall in the incore instrument room. The location was changed to the outside crane wall so maintenance can be performed in mode 1, 2 and 3. This will also reduce radiation exposure when working on the transmitters in modes 4-6. Functional testing consisted of calibration of level transmitters and Non Destructive Examination (NDE) of the welds. No problems were identified with this modification.

d. Steam Generator J-Nozzles Replacement

NCR 2215 and WP 12074 removes and replace original carbon steel J-nozzles with new Inconel J-Nozzles. The subject work activities were performed under the cognizance of the onsite Combustion Engineering (CE) Task Manager. QC visually examined "J" Nozzle Welds repairs per OP-9.1, Rev. 5. A final inspection of cleanliness was performed by QC. No post modification testing nor functional testing were required for this modification. No deficiencies were identified.

e. Limit Switch Replacements

ECN 6556 and WP 11928 replaced existing limit switches on various air operated valves in systems 30, 63, 77, 81, and 68 with environmentally qualified NAMCO brand limit switches to meet 10 CFR Part 50.49 requirements. Specified functional tests consisted of cycling the valves to ensure proper limit switch adjustment/valve position indication and stroke timing per SI-166.6. No problems were identified with this modification.

f. Limitorque Valve Modifications

ECN L6544 and WPs 11866 (Unit 1) and 11853 (Unit 2) replaced all wiring within the limit switch compartment of approximately 214 limitorque valve operators with environmentally qualified wiring. This Modification involved valves contained in systems 1, 3, 26, 62, 63, 67, 68, 70 and 74. Appropriate drawings were changed as part of this wire replacement effort, such that previously jumpered out limit/torque switches were eliminated from control circuits altogether in order to simplify the circuits and their rewiring. Additionally, in the case of 16 valves, wiring changes were made to eliminate a limit switch that was effectively making an existing torque switch in their respective control circuit non-functional.

The functional tests specified in the work plans consisted of a hand cycling of the valve actuators with a check on limit switches, closing and opening contractors. The valves were then cycled open and closed electrically. Excluding the 16 valves that were modified to include an existing torque switch as a functional part of their control circuit, the majority of these limitorque valves are containment isolation

valves and are therefore subject to the surveillance requirements of TS 3.6.3. Accordingly, TS Surveillance 4.6.3.1 requires that containment isolation valves be cycled and timed to demonstrate them operable prior to returning them to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit. The stroke timing test associated with these containment isolation valves is SI-166.6. As for the 16 excluded valves, section 6.8 of Technical Instruction (TI) -69, "Summary of Pre-and Post-Maintenance Valve Tests For ASME Section XI and 10 CFR 50 Appendix J," requires that a stroke timing test be performed per SI-166.6 whenever maintenance of this nature is performed on a valve control system. Consequently, the stroke timing test of each valve per SI-166.6 would be required to be performed in order to prove valve operability; however, SI-166.6 was not specified in either work plan as a test to be performed. Section 4.1.1.13.d (2) of Administrative Instruction (AI)-19, Part IV, requires that any checks or tests necessary to return equipment back to service be specified in the WP. The omission of SI-166.6 from the WPs is considered a violation of AI-19, Part IV (327, 328/86-43-01). It should be noted that ongoing MOVATS Testing of these valves, although not specified in the subject work plans, will include a stroke test per SI-166.6.

g. Residual Heat Removal (RHR) Loop Isolation Valves

ECN 6540 and WP 11906 replaced the existing motors on valves 2-FCV-74-1 and 2-FCV-74-2 with environmentally qualified motors.

These valves are the RHR suction isolation valves off of reactor coolant loop 4 and are considered necessary to mitigate an RHR line break. Specified functional tests included megger, grease, and rotational checks of the motors, and the performance of a stroke timing test of the valves per SI-166.6. TS Surveillance 4.4.6.2.2.c requires that these valves be demonstrated operable by verifying leakage to be within its limits prior to returning the valve(s) to service following maintenance, repair or replacement work on the valve(s). Additionally, TI-69 requires a Post-Maintenance Leak Test be performed on a motor operated valve when motors are not replaced with identical motors. A Leak Rate Test would be indicated in this case since the existing motors were rated at 2.6 HP, whereas the replacement motors were rated at 4.0 HP. The Leak Test associated with these valves is SI-166.18, "RHR Return Valve Leak Rate Test". The omission of SI-166.18 from the WP as a specified test to be performed prior to returning the valves to service is not in accordance with AI-19, Part IV. This is considered another example of Violation 327,328/86-43-01 identified in paragraph f above. It is recognized that due to the duration of this outage, SI-166.18 would have also been required to be performed by TS 4.4.6.2.2.c prior to entering mode 2. This would be verified in General Operating Instruction (GOI)-1, "Unit Heat Up From Cold Shutdown to Hot Standby."

h. Replace Solenoid Valves With New EQ Valves

ECN 6552 and WP 11897 replaced existing solenoid control valves with new EQ valves required to meet the requirements of NUREG 0552. The WP reviewed replaced 12 valves; three in system 43, six in system 62, one in system 63, and two in system 87. The new valves were Automatic Switch Co (ASCO) model #206-381 and model #8316-54E. Per the vendor installation and maintenance instruction manual, the model #206-381 valves were required to be mounted with the solenoid vertical and upright.

The inspectors review of the above WP verified that inspection records were included. These records indicated that the solenoid on valves 2-FSV-43-(202, 207 and 208), model #206-381, were oriented vertical. However, when the inspector reviewed the installation and inspection step of the WP, Step 8.2a of Vertical was defined as, "Vertical ± 45°. The inspector requested TVA provide justification for the 45° allowance. The modification engineer eventually produced a letter dated April 29, 1985, where an ASCO sales manager indicated that the model 206 series valves could function with a solenoid orientation up to 45° from vertical. However, the letter went on to state that seismic qualification for the 206 series was performed in the vertical position only and the effects of mounting in the other orientation would have to be evaluated. The inspector requested the seismic test data for other vertical orientation and received (from TVA) Seismic Simulation Test Report #17746-1. This report documented the Wyle Laboratories test performed June 9 and 10, 1986, for TVA under Purchase Order TV-56071A. The test concluded that for the seismic event the valves continued to function and maintain their structural integrity.

The inspector was satisfied with the information provided by TVA. However, since TVA had installed the valves in April 1986, several months before qualification testing, the modifications supervisor was cautioned about the use of equipment in a manner not recommended or qualified by the manufacturer without prior testing or qualification by TVA. Additionally, if the installation was conditioned to seismic qualification after installation it should have been specified in the WP. The functional testing review for this WP indicated that testing was performed, however, cross referencing of the testing performed back to the WP was not always documented. Specifically, WP 11897 was not referenced on a SI-166.6 test package or master list reference for eight of the twelve valves. The inspector did, however, locate a valve functional test performed on the same date indicated in the WP but no reference back to the WP could be produced by the licensee. SI-166.6 specifically required a test data package or master list notation to tie the specific test to the work plan. This failure to follow the requirements of SI-166.6 is considered another example of Violation 327, 328/86-43-01 identified in paragraph f. above.

i. Replacement of Cable PP711B in Cable Tray AS-B1, Emergency Supply Breaker Feeder From 6.9KV Shutdown Board 2B-B

ECN 6627 and WP 12040 replaced a section of cable identified as PP711B. This work plan specified functional testing per SI-7 which was accomplished on June 17, 1986. No problems were identified with this modification.

j. PMT-74 Automatic Shunt Trip Modification Test (Unit 2)

ECN 6293 and WP 11890 specified the testing associated with the Automatic Shunt Trip Modification on Unit 2. This procedure had several changes written prior to the completion of testing. Change #86-488 modified the expected voltage values at a specific test point. This change was processed using a change form (Appendix G of AI-4) and handled as an expeditious change. To understand the temporary change process as used by TVA, the following is provided:

- TS 6.8.3 allows temporary changes to plant committee approved procedures under certain restrictions.

- ANSI 18.7-1976, to which TVA is committed, also makes allowance (paragraph 5.2.2) for the licensee to make temporary changes to a procedure providing certain conditions are met. This ANSI also requires this procedure change program to be described in writing by the licensee.

- AI-4, "Plant Instructions - Document Control", is the plant procedure TVA used to describe this Procedure Change Program. Section 13 of this procedure discusses the actual change process. The method of changing a Plant Operation Review Committee (PORC) approved procedure in an expeditious manner is described in paragraph 13.1. AI-4 only allows expeditious changes under the following two conditions:

  (1) To make changes which will remain in effect for only a limited number of instruction performances (e.g., an SI needs to be performed differently this one time because the plant is in an abnormal configuration).

  (2) To make urgently needed revisions when there is not time to go through the original type of review/approval cycle (e.g., an NRC inspection identifies a serious deficiency in an instruction which must be corrected immediately). In this case, the plant instruction change form (Appendix G of AI-4) authorizes an expeditious change practice until a permanent instruction change can be issued.

- As part of the Post Modification and Post Maintenance Testing program, plant engineers routinely specify in the WP or on the maintenance form to "accomplish the applicable portions" of approved procedure. This method appears to circumvent the procedure change process as described in TS 6.8.3 and AI-4. Additionally, if the user omits certain steps or picks and chooses steps of the approved procedure he has in fact changed the intent of the original procedure. In this case, TS 6.8.3 requires that a change with the same level of review and approval be executed prior to use.

The specific example of changing a committee approved procedure (ie., changes to WP 11890) in an expeditious manner as well as the improper changing of committee approved procedures (i.e., "accomplish the applicable portions") is considered a violation of TS 6.8.3 (327, 328/86-43-02).