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

Report Nos.: 50-327/85-45 and 50-328/85-45

Licensee: Tennessee Valley Authority
6N11 B Missionary Ridge 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: December 2-6, 1985

Team Leader: F. R. McCoy 1/17/86 Date Signed

Team Members: D. P. Falconer
W. K. Poertner
D. P. Loveless
J. A. Arildsen
W. Holland
C. Caldwell
R. Pierson
J. Moorman
M. Scott
M. Runyan
D. Brinkman, OIE

Approved by: B. T. Debs, Acting, Chief 1/21/86 Date Signed
Operational Programs Section
Division of Reactor Safety

SUMMARY

Scope: This routine, announced inspection involved 494 inspector-hours on site in the area of maintenance activities.

Results: Two violations were identified: two examples of failure to take prompt corrective actions in resolving problems with Upper Head Injection (UHI) level switches (paragraph 13) and in resolving problems associated with review of completed maintenance requests (MRs) (paragraph 6); and three examples of failure to follow procedures in the areas of motor operated valve modification (paragraph 10), definition of preventative maintenance for auxiliary air compressor dryers (paragraph 7), and housekeeping of contaminated work areas (paragraph 14).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*H. L. Abrocrombie, Site Director
*P. R. Wallace, Plant Manager
*B. Patterson, Maintenance Superintendent
*G. B. Kirk, Compliance Supervisor
*R. W. Fortenberry, Engineering Section Supervisor
*C. R. Brimer, Manager, Site Services
*H. D. Elkins, Group Supervisor, Instrument Maintenance
*D. L. Jeralds, Craft Section Supervisor, Instrument Maintenance
*R. Schnur, Engineer, Instrument Maintenance
*A. S. Lehr, General Foreman, Instrument Maintenance
*T. Kontovich, Engineering Supervisor, Electrical Maintenance
*L. McEachern, Craft Section Supervisor, Electrical Maintenance
*D. L. Love, Craft Section Supervisor, Mechanical Maintenance
*G. S. Boles, Outage Engineering Supervisor, Mechanical Maintenance
*L. S. Bryant, Engineering Supervisor, Mechanical Maintenance
*J. R. Robertson, General Foreman, Mechanical Maintenance
*M. R. Sedlauh, Electrical Modification Supervisor
*L. O. Alexander, Mechanical Modification Supervisor
*R. J. Griffin, Nuclear Safety Review Staff Site Representative
*J. L. Hamilton, Quality Engineering/Quality Control Supervisor
*D. L. Cowart, Quality Surveillance Supervisor
*T. Burdette, Quality Assurance
*R. L. Birchell, Compliance Engineer

Other licensee employees contacted included engineers, technicians, operators, mechanics, and office personnel.

NRC Resident Inspectors

*K. Jenison
*L. Watson

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 6, 1985, with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

(Open) Violation 328-85-24-02 - Corrective actions associated with failure to properly preplan and perform post maintenance testing of safety related equipment have not yet been completed. The licensee identified date for implementation of these corrective actions is January 1, 1986. This item remains open.

(Open) Violation 328-85-24-03 - Corrective actions associated with operability of ice condenser intermediate deck doors have been determined to be adequately prescribed in surveillance instruction (SI)-108.1, Ice Condenser Intermediate Deck Doors - Visual Inspection, Lift Test, and Ice Removal, which is required to be performed weekly as required during Modes 1-4. Since SI-108.1 was issued on November 27, 1985, and since the units are currently in Mode 5, there is insufficient data to determine adequacy of implementation of this SI. This item will remain open pending evaluation of implementation.

(Closed) Unresolved Item 328-85-24-04 - With regard to missile hazard concerns associated with feedwater hanger 2-FDH-282, the licensee has redesigned and modified the hanger in accordance with Engineering Change Notice (ECN) L6263 in order to allow reloading of the hanger. This action should correct the initial inadequate anchoring of the hanger and does resolve the missile hazard concern. This item is closed.

(Open) Violation 327-85-05-01, 328-85-05-01 - Corrective actions associated with resolving deficiencies with measuring and test equipment (MTE) have been partially initiated and are not scheduled for full implementation until June 1, 1986. Pending completion of full implementation of MTE program improvements, this violation remains open.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. Four unresolved items were identified during this inspection. These unresolved items involve determination of operability for UHI (see paragraph 13), determination of seismic qualification for ASCO series 8316 solenoid valves (see paragraph 11), determination of NUREG-0588 environmental boundary qualification for ASCO series 8316 solenoid valves (see paragraph 11), and assessment of corrective actions associated with seismic and quality assurance documentation for three previously installed UHI level switches (see paragraph 13).

5. General Conclusions Associated With the Maintenance Assessment and Actions Requiring Completion Prior to Unit Restart

The inspection team considers that the actions committed in the Sequoyah Nuclear Performance Plan with regard to maintenance activities are being implemented and that, although some specific program weaknesses still exist, the maintenance program, in general, appears adequate. Improvement with regard to performance of maintenance work has been noted. The attitudes of employees at the craft and first line supervisory level were observed to be good. Direct observation of maintenance activities reflected adequate use of procedures. Reliance on skill of the craft for activities observed appeared to be in line with that noted at other Region II facilities. Craft personnel were observed to be knowledgeable of tasks they were performing and foremen and general foremen were observed to be properly knowledgeable of work being performed or planned under their cognizance.

In the area of planning and scheduling of maintenance work, the inspection team considers that the licensee's new programs show potential for proper work management; however, additional implementation time is necessary to properly assess effectiveness. The inspection team notes that the licensee relies extensively on the expertise and knowledge of planners for all aspects of maintenance program implementation. Because the role of the planners is so integral and important to program implementation, the licensee should consider improvement in written guidance, resource allocation, and training in order to ensure that the planners are adequately equipped to fulfill their responsibilities.

Weaknesses were noted in management assessments and actions associated with repetitive failure of safety related equipment. In the case of UHI level switch problems, initial implementation of short term corrective actions and definition of long term corrective actions were considered to be adequate; however, the timeliness associated with achieving full implementation of long term actions and the lack of establishment of intermediate actions in light of continued questionable system operability is considered inadequate. The inspection team considers that the underlying cause for this weakness may be that management is not fully considering the issue of operability of safety related equipment and systems from a broad perspective based on continued history of problems and performance. It is considered that the licensee should review all outstanding MRs, design change requests (DCRs), and engineering change notices (ECNs) to ensure outstanding work associated with safety related equipment is reviewed in a manner which challenges system operability; any work required to resolve problems associated with questionable operability of safety related equipment should be completed prior to restart of the affected unit. Additionally, cognizant engineers should be interviewed to ensure that all issues which may involve operability of safety related equipment have been formally identified with an MR, DCR, or ECN. Resolution of these concerns should be completed prior to unit restart and is identified as an inspector followup item (327-85-45-01, 328-85-45-01).

In the area of preventative maintenance, weaknesses were noted in program implementation. Of particular concern is the failure to establish a preventative maintenance program for the auxiliary air compressor dryers when the vendor manual for these components recommended 14 preventative maintenance items. It is considered that the licensee should establish if this failure to prescribe preventative maintenance represents an isolated case or if this represents a generic problem requiring programmatic corrective actions. Resolution of this concern should be addressed as a part of the response to violation 327-85-45-09, 328-85-45-09 prior to unit restart.

Deficiencies were noted in the implementation of equipment qualification modifications pursuant to 10 CFR 50.49. Specifically, a jumper was not removed from valve 2-FCV-70-134 during rewiring of the valve and modifications were accomplished on series 8316 ASCO solenoid valves which may have resulted in degradation of seismic and boundary qualifications. In the case of the valve rewiring problem, the licensee should determine if the problem is isolated or a generic problem requiring programmatic corrective actions. In the case of the ASCO solenoid valve problems, the licensee should determine, and if necessary take corrective action to ensure, adequate seismic and boundary qualifications for these valves. Resolution of these concerns should be addressed in response to violation 327-85-45-09, 328-85-45-09, Unresolved Item 327-85-45-11, 328-85-45-11, and Unresolved Item 327-85-45-12, 328-85-45-12, prior to unit restart.

In addition to completing those actions delineated above, it is also considered that the following additional actions should be completed prior to unit restart:

- complete replacement and post modification testing of UHI level switches on Unit 2 prior to unit restart. Resolution of this concern is identified as an inspector followup item (327-85-45-02, 328-85-45-02).

- resolve the question of UHI operability and address results of the licensee review of this issue in response to unresolved item 327-85-45-17, 328-85-45-17.

- complete work associated with those MRs identified as requiring completion in inspector followup item 327-85-45-05, 328-85-45-05.

- provide an assessment and status of actions taken to date in response to Inspection and Enforcement Bulletin 85-03. Completion of this action is identified as an inspector followup item (327-85-45-03, 328-85-45-03).

- evaluate the results of MOVATS testing and inspection over a larger data base to determine the necessity for full completion, prior to unit restart, of MOVATS testing and inspection on all motor operated valves which have been rewired pursuant to 10 CFR 50.49. Completion of this action is identified as an inspector followup item (327-85-45-04, 328-85-45-04).

6. Review of Programmatic Aspects of Corrective Maintenance

The inspection team reviewed maintenance initiation, planning practices, scheduling, execution, status reporting, tracking, post maintenance testing, and documentation of repair work and completion. Additionally, machinery history and trend analysis was reviewed. The inspectors reviewed Sequoyah Standard Practice SQM-2, Maintenance Management System, and discussed the maintenance program with the appropriate license personnel responsible for developing and implementing the maintenance program. The inspectors also discussed implementation of this procedure with the planning sections and technicians of the various disciplines. The purpose of SQM-2, is to establish the method and responsibilities for managing the initiation, planning, scheduling, execution, status, tracking, and documentation of corrective maintenance and repair work. The inspectors discussed the developmental aspects of this procedure and learned that the intent was to give maintenance personnel a clear, concise program that would easily identify equipment in need of repair, and allow for easier trending and documentation of work. The work request (WR) is the document generated by any individual to initiate corrective maintenance. The WR is suitable for non-critical system, structures, or components (CSSC) equipment; non-class IE equipment; non-environmentally qualified (10 CFR 50.49) equipment; non-reportable; or non-material history type items. If the work affects CSSC or similar type equipment or components then a MR is generated from the WR. This method appears to be an effective means of controlling work through different levels of planning and review suitable to the type equipment and components involved.

A review was conducted of work authorization and return to service of components under the WR and MR program. The inspectors noted that after the WR tag has been completed (including a description of work to be performed) the originator's supervisor is required to initial the WR to concur that the request is needed and that sufficient information has been given to allow the appropriate maintenance section to locate and plan the work. The planner then assigns a priority to the WR and details instructions on how the work is to be performed. The operations section is then notified prior to and upon completion of work. If a MR is required, an MR form is initiated and additional reviews are conducted. These reviews are performed by the quality assurance (QA) staff, the safety staff, and the craft section supervisors if the component is CSSC. Prior to and after completion of the work, the operations section shift engineer is notified and followup reviews of the MR are performed by the QA staff. The inspectors found SQM-2 to be technically adequate with regard to delineating the responsibilities for maintenance activities and giving guidance to personnel on the preparation of WRs and MRs. The inspectors recognize that this program relies extensively on the knowledge and experience of the planners. The planners are individuals of various backgrounds and disciplines who are responsible for planning work to be performed by WRs or MRs. The planners are responsible for gathering all necessary documentation and reference materials to prepare the WR or MR, for listing detailed instructions to perform the work and for listing all post-maintenance test requirements. The inspectors noted that the planners are the focal point for proper implementation of the maintenance program. The licensee has taken action to increase the number of planners from 3 to 12 over the past year in order to ensure that there are sufficient numbers of personnel to fulfill this critical role. Because the success of corrective maintenance implementation relies heavily on the planning effort and more specifically on planner knowledge, the inspectors are concerned that all necessary information to plan MRs may not be easily available to planners. An example of this is the availability of a document that delineates the specific post-maintenance test requirements for all QA components. Post-maintenance test requirements are currently assigned based on the knowledge and experience of the individual planners. Presently, the planners have no specific written guidance to assist them in deciding what post-maintenance test requirements are applicable to CSSC equipment and components. If the planner is in doubt about the post-maintenance test requirements for a particular maintenance request, he can request assistance from the maintenance engineering personnel. The licensee is presently developing guidelines to assist maintenance planners in the determination of post-maintenance test requirements. These guidelines are scheduled to be issued by January 1, 1986. In response to violation 328-85-24-02, the licensee committed to provide personnel who plan MRs instruction in proper post maintenance test requirements by January 1, 1986. As of this inspection, this training had not been provided to the planners. Although a review of selected MRs did not reveal inadequate post-maintenance test requirements for those specific jobs reviewed, there is still concern that programmatically, more written guidance and training for planners in the area of post-maintenance testing may be necessary in order to properly equip the planners to fulfill their responsibilities. This concern with regard to establishing written guidelines and formal training for planners is not restricted to just post-maintenance testing. Since the backgrounds and experience levels of the individual maintenance planners vary, the inspectors are also concerned that the lack of a formal training program or consistent guidelines for maintenance planners in all aspects of planning could lead to inconsistency in the implementation of the maintenance program, possibly resulting in inconsistent work being performed on similar components. The inspectors reviewed the manner in which the newly formed systems engineering group is used in the implementation of maintenance activities. The group's responsibilities are defined by Standard Practice SQA-168, Systems Engineering, which at the time of this inspection, was in the review and approval cycle. These responsibilities are designed to provide a single point contact for history, status, and resolution of system problems, and reliability and performance of systems under an engineer's cognizance. Additionally, these responsibilities allow the systems engineer to coordinate work activities across discipline lines. Discussions with system engineers, maintenance engineers, and planners determined that system engineers have little involvement in the work request process. If a problem develops that cannot be resolved by the planners or maintenance engineers, it will be referred to the systems engineers for resolution. The systems engineering group is not used in the determination of post-maintenance testing requirements. A member of the systems engineering group has been assigned to provide input into the development of the post-maintenance test program but has not yet been asked to participate. The inspection team considers that the systems engineering group could be an effective group for establishing and consolidating maintenance planning information, such as specific post-maintenance test requirements for all QA components, in order to assist planners in accomplishing their responsibilities.

The inspectors reviewed the manner in which corrective maintenance is scheduled and prioritized. Initial prioritization of each WR is accomplished by the initiator. Establishing the need for an MR and formal prioritizing of WRs and MRs which were initiated during the previous

24 hours is accomplished at a planning meeting conducted prior to the start of day shift. This meeting is attended by general foremen, planners, and middle management representatives from each of the maintenance groups as well as a QA representative and an operations coordinator. Work required to be accomplished by MR is identified as such and a priority of immediate action, or routine priority 1, 2, or 3 is established. Work on immediate action MRs should be initiated within 24 hours, work on routine priority 1 MRs should be initiated within seven days. Routine priority 2 and 3 MR initiation is indeterminate. The Maintenance Superintendent stated that, if a priority which was initiated by the operations group is downgraded, the operations group is notified by the operations coordinator in order to ensure operations' agreement with this action. Data is taken from this meeting and loaded into a data bank for tracking purposes and MRs are formally written by the maintenance scheduling unit. This process takes place in a two to four hour period. The MRs are given to the planners who complete the planning effort for each job and determine if resources are available for each job to be worked. If resources are available, the job goes on an available list. The available list is reviewed by general foremen and foremen at another meeting where available MRs are selected for work during the next 24 hours. Additionally, MRs which have been field completed during the past 24 hours are identified during this meeting. Completed work and scheduled work is then identified at an afternoon planning meeting attended by middle management, supervisors, and planners from each maintenance discipline and the operations coordinator. This cycle is continued on a daily basis. As indicated in the following paragraph, the backlog of open MRs which have yet to be field completed is not excessive and is experiencing a decreasing trend. This is considered to be supportive of an adequate program of scheduling.

A review of the backlog of corrective MRs indicates that the total numbers of outstanding corrective MRs which had not been field completed at the time of this inspection was 1169 items. This is considered to be a manageable backlog. The inspectors were provided with data showing the number of outstanding MRs for each week during 1985. This data showed that the number of outstanding MRs increased significantly during the two month period following plant shutdown on August 21, 1985. The number of outstanding MRs reached a peak in mid-October and has subsequently been decreasing steadily. This trend indicates that acceptable progress is being made in reducing the number of outstanding MRs. Section 6.7.2 of the Sequoyah Nuclear Performance Plan contains a commitment for the licensee's maintenance department to review outstanding MRs on safety-related equipment to ensure that no unworked item will degrade equipment or impede operator action necessary for safe operations of the plant. To determine the licensee's program for complying with this commitment, the inspectors obtained a list of all active mechanical section MRs. The inspectors reviewed this list and selected 25 MRs for evaluation. The inspectors evaluated the 25 selected MRs and made a determination of those which, in their opinion, required completion prior to plant startup and those for which completion was not required prior to startup. The list of selected MRs was then given to the licensee for an independent review and determination. The licensee's determinations were then compared with the inspectors' previous determinations. This comparison showed that, within the selected sample of MRs, the licensee had identified as requiring completion before plant startup, all the MRs the inspectors had so identified plus two MRs the inspectors had categorized as not necessarily requiring completion before plant startup. Therefore, the inspectors concluded that the licensee is apparently complying with the commitment to complete all necessary work prior to plant startup. Table 1, page 9, is a list of the MRs selected for this sample as well as inspector and licensee notations regarding requirements for completion prior to plant startup. Completion of work for those MRs for which completion is identified as being required prior to plant startup is identified as an inspector followup item (327-85-46-05, 328-85-45-05).

The inspectors noted that field completed MRs have potential for being reported complete based on general knowledge of work rather than a review of completed records due to the manner in which the information is compiled to support the afternoon planning meeting. The inspectors consider that a formal review of completed records is the proper vehicle for reporting completion of work and considers that there are benefits in using an independent group, such as the maintenance and scheduling section to accomplish this review.

The inspectors obtained and reviewed a printout of all MRs for which the field work had been completed but which had not completed licensee review and final closure. The printout showed 2466 MRs in this status. Licensee Corrective Action Report (CAR) No. 4b-82-45 dated July 7, 1982, noted that MRs were not being maintained in accordance with SQM2 in that computer records indicated that a large number (2,451) of CSSC MRs had been lost and discarded. The CAR was closed on February 18, 1983, without addressing the disposition of the missing CSSC MRs. A supplemental response to the CAR was issued on March 7, 1985, to provide guidance on the disposition of these MRs and to require completion of their disposition by April 12, 1985. The inspectors' review of the printout disclosed numerous MRs with field completion dates prior to February 18, 1983. In an interview with a licensee representative on December 5, 1985, it was determined that 670 MRs which had been field completed prior to February 18, 1983, were still in this status (had not been closed out) despite the requirements of the March 7, 1985 supplemental response to CAR No. 4b-82-45 to do so by April 12, 1985. A further review of the printout disclosed that an additional 710 MRs had been field completed between February 19, 1983 and September 30, 1985, but had not been closed out. This represents a review duration in excess of 60 days which is considered excessive. These failures to complete corrective actions associated with CAR 4b-82-05 and associated supplements and to properly manage the review process to prevent recurrence is an example of failure to take prompt corrective action and is a violation (327-85-45-06, 328-85-45-06).

TABLE 1

MAINTENANCE REQUESTS REVIEWED BY INSPECTOR AND LICENSEE

MR Number	Completion Required Before Plant Startup NRC Inspector Determination	Licensee Determination
Y102554	Not required	Not required, but will be done
A536974	Yes	Yes, before Mode 3
A536273	Yes	Yes, Completed
A520434	Yes	Yes, Completed
A548375	Yes	Yes
A548376	Yes	Yes
A533760	Yes	Yes
A285227	Yes	Yes, Completed
A546226	Yes	Yes
A237970	Not required	Not required
A534592	Yes	Yes
A561762	Yes	Yes
A562888	Not required	Not required
A522163	Yes	Yes
A282103	Not required	Not required
A244832	Not required	Not required
A546281	Yes	Yes, perform requested evaluation
A295578	Not required	Not required, but will be done
A521756	Yes	Yes
A520429	Yes	Yes
A548442	Yes	Yes
A550462	Yes	Yes
A523146	Not required	Yes
A548426	Yes	Yes
A548431	Not required	Yes

The inspectors reviewed the licensee's program for machinery history and trend analysis and noted that actions are being initiated to implement a trend analysis program. The provisions for this program are currently being drafted into Standard Practice procedure SQM-58. As presently conceptualized, this trend analysis program will establish a history data base through the TVA EQUIS program for NPRDS reportable maintenance items, maintenance activities associated with 10 CFR 50.49 equipment, maintenance activities associated with CSSC equipment failures, and maintenance activities associated with some non-CSSC equipment failures. The program will ensure unique identification for each component entered into the history data base and will establish a trending threshold to determine repetitive equipment problems for a specific component and generic equipment problems for a particular type of component. The inspectors reviewed machinery history for main feedwater isolation valves and also for UHI level switch problems noted in paragraph 13 of this report with respect to this conceptualized trend analysis program and concluded that, as conceived, this program is capable of providing for effective trend analysis. The inspectors consider that some potential problems could be encountered with assuring effective trend analysis and recommended that the licensee consider the following items in development of their program to avoid potential problem areas:

- If the trending program is to work properly, functional categorization of data on the MR must be accurate and compatible with the EQUIS program categories to ensure that trending program input data is reliable. To this end, it is considered that written guidance and training for planners in this area is necessary.

- The trending threshold for repetitive failures looks at a specific component by unique identification and the trending threshold for generic failures looks at a particular model of equipment. Nothing really addresses groups of components with the same specific application (e.g., all main feedwater isolation valves, all steam generator blowdown valves, all UHI level switches). As indicated by review of the UHI level switch problem delineated in paragraph 13 of this report, review of component data in this manner can effectively provide repetitive failure information.

- Unless "out of calibration" conditions are reported as equipment failures, it is possible that problems such as the UHI level switch problem delineated in paragraph 13 of this report would not be identified through the trend analysis program. Consideration should be given to resolving this issue.

- Once the trend analysis program has been developed and implemented, a review, using an independent data system such as the potential reportable occurrence data base, should be conducted to confirm program reliability.

The inspectors consider that the overall program as specified in SQM-2 should be adequate to assure safe and proper completion of corrective maintenance. However, since the program is relatively new, insufficient data exists to properly assess the effectiveness of program implementation. Additionally, efforts being initiated in the area of machinery history and trend analysis show the potential for an adequate program, but can not be effectively assessed until implemented. The inspection team considers that additional review of the programmatic aspects of maintenance planning is warranted after actual completion of committed improvements and after sufficient implementation time under operating conditions has transpired. Accomplishment of this additional inspection is identified as an inspector followup item (327-85-45-07, 328-85-45-07).

During inspection of this area, the inspectors reviewed resolution of inspector followup item 327-85-24-01, 328-85-24-01. All elements of this item have yet to be fully resolved; however, the Maintenance Superintendent indicated that it is intended that each element will be resolved in conjunction with implementation of long range maintenance program improvements. Inspector followup item 327-85-24-01, 328-85-24-01 remains open.

The inspectors also reviewed implementation of commitments from the Sequoyah Nuclear Performance Plan with respect to communications from management to craft workers. Section 6.3.1 of the Sequoyah Nuclear Performance Plan states that in the past, performance of maintenance activities by craft workers and control of craft worker activities at the foreman level had not met the licensee's expected level of excellence. The licensee identified one of the root causes for this problem to be inadequate communication to the working level by management of job requirements, performance expectations, and feedback in instances of inadequate performance. Therefore, the licensee committed in section 6.3.1 of the Sequoyah Nuclear Performance Plan to improve such communications via the following three routine meetings:

a. Weekly meetings among the maintenance group supervisor, craft section supervisor, foreman, and general foreman for each of the three maintenance sections with frequent attendance by the Maintenance Superintendent. The stated purpose of these meetings is to discuss current problems associated with regulatory performance, procedural adherence, procedure adequacy, coordination, and scheduling and to make assignments as appropriate for their resolution. The Sequoyah Nuclear Performance Plan also states that plant policy, experience review items, and administrative requirements will be reviewed and discussed in these weekly meetings.

b. Monthly safety meetings in which the licensee has committed to communicate plant policy and requirements to all maintenance section employees.

c. Weekly crew safety meetings in which the foremen are to discuss plant experience items such as recent violations, LERs, and personnel errors with their crew members.

To determine if these meetings are being conducted and if the meetings are covering the subjects the licensee committed to cover, the inspector interviewed 12 Maintenance Department employees (2 foremen, and 2 craft workers from each of the three sections; electrical, instrument and control, and mechanical). The information obtained during these interviews indicates that these meetings are being conducted at the specified frequencies and that the topics covered in these meetings include those committed to in the Sequoyah Nuclear Performance Plan.

7. Review of Preventative Maintenance, Instrument Calibration, and Measuring and Test Equipment Programs

The inspectors conducted a review of the licensee's preventative maintenance (PM) program. The PM program is governed by Standard Practice SQM-57. The objective of the program is to maintain equipment to ensure quality at least equivalent to that specified in the original design and material specification. The requirements of SQM-57 apply to inspections, lubrication, adjustments, parts replacement, or other activities accomplished on a routine basis to ensure reliable performance of mechanical, electrical, and instrument and control equipment. The program requires the maintenance groups to prepare PM requests based on vendor information or other requirements. The maintenance scheduling unit is responsible for scheduling of PMs and also assembles the work packages to perform the PMs. The maintenance scheduling unit assigns a completion due date to each PM work package and routes the packages to the maintenance groups. After completion, the package is reviewed by the appropriate group prior to filing in the appropriate history file. The inspectors reviewed scheduling of PMs with the scheduling supervisor and determined that a complete schedule of PMs with respect to due dates based on stated frequency is available. However, no scheduling consideration is provided with respect to manpower allocation which would help group planners in manpower planning. Also, the scheduling of PMs does not consider the operability requirements of the components. This condition may require that a PM which would require a component to be taken out of service would not be able to be accomplished when required by the master schedule if the equipment is required to be operable to support the mode that the unit is in. Additional discussions were held with responsible personnel in each of the maintenance groups and the following conclusions were reached.

- Planners do not receive a schedule of upcoming PMs other than receipt of the PM packages just prior to required performance.

- Late or incomplete (cancelled) PM activities normally are only reviewed by the general foreman with regard to affect on the equipment. It should be noted that administrative requirements make it easier to cancel a PM rather than defer it. Engineering evaluation of incomplete or cancelled PMs normally is not accomplished. Also, higher management reviews of late or incomplete PMs appeared to be minimal.

- Equipment failure in general is not used as an input into the PM preparation. The mechanical maintenance and electrical maintenance groups had not used any equipment failure (trending) data as source of information during engineering review of PM instructions for revision. The instrument maintenance group did provide for equipment failure input into PM revision due to an internal requirement that engineers maintain a notebook of maintenance problems associated with assigned systems.

- Procedures were prepared in advance for performance of most PMs. However, the detail required to insure that all required data was recorded coupled with the degree of training provided to personnel performing PMs in order to insure that they understood the information that was required to be recorded appeared to be inadequate. This conclusion was based on review of completed PMs which were only partially performed or had missing data in blanks that required data or information. The inspectors also noticed that no procedure was in place to allow for temporary changes to PM procedures and that changes were being done without appropriate technical review.

- A lubrication control system had been incorporated into the program and the instrument maintenance and mechanical maintenance groups had this incorporated into their respective PMs. An electrical maintenance group representative was not sure that all lubrication requirements were being accomplished through the electrical maintenance PM program. This is due to mechanical maintenance initially writing lubrication requirements for electrical motors which were part of a vendor supplied motor and pump assembly into the mechanical maintenance PM program when the lubrication program initially was assigned to the site. A mechanical maintenance representative stated that an internal memo had been issued assigning electrical maintenance responsibility for lubrication requirements on electrical components; therefore, mechanical maintenance no longer included lubrication requirements in their PMs for motors on pump and motor assemblies. the inspector requested that the electrical maintenance group review all PMs on safety related components to assure that proper lubrication controls are in place.

Resolution of concerns with PM program weaknesses as delineated herein is identified as an Inspector Followup Item (327-85-45-08, 328-85-45-08).

The inspectors reviewed implementation of PM recommendations from vendor manuals into the PM program. Six vendor manuals were reviewed to determine if the vendor PM recommendation were incorporated into the PM program. Most were inexplicit or did not delineate PM recommendations. However, Pall Trinity Micro Corporation had very specific preventive maintenance required for their model 101 HA1-6HD9810-331 air dryers. These dryers, which the licensee uses in their auxiliary control air system, are required in order to supply clean, dry air to certain valves in the containment building following an accident. The inspectors noted that the licensee's PM program did not include these dryers. Furthermore, through interviews with the systems engineer, the inspectors determined that the dryers had not been considered for inclusion in the program. The inspectors toured the spaces containing the dryers. The inspectors noted the following items:

- The calibration stickers for the dryers instrument panels were dated in 1978.

- The optional package available from the vendor to easily check desiccant quality was not installed.

- Old paint on the dryers indicated that certain major parts had not been opened in a long time (e.g., pre- and after-filters, desiccant parts, check valves, and pilot valves).

The inspectors noted that information related to air dryer maintenance was previously provided in IE Circular 81-14 and IE Notice 81-38. In fact, IE Notice 81-38 even stated selected preventive maintenance items which were also delineated in the Pall Trinity Micro Corporation manuals. During the inspectors' review of SQM-57, it was noted that the document required that the responsible performing group shall identify the type and frequency of maintenance to be performed from vendor manuals, manufacturers' bulletins, Technical Specification requirements, division procedures, standard practices, 10 CFR 50.49 or other directives and documents. The Pall Trinity Micro Corporation manual suggests 14 types of maintenance be performed in timeframes from monthly to annually. These requirements include checking outlet dewpoint, blowdown of relief valves, replacing filter cartridges, inspection of desiccant, and cleaning of valves. These recommendations were not taken into consideration in developing the PM program. Consequently, this is an example of failure to follow procedure SQM-57 and is a violation (327-85-45-09, 328-85-45-09).

The inspectors reviewed the licensee's instrument calibration program by evaluating the calibration history of three safety-related instruments. Instruments selected were:

IN No.	Description
PI-62-110 (Unit 1)	Centrifugal Charging Pump Discharge Pressure Instrument
TR-61-138 (Unit 2)	Ice Condenser Ice Bay Temperature Monitor
MIS-65-16 (Common)	Emergency Gas Treatment System Train A Moisture Level Hi

For each instrument, calibration history was maintained current on calibration cards which were maintained in fire-resistent files as quality records. In addition, administrative records associated with each calibration were maintained in document control. The information contained in the local historical file included "as-found" and "as-left" data for each instrument calibration range and was sufficient in whole to provide a basis for trend analysis and for evaluation of the credibility of affected surveillance tests when the instrument is found out of calibration. For each instrument, documentation was maintained locally which certified that the instrument was calibrated by TVA Central Laboratory Services and that the calibration was traceable to nationally recognized standards. Each calibration card contained initials of the individuals who performed the calibration. The Materials Clerk who is assigned the primary responsibility for maintaining the file was able to identify the persons who had performed the calibrations. The use of initials on the calibration card was backed up by full signatures on the Instrument Maintenance Instruction forms filed in document control. Although approved procedures were available to calibrate the above instruments, detailed step-by-step instructions were not provided. The licensee stated that these instruments, though safety related, were not CSSC and that the calibration of non-CSSC (including safety-related and compliance related) instruments is considered within the skill of the craft. Calibration instructions involving CSSC instruments provide step-by-step guidance. It was beyond the scope of this inspection to evaluate the level of skill within the instrument maintenance group. However, the inspector observed a calibration of the feedwater control system (IMI-46) and determined that the technicians were capable of performing this calibration without detailed instructions.

The inspectors reviewed the implementation of corrective actions associated with MTE concerns noted within the last Systematic Assessment of Licensee Performance (SALP) reported for Sequoyah and delineated in NRC Inspection Report 327/85-05, 328/85-05, dated February 22, 1985. Improvements in the MTE program are scheduled for implementation on June 1, 1986, and consequently have yet to be completed. A review of a draft TVA summary report which addresses resolution of problems with MTE indicates that TVA considers that some improvement has been made with regard to control of MTE, as a result of actions taken to date, which include changes to control and issue all MTE from a central site services location. The inspectors consider that it is too premature to assess implementation of program improvements at this stage of development and that actions requiring completion prior to such assessment include:

- assigning singular program responsibility to one organization to ensure program consistency.

- revising all applicable procedures (including ancillary procedures) to reflect all changes within the MTE program.

Until these actions are implemented and this implementation reviewed violation 327-85-05-01, 328-85-05-01 remains open.

8. Review of Implementation of Vendor Recommendations for 10 CFR 50.49 Equipment Into Corrective and Preventative Maintenance Programs

The licensee recently revised Standard Practice Procedure SQM-62, Qualification Maintenance Data Sheets (QMDS) Implementation, Environmental Qualification Deviation Report, and Category II Upgrade Control, to clarify and upgrade the QMDS program. QMDS is a subset of the Equipment Qualification (EQ) data packages which are now being revised at TVA-Knoxville. At the time of the inspection, only preliminary EQ packages had been received at the site. The revised SQM-62 program will incorporate the final updated QMDS packages as they are received at the site. The major thrust of the revised QMDS program will be to eliminate the practice of using MRs to disseminate QMDS requirements by instead incorporating them into approved plant procedures. QMDS recommendations may still appear in MRs but a portion of them will also be incorporated in plant procedures. Scheduling of QMDS requirements will utilize the surveillance instruction (SI) program whenever the SI frequency satisfies the QMDS required frequency. When the frequencies are not compatible or when replacement of whole devices qualified for less than 40 years is required, scheduling will be accomplished with a new quality maintenance (QM) program. The entire QMDS program will be consolidated as Appendix C to SQM-62 after all revised QMDS packages are received. This appendix will list the unique identification number of the equipment, the EQ binder in which it is located, a description of each individual requirement, the frequency, the implementing instruction, and the responsible group. The inspectors questioned the licensee concerning restrictions involving maintenance activities taking place in the vicinity of qualified equipment which could create environmental conditions contrary to QMDS requirements. Standard Practice Procedure SQA-173, Sequoyah Nuclear Plant 10 CFR 50.49 Environmental Qualification Program, Section 6.5.1, states that planners should positively identify maintenance activities that may affect equipment within the scope of the SQN 10 CFR 50.59 program. Based on numerous interviews with maintenance planners, this aspect of the QMDS program is not well established. The licensee stated that a detailed EQ training program is scheduled to begin December 16, 1985, which should educate planners on these new requirements. The revised QMDS program appears to be adequate to ensure that QMDS requirements and recommendations will be properly accomplished; however, the manner in which the program is implemented will be critical to its success. The implementation of this program is again dependent upon the experience, guidance, and training provided to planners. As in the case of other planning activities, this area also needs to be reviewed following completion of training and after sufficient implementation time has transpired to allow for assessment of effectiveness.

9. Review of Maintenance Instructions

The inspectors reviewed several maintenance instructions (MIs), spanning each of the disciplines, in order to determine the instruction's understandability, adequacy of reviews, and technical accuracy. The instructions reviewed were MI-10.27, Diesel Generator Battery Maintenance and Inspections; MI-5.4, Blocking of Ice Condenser Lower Inlet Doors During

Cold Shutdown; MI-10.38, ASCO Solenoid valves; MI-10.38.1, ASCO Solenoid Valves 206-381-1R through 206-381-7R; MI-2.6, Disassembly, Inspection, and Reassembly of Reactor Coolant Pump No. 1 Seal and Runner - Units 1 and 2; Instrument Maintenance Instruction (IMI)-99 cc 11.6 B, Reactor Protection System, Offline Channel Calibration of ΔT/Tavg Channel II Rack 6, Unit 1; IMI-46, Feedwater Control System, Units 1 and 2; MI-11.4, Maintenance of CSSC Valves; MI-6.15, General Procedure, Tightening Bolted Joints; MI-6.20, Configuration Control During Maintenance Activities; and MI-11.10, G. H. Bettis Actuator Maintenance Guidelines, Units 1 and 2. Within the scope of this inspection, the requirements of these procedures appeared to be clear, technically adequate, and correctly incorporated into the observed maintenance activities. In particular, it was noted that MI-10.38 and MI-10.38.1 contained special requirements for the torquing of screws and application of lubricants to seals of ASCO solenoids in accordance with vendor recommendations. Suitable QC holdpoints were noted to be inserted in the procedures to ensure adequacy of the maintenance activity and suitable prerequisites were in place to ensure the activity would be performed in a safe and controlled manner. The Sequoyah Nuclear Performance Plan committed to a reduction in the tiering of procedures where possible such as to directly implement regulatory documents without intermediate level manuals. A schedule for the review and revision of surveillance instructions with respect to reduction in tiering of procedures has been promulgated and a similar schedule for maintenance instructions is in draft. Two recent procedures (EQ-10.46 and EQ 10.37), were noted to have incorporated this consideration in the drafting of their data sheets. The inspectors reviewed implementation of maintenance instruction improvements delineated in the Sequoyah Nuclear Performance Plan. The Sequoyah Nuclear Performance Plan committed to limitorque valve operator maintenance procedure revisions in order to incorporate appropriate measures addressing the limitorque valve operator gear reversal problem identified at Browns Ferry. Maintenance Instruction MI-11.2A, has been drafted to provide guidelines for the maintenance of limitorque SB-00, SMB-000, and SMB-00 valve operators and the adjustments of torque and limit switches. MI-11.2A incorporates measures addressing the gear reversal problem and is in review for approval. Two additional procedures are in draft to address the gear reversal problem for the remaining CSSC and non-CSSC limitorque valve operators. The Sequoyah Nuclear Performance Plan committed to the development of a checklist for review of maintenance instructions. These maintenance instruction review checklists were reviewed for MI-9.3.1 and MI-10.35, and demonstrated in those areas implementation of this commitment. The Sequoyah Nuclear Performance Plan committed to the November 15, 1985 interim implementation of an instruction review sheet to obtain input from craftsmen to ensure adequacy of existing maintenance instructions. The inspector reviewed procedures in three maintenance shops and found maintenance instruction review sheets being used on 22 of 23 procedures reviewed. The inspectors consider that this demonstrates implementation of this commitment.

During a review of the maintenance program, the inspectors noticed that the procedures which describe and control the maintenance program such as SQM-1, Sequoyah Nuclear Plant Maintenance Program; and SQM-2, Maintenance Program, were written as standard practices. The inspectors determined that standard practices do not receive Plant Operations Review Committee (PORC) review. The inspectors informed the licensee that they considered that the above listed procedures are required by technical specifications paragraph 6.8.1.a, and also require PORC review in addition to plant manager approval as required by technical specification 6.8.1.b. The licensee then provided the inspector with a copy of Division of Quality Assurance audit finding from Audit Report No. QSQ-A-85-0010. The finding (Deviation QSQ-a-85-0010-D01) stated that SQN Maintenance Program procedures are not being reviewed by PORC as required by the technical specifications. The Sequoyah response dated August 14, 1985, stated that a general procedure for the control of maintenance, repair, and replacement work will be prepared. This procedure will be issued by December 31, 1985. After learning that the issue had been licensee identified, the inspectors reviewed the index of standard practices and questioned whether other standard practices should also be PORC reviewed. During the inspection exit, the licensee committed to PORC review the maintenance program procedures (SQM-1, SQM-2, SQM-57, and SQM-58) and to also review the other standard practices to determine if others require PORC review. Additionally, the licensee committed to issue an LER on this matter. Until all actions have been completed such that it can be verified that the licensee actions satisfy all requirements of 10 CFR 2 Appendix C for self-identification and correction of violations, this item will be identified as an inspector followup item (327-85-45-10, 328-85-45-10).

10. Review of Sequoyah's Application of Lessons Learned From The Maintenance Aspects of the Davis Besse Auxiliary Feedwater Event

The inspectors reviewed the licensee's evaluation of Generic Letter 85-13 which transmitted NUREG-1154 with respect to Auxiliary Feedwater (AFW) containment isolation valves and other safety related valves and the reliability of the AFW system. The inspectors noted that during the week of this assessment, the licensee received Inspection and Enforcement (IE) Bulletin 85-03 which requires completion of specific actions associated with the Davis Besse AFW event. The inspectors noted that as part of the licensee evaluation of NUREG-1154, the licensee stated a review of safety related MOVs to assess the pertinent failure modes affect[illegible] valve performance under design basis conditions would be consio..ed. The inspectors noted that IE Bulletin 85-03 requires review and documentation of the design basis for operation of motor-operated valves in high pressure coolant injection, core spray, and emergency feedwater systems. The inspectors noted that as a result of concerns over AFW system reliability, Sequoyah formed an AFW system task force to evaluate the reliability of the AFW system. As a result of this task force evaluation, the licensee identified 24 action items to improve the overall reliability of the AFW system. These action items are tracked by the AFW system engineer. The AFW system engineer also trends, on a monthly basis, the number of issued potential reportable occurrences which affect the AFW system in order to trend system performance. The inspectors reviewed the AFW system task team report and determined the status of the 24 action items recommended by the task force. All items were being tracked by the AFW system engineer and most items had already been completed or were in the process of completion.

The inspectors reviewed the Motor Operated Valve (MOV) program which is being initiated at Sequoyah as a result of Limitorque valve operator pinion gear reversal problems experienced at TVA's Browns Ferry facility. Sequoyah conducted an investigation to determine what maintenance had been performed on CSSC Limitorque valve operators in which the pinion gear may have been disturbed. This investigation identified five valves on which maintenance had been performed that may have effected the pinion gear. These five valves have been inspected by the licensee for proper pinion gear installation and no problems were identified by the licensee. The licensee is presently developing a comprehensive safety related MOV program. This program will consist of visual inspection, lubrication and testing. As part of the MOV program, the licensee has instituted a major rewrite of the limitorque maintenance procedures. One aspect of the rewrite program is to replace generic limitorque maintenance instruction with instructions addressing specific type of limitorque valves. This rewrite is scheduled for completion in January 1986. Sequoyah has instituted a composite crew to perform maintenance and testing of MOVs. This crew consists of a foreman, two mechanics, and four electricians. All personnel, with the exception of two electricians, have attended the limitorque training program. The two electricians that have not attended the limitorque training are paired with the two electricians that have attended the training. As part of the MOV program, Sequoyah has purchased Motor Operated Valve Test Systems (MOVATS) equipment and has received training from the MOVATS company on its use. Sequoyah presently plans to utilize the composite crew and MOVATS testing on 241 limitorque valves on units 1 and 2 prior to startup if resources and time permit. These 241 valves are undergoing modification to replace internal wiring on the valve operators to meet NUREG-0588, 10 CFR 50.49 requirements prior to startup. As the modification group completes modification and post modification testing on a specific limitorque valve, the valve is turned over to the composite crew for MOVATS testing and inspection. As of this inspection, MOVATS testing and inspection had been completed on six limitorque valves of which problems were identified on four valves. The inspectors consider that the results of the MOVATS testing and inspection should be evaluated as more valves are completed to determine the extent of problems and the need to test all 241 valves prior to unit startup. The inspector observed the MOVATS testing conducted on valve 2-FCV-70-134 per MI-10.43, Procedure for Testing of Motor Operated Valves Using the MOVATS-2000 System. During the conduct of the MOVATS testing, the limitorque motor tripped on overload as opposed to the torque switch as specified in the procedure. Investigation by the MOVATS personnel determined that a jumper was installed across the torque switch which prevented the torque switch from functioning. This jumper should have been removed during the performance of work plan 11853, NUREG-0588, 10 CFR 50.49 Valve Rewiring, that was performed by the modifications group prior to turning the valve over to the composite crew for MOVATS testing and inspection. Under normal operation of valve 2-FCV-70-134, this jumper would have no affect on the operation of the valve because the torque switch is not electrically connected. However, when the torque switch was inserted in the circuitry to accomplish MOVATS testing, this jumper prevented the torque switch from functioning and the limitorque motor tripped on overload. Review of work plan 11853 determined that this jumper should have been removed during the valve rewiring modification performed on the valve. Discussions with the modifications crew that performed the work indicated that this was the first valve they had performed the modification on and that not removing the installed jumper was an oversight, the torque switch was electrically disconnected from the circuitry as required by the work plan; however, the electrical leads were not removed as required per the work plan. The licensee instituted MR-A-295497 to visually inspect all valves that had already been functionally tested per the modifications package. Fifteen valves were inspected and no similar occurrences were discovered. The licensee also revised the procedure to visually inspect wiring during functional testing to verify correct wiring on the valves that have yet to be functionally tested per the work plan. Failure to remove electrical wiring in valve 2FCV-70-134 as required per work plan 11853 is another example of failure to follow procedure which has been identified as violation 327-85-45-09, 328-85-45-09.

11. Review of Implementation of Watts Bar Experiences at Sequoyah

a. Followup of Watts Bar Nonconformance Reports

The inspectors selected several non-conformance reports (NCRs) from Watts Bar files that were potentially generic to Sequoyah to determine if the experience review and lessons learned program at Sequoyah was delivering information, when required, to the responsible sections for corrective action. The Watts Bar NCRs which were reviewed and their dispositions at Sequoyah are as follows:

- NCR W-312-P identified a problem with the 6900V breaker on 2A-A shutdown board feeding ERCW pump D-A in which the breaker failed to open electrically by use of the handswitch in the main control room. The problem occurred when the mechanical linkage to the trip coil had a sheared pin preventing the trip. The pin failure was due to lack of fusion of a fabrication weld. A further random sampling of twenty breakers of similar make revealed six welds that were identified as questionable. Discussions with Sequoyah electrical maintenance section personnel indicated that they were aware of this NCR through informal discussion with Watts Bar electrical maintenance personnel. However, by the end of this inspection period, December 6, 1985, the Sequoyah electrical maintenance section had not received any formal documentation on this problem. This is not considered to be a problem at this point in time since this NCR was dated November 25, 1985, and a generic review is required to be performed by the engineering section in Knoxville. Office of Engineering Procedure (OEP)-17, Corrective Action, is the controlling procedure for generic reviews between sites and allows up to 30 days for analysis to be performed and documentation to be routed to the site. The licensee did perform an evaluation of this NCR for applicability to Sequoyah based upon preliminary information and determined that the breakers for the additional emergency diesel generator are manufactured by the same vendor and are of similar type. However, the licensee had not physically inspected the breakers for mechanical linkage damage as of this inspection.

- NCR W-310-P dated November 20, 1985, identified a problem with the additional diesel generator system in which the General Electric model 12 CFD differential protection relay is not seismically qualified per IE Notice 85-82. The licensee had not reviewed this NCR from Watts Bar since this item was evaluated per the IE Notice. This evaluation determined that the identified conditions are not applicable to Sequoyah since Westinghouse differential protection relays are used.

- Construction Deficiency Report (CDR) WBRD-50-390/85-52 was issued in accordance with 10 CFR 50.55(e). This CDR identified improperly installed ASCO solenoid valves at Watts Bar. As of the end of this inspection period, the licensee was not aware of this CDR through the formal or informal process. However, at this point in time, this can not be considered to be a problem since the CDR was issued November 19, 1985. Again, per OEP-17, engineering has 30 days to complete a generic review. The inspectors toured the plant and observed several series 8316 ASCO solenoid valves which were recently installed at Sequoyah as part of the NUREG 0588, 10 CFR 50.49 program. The specific valves inspected were 1-FSV-63-64, 1-FSV-68-305, 1-FSV-77-20, and 1-FSV-63-42 which are located in the unit 1 690 foot elevation pipe chase. The inspectors learned through discussions with the licensee that these solenoids were provided from the vendor with mounting brackets installed on each end of the valve. This configuration was seismically and environmentally qualified by the vendor. However, the valves inspected had mounting configurations that differed from that provided by the vendor. Valves 1-FSV-63-64 and 1-FSV-63-42 had only a bracket attached to one end and valves 1-FSV-68-305 and 1-FSV-77-20 were mounted by the ½ inch piping that connects to the inlet and outlet ports of the solenoids. In turn, the piping is supported by a unistrut hanger. The inspectors questioned the original seismic qualification of these solenoid valves and requested documentation that proved that mounting the solenoids by using unistrut piping supports was a seismically analyzed and approved method. Since the licensee was unable to provide this documentation by the end of this inspection period, the seismic qualification verification of these valves is identified as unresolved item (327-85-45-11, 328-85-45-11). With respect to the environmental qualification of the four valves, the inspector reviewed engineering change notice (ECN)-6487 which was issued in September 10, 1985, and work plan (WP) 11806. The purpose of this ECN was to replace the existing solenoid valves with qualified valves to meet NUREG 0588 requirements and the WP gave detailed instructions to implement the actions required by the ECN for unit 1. The inspector noted that neither the ECN nor the WP denoted any special requirements for disassembly or reassembly of these valves to allow for installation. In these cases, one or both of the mounting brackets were removed in order for the valves to be installed to conform to the existing mounting configuration. This required removal and replacement of two of the four screws, at the end of each valve body, that maintain the NUREG 0588 boundary. However, no torque values or tightening patterns were specified in the ECN nor the WP and discussions with the licensee indicated that no special torquing of the screws was performed. The vendor bulletin gives specific torque values for these screws and requires that a criss-cross tightening pattern be used to maintain the NUREG 0588 boundary. The inspectors requested that the licensee provide documentation to show that the NUREG 0588 boundary was not violated upon removal and reinstallation of the valve body screws. Since the licensee was not able to provide this documentation by the end of this inspection period, the verification of the environmental qualification of these solenoid valves is identified as unresolved item (327-85-45-12, 328-85-45-12).

- Non-ASME Significant NCR W-295-P dated November 21, 1985, identified a problem with the automatic to manual transfer switch for the emergency diesel generator excitation system. The problem involved the inability to select between the manual and the automatic voltage regulators in the remote (main control room) location due to improper wiring of the "K2" and "K3" relays which allow for this transfer capability. Discussions with licensee personnel indicated that they were aware of this NCR through the formal process. However, as of the end of this inspection period, a licensee determination for existence of similar problems at Sequoyah had not been completed.

- Numerous NCRs have been generated at Watts Bar with regard to cable pulling deficiencies. The inspectors held discussions with the appropriate licensee management to review Sequoyah's evaluation of these problems. The licensee indicated that they were aware of cable pulling problems at Watts Bar and had received a Significant Condition Report from engineering in August 1985. The licensee further indicated that a review for applicability at Sequoyah was completed in September 1985, and work was consequently stopped based upon the fact that Sequoyah was pulling cable under the same specifications as Watts Bar. The general specification for cable pulling, G-38, was subsequently revised and cable pulling operations were reinitiated, although pulling at Watts Bar was only partially authorized under certain conditions. At the beginning of November 1985, the licensee learned that a full stop work authority was again in effect at Watts Bar. Consequently, the licensee stopped work prior to reviewing information through the formal experience review process. At the end of this inspection period, the licensee had not received any formal documentation; however, informal communications have taken place with Watts Bar.

As a result of inspection of these specific items, the inspectors concluded that the licensee is aware of problems at Watts Bar that may be generic to Sequoyah. The inspectors noted that the formal experience review and lessons learned program takes a period of up to four weeks for applicable documentation to get from one site to another once the generic review process has begun. However, a timely informal communications process is in effect between the sites prior to that time so that items of mutual interest may be discussed in a timely manner. The inspectors will review the implementation of OEP-17 to determine if all significant NCRs generated at Watts Bar (including construction generated NCRs) receive an adequate and timely review. This item is identified as an Inspector followup item (327-85-45-13, 328-85-45-13) and will be followed up by the Watts Bar resident inspector.

b. Nuclear Safety Review Staff Inspection Report Followup

The inspectors reviewed numerous discrepancies identified by TVA's Nuclear Safety Review Staff (NSRS). These discrepancies had been identified and documented in several NSRS inspection reports for Sequoyah during 1985. The inspectors noted that NSRS had not conducted followup inspections at Sequoyah to determine if corrective action for these discrepancies had been implemented. Therefore, the inspectors selected several of these items to determine if the responsible sections were aware of the NSRS concerns and if corrective action had been taken if necessary. The selected deficiencies, denoted by NSRS item number, and resultant corrective actions are noted as follows:

- R-85-03-NPS-08, Surveillance of Maintenance Programs for All Nuclear Plants. This NSRS concern identified that surveillances of the maintenance activities by onsite QA groups have not been adequately performed. The inspector discussed this concern with the appropriate licensee personnel and learned that the Sequoyah QA section prepared a response that specified that five QA evaluators perform surveillance of maintenance activities for the various licensee maintenance sections. In addition, the response specified that these QA inspections include reviews of documentation to ensure tests are required as appropriate, observation of test performance, and verification that acceptance criteria are met. Also, the response indicated that the quality engineering section has performed and will continue to perform an after-the-fact review of MRs on CSSC equipment for documentation, correction of problems encountered, and verification that acceptance criteria are met. As of the response date, eight surveys of maintenance activities had been performed for 1985. The inspectors reviewed the survey checklists and verified that they contained the requirements delineated in the response to the NSRS concern. Some of these requirements are as follows: check MR documentation, verify that a clearance has been established, verify that the MR has complete instructions and provisions for configuration control, verify that appropriate QC holdpoints and post-maintenance testing requirements are established, verify that the procedure does not violate Technical Specifications, and verify that acceptance criteria are met.

- R-85-02-SQN/WBN-02, Maintenance, Operating, and Test Instructions at Watts Bar and Sequoyah. This NSRS concern specified that Sequoyah instructions were not adequate to provide the level of confidence needed for tube fitting maintenance activities as a result of the thimble tube event at Sequoyah. The inspectors discussed this item with the licensee and learned that revision 7 to MI-1.9, Bottom Mounted Instrument Thimble Tube Retraction and Reinsertion, had been issued. The inspectors noted that the revision incorporated: (1) a precaution to ensure that, except as allowed in (2) below, no maintenance on the high pressure fittings was to be performed while primary system pressure is above atmospheric pressure; (2) a precaution that any maintenance on the fittings above atmospheric pressure be performed by a unique PORC approved procedure; (3) a requirement for the cognizant engineer to be present during the tightening process; and (4) a requirement for QA to complete and document a visible check for any evidence of reactor coolant leakage during mode 3.

- R-85-03-NPS-07, Common Mode Failure at all Plants. This NSRS concern identified that the mechanical maintenance section did not appear to have a method of avoiding common mode failures unlike the electrical and instrument maintenance sections. The inspectors discussed this item with the appropriate licensee personnel and learned that the mechanical maintenance section has issued a section letter and three subsequent revisions on this subject. The inspectors reviewed mechanical maintenance section letter (MMSL)-A36, Common-Mode Failures, Maintenance Initiated. The purpose of this procedure is to delineate the responsibilities of the mechanical maintenance section to identify and prevent maintenance initiated common-mode failures to CSSC equipment through proper training, proper procedure preparation, appropriate supervisory review, assignment of various personnel to jobs, and adequate post-maintenance testing. However, as of this inspection period, implementation of this section letter had not taken place. The inspectors consider that implementing precautions to prevent common mode failure is required for safe operation of the plant. Therefore, followup of the implementation of the requirements of MMSL-A36, is identified as inspector followup item (327-85-45-14, 328-85-45-14).

- R-85-02-SQN/WBN-01, Office-Wide Awareness Bulletin for Tube Fitting Maintenance Activities. This NSRS concern involved a recommendation that an office-wide awareness bulletin be issued relative to tube fitting practices as a result of recent industry events with failures of pressurized tube fittings during maintenance activities. The inspectors discussed this item with the appropriate licensee personnel and learned that a safety bulletin has been issued and that training has been conducted for all mechanical maintenance employees with regard to tube fitting awareness. This bulletin referenced IE notice 84-55 which described seal table leaks at Zion and Sequoyah nuclear plants. The safety bulletin addressed the Office of Nuclear Power's policy on compression fittings. The inspectors reviewed the bulletin and noted that it contained a brief summary of problems associated with interchanging fittings with those of different manufacturers, problems associated with improper orientation of fittings, specific procedure requirements for disassembly and reassembly of connections, and methods of inspection and use of "SWAGELOCK" gap inspection gauges.

- R-85-03-NPS-04, American Society of Mechanical Engineers (ASME) Section XI Post-Maintenance Valve Testing at Sequoyah. This NSRS concern specified that the instrumentation maintenance section did not identify the need for ASME Section XI valve testing when they performed work on Section XI valves. Discussions with appropriate licensee personnel indicated that the instrument maintenance planners are aware of the requirements for ASME Section XI valve testing as delineated in surveillance instruction (SI)-114.1, ASME Section XI Interview Inspection Program, and SI-114.2, Inservice Inspection Program for TVA Sequoyah Nuclear Plant (Unit 2). The licensee also indicated that training on the requirements for valve stroke testing is being prepared for all instrument maintenance personnel (including planners) in addition to general ASME Section XI training. The inspectors' concern about the importance of a formal training process for planners has been previously addressed in paragraph 6 of this report.

As a result of inspection of these specific items, the inspectors have concluded that the licensee is aware of the NSRS concerns and is implementing appropriate corrective actions as required.

12. Review of Maintenance Training

The inspectors reviewed maintenance training referenced by the licensee in the Sequoyah Nuclear Performance Plan. The review included training on administrative requirements, instrument maintenance training, mechanical maintenance training, electrical maintenance training, unresolved safety question determination training for engineers, and maintenance request training. Within these areas, the inspectors made the following observations:

a. Training on Administrative Requirements (paragraph 6.3 of the Sequoyah Nuclear Performance Plan)

This course is provided by the Power Operations Training Center (POTC) and gives maintenance craft personnel 16 instructional contact hours in quality assurance requirements, the maintenance work control system, clearance procedures, temporary alterations and procedural adherence. A review of the student manual indicates that the course is well structured and provides instruction to the detail necessary to achieve the indicated learning objectives. In addition, course administration includes controlled instructor lesson plans, attendance control, examination standards and remedial training. Approximately 86 percent, 90 percent, and 100 percent of plant mechanical electrical and instrument maintenance personnel respectively have completed this training. Additional training has been scheduled for completion in administrative requirements for all maintenance craft personnel; however, the training schedule is not based upon unit restart. The inspectors consider that this training in administrative requirements meets the elements stated in the Sequoyah Nuclear Performance Plan and is adequate.

b. Instrument Maintenance (paragraph 6.6.1 of the Sequoyah Nuclear Performance Plan)

The instrument maintenance apprentice training program is INPO accredited and provides extensive training. The program is approximately 3.5 years (7000 hours) in duration of which 17 months (2640 hours) of this time is formal classroom and laboratory instruction with the balance of time consisting of formalized on-the-job training (OJT) at the plant. All phases of the program contain student evaluations in the form of written examinations, oral boards and plant craft or POTC subcommittee progress review. Overall, the program appeared to contain the elements and management oversite necessary to provide technically qualified replacement instrument maintenance personnel.

c. Mechanical Maintenance Training (paragraph 6.6.2.(a) of the Sequoyah Nuclear Performance Plan)

The mechanical training program has not received INPO accreditation. The self evaluation report is scheduled for submittal to INPO in January 1986, with INPO accreditation team visit anticipated in the Spring of 1986. Mechanical maintenance training consists of three general areas, plant systems familiarization, mechanical update training and mechanical specialized training and is administered by the POTC. Three full-time mechanical instructors are assigned to conduct the courses in each of these areas. Allocation of additional space at the POTC is being developed into instructor offices, classrooms and laboratories. A review of this program indicates that adequate resources and management attention are being allocated in order to ensure that mechanical maintenance personnel are well trained in the technical elements necessary to accomplish their job function. The inspectors noted that the training is not a certification process; therefore, the control of job function in the plant is not based on completion of any segment of the training program. Determination of whether a mechanic is qualified to accomplish a job task is performed at the foreman level and is not administratively related to current training status. The plant systems familiarization course consists of 80 hours of formally administered and controlled instruction in the following areas:

Mechanical Print Reading
Reactor Familiarization
Condensate and Feedwater
Main Steam, Turbine and Generator
Reactor Coolant
Chemical and Volume Control
Reactor Core Cooling
- Shutdown Cooling
  - Residual Heat Removal
- Emergency Core Cooling
  - High-Pressure Coolant Injection
  - Low-Pressure Coolant Injection

Containment
- Ice Condenser
- Containment Spray
- Containment Isolation

Cooling Water System
- Component Cooling Water
- Essential Raw Cooling Water
- Spent Fuel Pool Cooling

In addition, periodic retraining is provided on additional systems and areas as designated by formal and informal feedback and program evaluation.

Current estimates of the status of completion of training are as follows:

Craft	Training Completed	Retraining Completed
Boilermakers	63%	100%
Machinist	65%	60%
Steamfitters	86%	74%
Asbestos Workers	57%	100%

Craft (Continued)	Training Completed	Retraining Completed
Carpenters	79%	75%
Sheetmetal Workers	100%	60%

The update training consists of the following courses and hours of instruction. Courses are provided only to applicable crafts (e.g., only carpenters get Rigging Fundamentals).

Course Title	Training Hours
Air Compressors 1	8
Air Compressors 2	8
Basic Bearings	12
Centrifugal Pumps 1	8
Centrifugal Pumps 2	8
Coupling and Shaft Alignment	12
Heat Exchangers 1	8
Heat Exchangers 2	8
Piping Auxiliaries	8
Positive Displacement Pumps 1	8
Positive Displacement Pumps 2	8
Safety Valves 1	8
Safety Valves 2	8
Steam Traps	8
Rigging Fundamentals	16

Estimates of the status of completion of update training are as follows:

Craft	Training Hours
Boilermakers	45%
Machinist	21%
Steamfitters	29%

The specialized training consists of the following courses and hours of instruction which are provided to applicable crafts.

Course Title	Training Hours
Limitorque Actuator Maintenance	24
Valve Maintenance 1	8
Valve Maintenance 2	32
Emergency Diesel Generators	24
Refrigeration and Air Conditioning	40
Reactor Coolant Pump Seals	8
Initial Tube Fitting	4
Crane Operator Screening	Approx. 1-1/2
Procedures	16

d. Electrical Maintenance (paragraph 6.6.2(b) of the Sequoyah Nuclear Performance Plan)

The electrical maintenance training program has not received INPO accreditation. The self evaluation report is scheduled for submittal to INPO in January 1986 with INPO accreditation team visit anticipated in the Spring of 1986. Electrical maintenance training is administered by the POTC and consists of plant systems familiarization, electrical update training and electrical specialized training. Three full time electrical maintenance instructors conduct the courses in the above areas. Allocation of additional space at the POTC is being developed into instructor offices, classrooms and laboratories. A review of this program indicates that adequate resources and management attention have been allocated in order to ensure that electrical maintenance personnel are well trained in the technical elements necessary to accomplish their job function. The inspectors noted, as in the mechanical maintenance program, that the electrical maintenance training program is not a certification process. Determination of whether an electrician is qualified to accomplish a job task is performed at the foreman level and does not administratively require completion of the electrical maintenance training program. Topics covered in plant systems familiarization consists of 80 hours of classroom instruction. In addition, retraining is provided as determined by plant feedback and program evaluation. The following topics are contained in this curriculum:

<u>Plant Systems Familiarization (80 Hrs)</u>

Mechanical Print Reading
Electrical Print Reading
Reactor Familiarization
Condensate and Feedwater
Main Steam, Turbine and Generator
Reactor Coolant
Chemical and Volume Control
Reactor Core Cooling
- Shutdown Cooling
  - Residual Heat Removal
- Emergency Core Cooling
  - High-Pressure Coolant Injection
  - Low-Pressure Coolant Injection

Containment
- Ice Condensor
- Containment Spray
- Containment Isolation

Cooling Water Systems
- Component Cooling Water
- Essential Raw Cooling Water
- Spent Fuel Pool Cooling

<u>Systems Retraining (24 Hrs)</u>

Electrical Print Reading Review
- Single Line Diagrams
- Schematics
- Logic Diagrams
- Connection Prints
- Conduit and Grounding Drawings

Power Distribution Systems
- Offsite Power
- Onsite Power
- Unit Boards
- Diesel Generators
- Vital DC Power
- Vital Inverters
- Preferred Inverters

An estimated of the status of plant system familiarization training completed is as follows:

Training Completed	Retraining Completed
80%	95%

Update training consists of the follcwing topics and hours of instruction:

Course Title	Training Hours
DC Motors, Control Circuits and Troubleshooting	20
AC Motors, Control Circuits and Troubleshooting	28
AC and AC Generators	8
Transformer Maintenance	12
Battery Maintenance	12
Measuring and Test Equipment	16
EMT-21a Wheatstone Bridge	
EMT-21b The Megohmmeter	
EMT-21c Biddle Digital Low Resistance Ohmmeter	
EMT-21d Hypot	

Approximately 21 percent of plant electricians have completed this entire curriculum.

Specialized training consists of the following topics and instructional hours.

Course Title	Training Hours
Annunciator Maintenance & Troubleshooting	40
Circuit Breaker Maintenance	40
Limitorque Actuator Maintenance	24
Elevator Maintenance	64
Basic Oscilloscope Operation	24
Solid State Electronics	40
Emergency Diesel Generators	24
Refrigeration and Air Conditioning	40
Crane Operator Screening	Approximately 1-1/2
Procedures	16

e. Unresolved Safety Question Determination (USQD) Training for Engineers (paragraph 4.13 of the Sequoyah Nuclear Performance Plan)

USQD training for engineers is conducted by the plant compliance staff and provides training in procedure SQA 119, Unresolved Safety Question Determination, for plant engineers. These courses were provided at various times and consisted of approximately one instructional contact hour in changes to, philosophy of, and implementation of SQA 119. During the review of this training, the inspectors noted that the training was not provided in a controlled manner. mandatory attendance was not established and attendance sheets were not utilized; therefore, accountability and auditability of course attendance was not possible. Course instructors did not utilize approved and reviewed lesson plans with stated learning objectives; therefore, course consistency could not be assured. In addition, no form of student evaluation was utilized to ensure that a minimum level of knowledge was retained. Since the USQD material was administered in an uncontrolled, nonauditable manner, the inspectors do not consider that the instruction which was presented constitutes training. Additionally, the inspectors can not confirm that all applicable engineers have received the training committed to in the Sequoyah Nuclear Performance Plan, paragraph 4.13. The licensee should ensure that training provided by organizations other than the POTC is administered in a controlled and auditable manner. Additionally, the licensee should review that training designated in the Sequoyah Nuclear Performance Plan, paragraph 4.13 to ensure that all applicable personnel have received requisite training as stated. Resolution of this concern is identified as an inspector followup item (327-85-45-15, 328-85-45-15).

f. MR Training

In response to the thimble tube cleaning event, the licensee provided MR training to personnel authorized to review MRs in the QA organization. The inspector reviewed course attendance records dated September 21 and 28, 1984, and December 20, 1984, and verified that the training was conducted as required.

13. Review of Past Maintenance Related Events and Repetitive Failures

During the course of this inspection, the inspectors reviewed four events dealing with maintenance activities and evaluated licensee corrective actions on three types of components that have experienced repetitive type problems. The results of these reviews are delineated below.

a. Review of LER 327-85-27 (Loss of Residual Heat Removal (RHR) Suction)

On May 14, 1985, while in Mode 5 at 140°F and 10 psig, both trains of Unit 1 RHR were isolated by a false high pressure signal from Reactor Coolant System (RCS) pressure transmitter PT-68-66. Unit 1 had been in cold shutdown for approximately one month prior to the event. The RCS temperature increased from 140°F to 149°F during the event. The train B RCS transmitter was on a common sensing line with the train B Reactor Vessel Level Indication System (RVLIS), which was undergoing a high pressure test to assure adequate fill of the RVLIS sensing lines. The transmitter sensed the high pressure in the RVLIS and isolated FCV-74-2, the RHR suction line isolation valve, at 500 psig, as designed. Operators promptly responded to indication of FCV-74-2 closing and secured the operating RHR pump. The RHR system was isolated for 16 minutes while operators diagnosed the problem and depressurized the RVLIS. The inspectors reviewed the maintenance activities associated with this event to determine if they were conducted in accordance with administrative procedures governing the control and accomplishment of plant maintenance. Corrective actions were evaluated to determine if they were promptly implemented and corrected the root cause of this event. The event was caused by an inadequacy in SI-484, Periodic Calibration of RVLIS and RCS Wide Range Pressure Channels (P-403, P-406) (Refueling Outage), which prescribed the configuration of the RVLIS for the for the test. The test was performed in accordance with Special Maintenance Instruction (SMI) 0-68-26, Partial Fill of RVLIS System - Upper Plenum Sense Lines (trains A and B). Steps to preclude this event, such as isolation of the RCS transmitter from RVLIS or disabling the pressure signal to the RHR suction isolation valve, were not included in either procedure SI-484 or SMI-0-68-26. The licensee stopped work on the RVLIS test after the system was depressurized. The procedures were reviewed in detail by the licensee, revised as needed, and were reviewed and approved by PORC. In addition, the licensee conducted a review of other procedures being utilized to perform outage work to assure that no other conflicts existed. Failure to provide an adequate procedure for testing of the RVLIS was previously cited as an example of violation 327-85-17-04, 328-85-17-03. A review of licensee revisions to SI-484 and SMI-0-68-26 to correct the identified deficiency indicates adequate resolution of this example of the above violation.

b. Review of LER 327-85-21 (Main Control Room Ventilation Isolation)

The inspectors reviewed the subject LER and determined that the licensee identified that the main control room isolation signal was generated due to a spike on radiation monitor RM-90-125. After the event, a maintenance request was written to investigate the cause of the problem. During the investigation, it was determined that the monitor had a defective power supply. The power supply was replaced and the radiation monitor was returned to service. The inspectors reviewed the completed MR, A-528889, and associated work documents and determined that the troubleshooting and repair of RM-90-125 was accomplished by approved procedure IMI-134. The cause of the failure appeared to be properly evaluated and appropriate corrective action was taken to resolve the problem. The inspectors' review also determined that required administrative approvals were obtained before initiating work, QA control and review was accomplished as required, and corrective action records were being stored as part of the package. The inspectors reviewed IMI-134 and determined that the PORC approved procedure conformed to administrative requirements including format, approval, control, and necessary detailing of work instructions.

c. Review of LER 328-85-009, (Reactor Trip from Turbine Trip from Loss of Stator Cooling)

LER 328-85-009 was reviewed to assess the cause of the failure and to determine if adequate corrective action was taken to reduce the probability of reoccurrence. It was determined that the event chronology was essentially as delineated within LER 328-85-009. The inspectors consider that the failure of 2A stator cooling water pump was not precipitated by licensee maintenance inadequacies. Additionally, it is considered that adequate corrective action has been implemented as a result of this event.

d. Review of LER 327-85-30 (Two Inadvertent AFW Starts Due to a Failed Condensate Pump Valve and Leaking Feedwater Regulator Valve)

LER 327-85-30 discusses two events in which the AFW pumps started inadvertently. The first event was caused by the condensate dump back valve from the hotwell failing open. This fluctuation caused the main feed pumps (on their turning gears) to trip, causing automatic initiation of the turbine driven AFW pump. The inspectors reviewed documentation associated with the repair and re-calibration of the affected valve and its associated controller. This documentation appeared complete and gave confirmation that work associated with this event was performed in accordance with requisite administrative controls and procedures. The second event occurred due to inadequate calibration which resulted in the valve being improperly seated. This caused the steam generator to flood up to 75% level thereby tripping the main feedwater system and starting AFW pumps. As a result of this event, the licensee has developed new instructions for ensuring proper seating of this type of valve during calibration.

e. Assessment of Repeated Ice Condenser Door Problems Since May 1985

Since May 1985, several unit 2 ice condenser intermediate deck doors have been repeatedly covered by an accumulation of ice severe enough to cause a limiting condition for operation as defined by Section 3.6 of the Technical Specification. On several occasions, the minimum torque necessary to open the doors has exceeded the Technical Specification limit. In all cases, ice was removed and the doors returned to operable status prior to reaching the time limit of the action statement. It was initially considered that the ice buildup was caused by inleakage of humid air through torn insulating tape on the overhead upper ice condenser doors. However, TVA evaluated this condition and determined that the torn insulating tape was not a major cause of the ice buildup. Rather, the problem has apparently been caused by ice condenser inleakage through the existing vents blankets in conjunction with high humidity conditions resulting from steam leakage through the steam generators manway. A power plant maintenance specialist who was interviewed considered that the steam leaks were the major factors for the problem, and that once these leaks were repaired, the icing problem would most likely be solved. The steam leaks were repaired during the current outage. Additional corrective action has been scheduled prior to startup to limit the vented airflow space and to provide extra insulation to minimize condensation above the intermediate deck doors. Workplan No. 11872 was PORC approved on November 27, 1985, and this modification will be completed prior to startup. Included in the scope of work is to install insulation behind the upper deck vent curtain and seal the bottom of the curtain above all ice condenser bays which do not contain vents. Vents are to be located at every third bay. Westinghouse assured TVA in a letter dated April 6, 1984, that the minimum vented area of 120 cubic feet could be adequately provided by the installation of a vent every third ice condenser bay. This modification will therefore not inhibit the design vent capacity which is based on the analysis of a small break loss of coolant accident. Another part of the modification to install insulation around radial beams located in the upper plenum. Water has been observed to condense on the radial beams and to drip on the intermediate deck doors below and freeze. Most of the icing in the past has occurred under the radial beams. The repair of the steam leaks and the installation of the modification described above should solve the recurrent ice condenser problems. However, until unit 2 is restarted and brought to full power for several weeks, the effectiveness of the corrective action cannot be determined. The licensee should closely monitor the situation after startup. The inspectors toured the ice condenser intermediate plenum and observed that several intermediate deck doors were severely iced over. Since the unit is below mode 4, ice condenser operability is not required. The current icing problem is apparently due to piping leaks from several air handling units and is not related to the general recurring situation. The inspectors were told that the problems with the air handling units would be resolved prior to startup. The inspector reviewed corrective actions taken in response to NRC violation 328-85-24-03, Failure to Monitor Ice Condenser Bed Temperatures at the Required Frequency. The principal NRC concern resulted from performance of ice removal activities without formal procedures needed for work on safety-related equipment. SI-108.1, Ice Condenser Intermediate Deck Doors - Visual Inspection, Lift Test and Ice Removal, was PORC approved and issued on November 27, 1985. This procedure which is scheduled to be performed weekly, formally controls pull test and ice removal activities and appears to satisfactorily resolve concerns regarding procedural controls on safety-related equipment. However, there is insufficient data to review implementation of this instruction and consequently violation 328-85-24-03 remains open.

f. Masoneilan Valve Failures

Steam generator blowdown valves, their paired isolation valves, and a safety injection system test isolation valve have had repeated repairs on their limit switch actuator arms and stem nuts. The valve vendor is Masoneilan for all three valve types. These valves are FCV-1-7, -14, -25, and -32; FCV-1-181 thru 184; and FCV-63-84, respectively. These valves have not been permanently fixed or replaced to prevent cyclic repairs; preventive maintenance and attempted repairs have been unsuccessful in correcting these failures. The mode of actuator arm or stem nut failure is generic to all three valve groups. The valves are air operated with stem nuts attaching the stem to the air diaphram. The limit switch actuator arms are attached to the stem by screws. The arms ride between limit switches, which when contacted by the arms, provide indication of valve position in the control room. Due to vibration or flow through the valves two events can occur; one, the stem nut loosens and the actuator arm swings clear of the limit switch and two, the retaining screws loosen on the actuator arm and the arm ceases to rigidly contact a limit switch. This mode of actuator arm or stem nut malfunction causes a loss of valve position indication. Site personnel had been evaluating and repairing steam generator blowdown valves and their paired isolation valves. Site actions on these valves have been as follows:

- In the valve repair procedure, a check was made of stem nut tightness.

- In accordance with a valve vendor suggestion, lock-tight was used, without success, to lock the stem nut to the diaphram and stem.

- In accordance with a valve vendor recommendation, the diaphrams on 1-FCV-1-7, 14, 25, and 32 valves were replaced with a diaphram which could withstand higher ambient temperatures since the space which housed the unit 1 isolation valves experienced elevated temperatures. A PM procedure was written in response to IE Bulletin 78-04 to address the NAMCO limit switches on the valves.

- In recognizing the stem rotation problem, a DCR, SQ-DCR-1978 dated July 1985, was initiated on this problem. However, discussions with licensee staff indicates that SQ-DCR-1978 was lost in typing and was never rerouted.

Prior to this inspection, the licensee initiated a revision to SQM 58, Maintenance History and Trending in order to establish a trend analysis program as discussed in paragraph 6 of this report. The inspectors consider that implementation of this trend analysis program would have detected these repetitive problems and could have prompted corrective action. To date, the corrective measures taken by the licensee have not satisfactorily resolved these problems and until such resolution is completed, this concern is identified as an inspector followup item (327-85-45-16, 328-85-45-16).

g. UHI Level Switches

The UHI lines are provided with four accumulator isolation valves, two in each line, which function to isolate the UHI accumulator to prevent the injection of nitrogen gas (driving force) into the RCS following the blowdown of UHI water. Actuation of UHI accumulator isolation is controlled by UHI level switches (LS-87-21, LS-87-22, LS-87-23, and LS-87-24). Each switch functions to close one of the four UHI accumulator isolation valves on low UHI water level. On November 22, 1982, three of four Unit 1 UHI level switches and three of four Unit 2 UHI level switches were found outside the setpoint tolerance of 103.4 ± 0.5 inches allowed by Technical Specification surveillance requirement 4.5.1.2.c during the performance of their required 18-month calibration. In addition, the fourth unit 2 UHI level switch was found to be inoperable due to a broken microswitch. The inoperability of UHI level switches was subsequently reported to the NRC pursuant to Technical Specification 6.9.1.13.b on December 21, 1982, via LERs 50-327/82-35 and 50-328/82-37. In a supplemental response to these LERs, the licensee committed to check the calibration of the UHI level switches on or before February 1, 1983, and to recheck it every 30 days if they were found out of tolerance and, if not, every 90 days. On January 15, 1983, the licensee discovered two of four unit 1 level switches out of tolerance (LER 50-327/83002) and on January 28, 1983, discovered four of four unit 2 level switches out of tolerance (LER 50-328/83013). In response to these findings, the licensee committed to continue checking the calibration of the level switches once per month. In addition, engineering assistance was requested from the TVA downtown office. The results of the once per month checks of the level switches are summarized in Table 3 on page 42. The licensee continued to find the level switches out of the Technical Specification tolerance throughout the spring of 1983. In response to this unsatisfactory trend, corrective actions continued including contacting Duke Power Company. Plant McGuire was also having problems with these switches and extensive interactions with the vendor representative (Barton) and with Westinghouse, both onsite and offsite, were directed towards improving calibration techniques and determining the root cause of the setpoint drift. On March 22, 1983, Westinghouse provided a Nuclear Safety Evaluation demonstrating that UHI water delivery limits of 900 cubic foot (minimum) and 1105 cubic foot (maximum) were acceptable for Sequoyah based on available LOCA analysis. This increased the maximum UHI volumetric delivery envelope from 1055 cubic feet which was utilized in establishing the Technical Specification level switch setpoint tolerance. Based on Westinghouse's reanalysis, the licensee submitted a Technical Specification change request to change the setpoint to 82.1 ± 5.6 inches above the tank vendor working line on March 28, 1985. On April 12, 1983, the licensee began investigating the availability of a qualified replacement for the UHI level switches. At that time, no other available replacement level switch was qualified. The licensee considered utilization of a "Static-O-Ring" (SOR) switch as a possible replacement switch and initiated implementation of qualification tests for this switch by Wylie Laboratories in conjunction with an inplant reliability test of the switch. By letter dated May 3, 1983, the NRC granted the previously requested Technical Specification change. On May 5, 1985, the licensee performed the last calibration check on unit 2 UHI level switch utilizing the 103.4 ± 0.5 inch setpoint. Four of four level switches were discovered to be out of tolerance and were subsequently recalibrated to the new setpoint (LER 50-328/83062). On May 6, 1985, the licensee performed the last calibration check on unit 1 UHI level switches utilizing the 103.4 ± 0.5 inch setpoint. Three of four level switches were found to be out of tolerance and were subsequently recalibrated to the new setpoint (LER 50-328/83066). The UHI level switches are Barton Model 288A. The licensee suspected that the observed setpoint drift was the result of a combination of inherent instrument drift, calibration technique, and environmental conditions (vibration). On June 28, 1983, the calibration procedure was revised to incorporate all vendor recommended improvements in the calibration of the Barton 288A level switch.

As a result of repeated problems with these Barton 288A level switches, the licensee instituted corrective actions as delineated in Table 2, page 41. These actions included:

(1) Contacted the vendor (Barton) and had a vendor representative onsite to investigate the problem and recommend improvements in calibration techniques.

(2) Contacted Westinghouse about calibration problems and requested reanalysis of UHI volumetric delivery envelope to justify a Technical Specification change to increase the allowed setpont tolerance.

(3) Contacted other plants (McGuire) with similar Bartons.

(4) Decreased the surveillance interval from the Technical Specification required 18 months to one month.

(5) Initiated efforts to determine a replacement level switch (SOR).

(6) Replaced installed Barton 288A level switches which showed excessive unreliability with other Barton 288A level switches from plant replacement inventory.

On August 24, 1983, the licensee initiated special test procedure SQ-STEAR-INST-83-13, Reliability Test of Static-O-Ring (SOR) Level Switch for UHI Water Accumulator. This procedure installed a SOR level switch in parallel with a unit 2 Barton 288A switch. The SOR switch calibration was checked monthly for a period of seven months to determine reliability. The last data point was taken on March 20, 1984, and on June 29, 1984, the Director of Nuclear Services recommended to the Site Director that the SOR calibration data and the simple construction and operation of the SOR switch indicated that it would be a reliable replacement and that final approval was pending resolution of Class 1E environmental qualification concerns which were being addressed by the vendor and the Division of Engineering Design. On June 1, 1984, the licensee prepared DCR 2111 to replace the Barton Model 288A UHI level switch with a more reliable one. This DCR was subsequently approved for transmittal to Engineering Design on January 27, 1985. Calibration data on the Barton 288A level switch remained good from June 1983 (implementation of the above corrective actions) until July 1984 on unit 1, and May 1984 on Unit 2. During the 14 month period on unit 1, Barton 288A level switches were found to be outside the allowed setpoint tolerance only five times, two switches in

June 1983 (LER 50-327/83084), one switch in November 1983 (LER 50-327/83156), one switch in January 1984 (PRO-1-84-038)+, and one switch in April 1984 (PRO-1-84-157)+. During the 12 month period on unit 2, no Barton level switches were found to be outside the tolerance.

From August 1984 on unit 1 and June 1984 on unit 2, Barton 288A level switch calibration data began a deteriorating trend of being outside the Technical Specification allowed setpoint tolerance as delineated in Table 3, page 42. Between August 1984 and August 1985, unit 1 Barton 288A UHI level switches were found outside the Technical Specification allowable setpoint tolerance on 10 occasions during monthly calibration checks. Between June 1984 and June 1985, unit 2 Barton 288A switches were found outside the Technical Specification tolerance on five occasions during monthly calibration checks. The only apparent licensee response to this out of tolerance trend was to recalibrate the out of tolerance Barton 288A level switches or to change out selected level switches with replacement Barton 288A level switches from plant stores. The inspectors consider that during this period of time there was indication that short term corrective actions established in June 1983 were not providing continued assurance of UHI level switch operability. Although long term corrective actions were still being pursued, additional short term corrective actions were not established to analyze the increased unreliability of level switches subsequent to June 1984. On March 28, 1985, Engineering Change Notice (ECN) L6359 was issued by the Division of Engineering Design to replace the unit 1 and unit 2 Barton 288A UHI level switches with a more reliable level switch (SOR). Work Plan 11751 was authorized on August 23, 1985, to replace the level switches on unit 1. Switch replacement has been completed; however, post-maintenance testing has not been completed due to the need to revise the calibration procedure, SI-196 for use on the SOR switch. At the time of this inspection, unit 2 replacement was not planned to be accomplished prior to unit restart; instead, it was scheduled to be accomplished during the next refueling outage following restart. The inspectors consider that the operability of UHI is questionable in light of continued problems with the Barton 288A level switchs and consequently consider that replacement and post-modification testing should complete prior to unit 2 restart. The licensee committed that this action would be completed prior to unit restart. This concern has been previously identified in paragraph 5 of this report as inspector followup item 327-85-45-02, 328-85-45-02.

+On January 1, 1984, 10 CFR 50.73 removed reporting requirement for these failures; therefore, only Potential Reportable Occurrence (PRO) reports were written by the licensee.

10 CFR 50, Appendix B, Criterion XVI requires that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, measures established by the licensee and placed in effect on June 1983 were not sufficient to assure continued operability of Barton 288A UHI level switches until the installation of a suitable replacement level switch, in that the Barton 288A level switches displayed a deteriorating out of Technical Specification allowed setpoint tolerance trend from August 1984 on unit 1 and June 1984 on unit 2 during monthly calibration checks. Additionally, long term corrective actions which were scheduled for unit 2 were not being promptly implemented in that level switch replacement was not considered prior to unit 2 restart. This is another example of failure to take prompt corrective action identified as violation 327-85-45-06, 328-85-45-06.

Technical Specification 3.5.1.2 requires that each upper head injection accumulator system shall be operable in Modes 1, 2, and 3 when above 1900 psig. Until the licensee can demonstrate that the multiple failures of the Barton 288A UHI level switches to meet allowed setpoint tolerances during a decreased surveillance interval of one month did not constitute UHI system inoperability, this item will be identified as an unresolved item (327-85-45-17, 328-84-45-17).

During the review of the UHI Barton 288A issue, the inspectors noted that the licensee has not performed a formal evaluation of all plant components to determine if other plant applications of Barton 288A switches are adversely affected by setpoint drift. However, it was noted that the licensee had identified and initiated action to resolve one other Barton 288A application in which setpoint drift had caused calibration problems. The reactor coolant loop resistance temperature detection (RTD) bypass line utilizes Barton 288A instruments as flow switches to indicate low bypass flow. The instruments do not serve a control function, but do actuate an alarm in the main control room to indicate low bypass flow to the RTDs which supply RCS temperature inputs to the reactor protection system. ECN L6380 was issued on April 29, 1985, to replace the RCS bypass line Barton 288A flow switch. At the time of this inspection, installation was planned for cycle 3 refueling outages on both units which is subsequent to scheduled unit restart. The inspectors consider that this particular Barton application should be considered in conjunction with the reviews and evaluations to be conducted in resolution of inspector followup item 327-85-45-01, 328-85-45-01.

Also, during the inspection team's review of the UHI Barton 288A issue, a problem concerning documentation of seismic qualification and QA level designation was identified. On June 12, 1985, the licensee identified (PRO-2-85-008) that UHI level switch 2-LS-87-23 did not have the proper documentation of seismic qualification and QA level designation. An evaluation of the other installed switches by the licensee identified that 1-LS-87-21 and 1-LS-87-24 had the same deficiency. All switches were promptly replaced with components having proper qualification documentation. Discussions with Barton representatives and a review of procurement records indicated that these switches were of a type seismically qualified; however, seismic certification was not requested in the procurement process and therefore appropriate documentation was not provided as part of the contract. The switches were correctly ordered as QA Level II replacement parts; however, since the switches were upgraded to Class 1E components after receipt of the switches, QA level designation of replacement components in stores should have been upgraded to QA Level I. A review of the licensee's investigation into the incident revealed a thorough evaluation of the circumstances and resolution of discrepancies. A review of the licensee's corrective actions could not be completed during this inspection to verify that all the requirements of 10 CFR 2 Appendix C for self identification and correction of violations were met. Until the licensee provides a complete description of corrective actions to preclude the problems described above for evaluation, this item will be identified as unresolved (327-85-45-18, 328-85-45-18).

TABLE 2

CHRONOLOGY OF CORRECTIVE ACTIONS

Date	
January 1983	Began 30 day calibration checks
February 1983	Contacted TVA downtown office for engineering support.
March 1983	Contacted Westinghouse for onsite support. Contacted Duke Power Company, McGuire plant about similar problems. Contacted Barton vendor. Contacted Westinghouse concerning increasing tolerance. Requested Technical Specification change to increase tolerance based on Westinghouse analysis.
April 1983	Purchase request submitted for onsite Barton services.
May 1983	Barton representative on site to provide vendor support. Technical Specification change request granted.
June 1983	Calibration procedures revised to include improvements in calibration technique.
August 1983	Began STEAR-INST-83-13 to test SOR replacement switch.
March 1984	Completed STEAR-INST-83-13 with favorable results.
June 1984	Director, Nuclear Services recommends SOR replacement switch pending resolution of 1E environment qualification concerns.
March 1985	DCR 2111 submitted to replace Barton 288A switches.
August 1985	ECN 6359 issued to replace Barton 288A switches with SOR switches.

NOTE: Change out of install Barton 288A level switches with replacement Bartons from plant stores' inventory and recalibration of out-of-calibration level switches are not shown in above chronology.

TABLE 3

Date Out of Tolerance		Number Out of Tolerance	
Month	Year	Unit 1	Unit 2
November	1982	3	3
January	1983	2	4
February	1983	2	3
March	1983	3	4
April	1983	2	3
May	1983	3	4
*	--	TS Change	TS Change
June	1983	2	-
November	1983	1	-
January	1984	1	-
April	1984	1	-
June	1984	-	1
July	1984	-	1
August	1984	2	-
October	1984	1	1
February	1985	1	1
March	1985	2	-
May	1985	1	1
July	1985	2	-
August	1985	1	-

NOTE: Months during which no switches were found to be out of the Technical Specification tolerance or when the calibration was not required (shutdowns) are not shown.

14. Observations of Maintenance Activities

The inspection team observed the performance of various maintenance work items spanning each of the disciplines.

The performance of work controlled by WP 11853 to perform a functional test for valve 2-FCV-63-175, Safety Injection Pump 2B-B Discharge to Refueling Water Storage Tank Shutoff Valve, was observed. The inspectors reviewed this WP and noted that a control form with appropriate signatures was included. In addition, the inspectors discussed the scope of this WP with the responsible engineer stationed in the control room and maintenance personnel stationed at Motor Operated Valve (MOV) Board 2B-B. The inspectors found that the responsible engineer was knowledgeable of the procedure and that the technician at the MOV Board was aware of his duties. The inspectors noted that the cognizant engineer completed all steps as required by the instruction and documented discrepancies that were encountered. One problem occurred during performance of this functional test in which the closing contacts at the local control panel would not operate to give local control. However, the closing contacts at the remote station (main control room) did operate properly. The inspector discussed with the cognizant engineer the method for handling this discrepancy. The engineer stated that he would write a work request for electrical maintenance to check the local close contacts to clean and/or repair as necessary. A second problem encountered was vibratory movement of the valve handwheel during valve stroking. The cognizant engineer stated that the work request would also address this discrepancy. The inspector noted that the responsible engineer was in control of the test and that the control room operator performed actual valve manipulations in the control room. In addition, the shift engineer was consulted as to the required position of the valve upon completion of the test. The inspector considers that this functional test was conducted in a safe and professional manner.

The inspectors observed the performance of main feed pump turbine special control loop calibration in accordance with selected portions of IMI-46. No significant procedural or performance inadequacies were noted. Prior to performance of this procedure, a preliminary review by the IM technician led to the implementation of a temporary change to the procedure which clarified the signal cable connection points required for the dynamic response verification, and corrected a page numbering error. During the performance of the observed portions of IMI-46, the technicians displayed familiarity with the procedure and exhibited proficiency in its performance.

The rebuilding of a Bettis actuator for containment isolation valve 2-FCV-31C-229, in accordance with MR A302455 was observed. This maintenance request incorporated portions of MI-6.15, General Procedure for Tightening Bolted Joints, MI-6.20, Configuration Control During Maintenance Activities, MI-11.4, Maintenance of CSSC Valves, and MI-11.10, G. H. Bettis Actuator Maintenance Guidelines. Applicable portions of these procedures were followed and QC hold points were adhered to. As used, the procedures were technically adequate and the technicians performing the procedure performed the procedure as written.

The inspectors observed Motor Operated Valve Test System (MOVATS) testing conducted on Valve 2-FCV-70-134 per Maintenance Instruction 10.43, Procedure for Testing of Motor Operated Valves Using the MOVATS-2000 System. The inspectors' assessment of this work was previously delineated in paragraph 10 of this report.

The inspectors observed preventative maintenance being performed by instrument maintenance technicians on unit 1 strip chart recorders on the 1-M-5 panel in accordance with preventative maintenance procedure PM 0765-068. The inspectors reviewed the work copy of the procedure and noted that required information was being recorded as work on the different instruments was progressing. Also, the instrument history cards were being used and updated as required. The inspectors questioned the instrument technicians assigned to the job and determined that the personnel understood the scope of the job and were properly qualified to perform the tasks. The inspectors asked the lead technician to indicate what actions would be taken for a problem encountered beyond the scope of the work. The lead technician stated that the supervisor would be informed of the problem and added that if additional repair beyond the scope of the procedures were required, the technician would prepare a MR after consultation with the supervisor. The inspectors also determined that the appropriate controlled technical manuals were available to assist in performing the work and that appropriate supervision was available to assist in evaluating problems and provide for appropriate evaluation of work progress.

The inspectors observed partial performance MR A549627, Component Cooling Water Heat Exchanger A Sleeve and Plug Tubes. This included observation of the removal of the heat exchanger's end bells. Written procedures were followed at the work site, the technicians displayed familiarity with the procedures, and adequate technical knowledge of the system. No significant procedural or performance inadequacies were noted.

Additional observations were conducted by the inspection team with regard to plant housekeeping. The inspectors reviewed Standard Practice Procedure SQA-66, Plant Housekeeping. The purpose of this instruction is to implement the requirements of the Operations Quality Assurance Manual (N-OQAM) Part II Section 1.2, Housekeeping in Nuclear Power Plants. This procedure specifies that each supervisor responsible for work activities within the plant shall ensure that the work area is cleaned up upon completion of maintenance or modification work, or the end of the working shifts whichever occurs first. In addition, appendix A of this procedure specifies that the normal housekeeping assignment of the auxiliary building belongs to the Operations Supervisor. Attachment 1 of SQA-66 specifies items that shall be considered in performance of housekeeping checks. Some of those items are the following:

- floors are cleared of accumulation of litter, dirt, water, oil, etc.;
- expendable items, loose unused tools, and spare parts have been stored and trash disposed of in predesignated locations;
- scaffolding in the area is actually being used; and