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

Report Nos.: 50-259/90-25, 50-260/90-25, and 50-296/90-25

Licensee: Tennessee Valley Authority
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1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-259, 50-260, and 50-296

License Nos.: DPR-33, DPR-52, and DPR-68

Facility Name: Browns Ferry Units 1, 2, and 3

Inspection at Browns Ferry Site near Decatur, Alabama

Inspection Conducted: July 21 - August 17, 1990

Inspector: _____ 9/13/90
C. A. Patterson, NRC Restart Coordinator — Date Signed

for _____ 9/13/90
D. R. Carpenter, NRC Manager for Modifications and Unit 3 — Date Signed

Accompanied by: E. Christnot, Resident Inspector
W. Bearden, Resident Inspector
K. Ivey, Resident Inspector
G. Humphrey, Resident Inspector

Approved by: _____ 9/13/90
Paul J. Kellogg, Section Chief, Inspection Programs, TVA Projects Division — Date Signed

SUMMARY

Scope:

This routine resident inspection included surveillance observation, maintenance observation, operational safety verification, field activities, system status control, system preoperability checklist, reportable occurrences, action on previous findings, and essential calculations. Modifications and Unit 3 activities were reviewed.

Results:

A violation was identified for an inadequate fire protection SI (paragraph two). A TS amendment change in 1988 was not incorporated the SI and resulted in the use of an inadequate surveillance procedure. The inspector identified that the revision indication line on the TS page was not present on the controlled copy, although the original amendment change received from the NRC had the change indication. The practice of reformatting TS changes received from the NRC was identified as an IFI (paragraph two).

A violation was identified for failure to follow a work plan requirement to protect emergency electrical equipment from water intrusion. The intrusion occurred during a plant modification and was the second occurrence of water entry into the DG building within a few days. (paragraph four)

The licensee has established detailed procedures for returning systems to service and maintaining system status control (paragraphs 6 and 7). Return to service of 17 of 81 systems has been completed. These were relatively minor systems while the majority of major systems still remain to be returned to service. Over 30 systems are scheduled for return to service during September.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

O. Zeringue, Site Director
*L. Myers, Plant Manager
*M. Herrell, Plant Operations Manager
J. Hutson, Project Engineer
R. Jones, Operations Superintendent
*A. Sorrell, Maintenance Superintendent
G. Turner, Site Quality Assurance Manager
*P. Carier, Site Licensing Manager
P. Salas, Compliance Supervisor
*J. Corey, Site Radiological Control Superintendent
R. Tuttle, Site Security Manager

Other licensee employees or contractors contacted included licensed reactor operators, auxiliary operators, craftsmen, technicians, and public safety officers; and quality assurance, design, and engineering personnel.

NRC Personnel:

*C. Patterson, Restart Coordinator
*D. Carpenter, Manager for Modifications and Unit 3
*E. Christnot, Resident Inspector
*W. Bearden, Resident Inspector
*K. Ivey, Resident Inspector
*G. Humphrey, Resident Inspector

*Attended exit interview

Acronyms used throughout this report are listed in the last paragraph.

2. Surveillance Observation (61726)

The inspectors observed and reviewed the performance of required SIs. The inspections included reviews of the SIs for technical adequacy and conformance to TS, verification of test instrument calibration, observations of the conduct of testing, confirmation of proper removal from service and return to service of systems, and reviews of test data. The inspectors also verified that LCOs were met, testing was accomplished by qualified personnel, and the SIs were completed within the required frequency. The following SIs were reviewed during this reporting period:

a. Fire Protection Surveillance Requirement Change

An inspector reviewed LRED 90-0-53 dated August 1, 1990. During a review of TSs for changes in fire protection, the licensee identified

that PS 26-44 had been calibrated at 100 psig rather than at 120 psi as required by TS 4.11.B.1.f.(4). The PS, in conjunction with other conditions, starts electric driven fire pumps A, B, C, and the diesel driven fire pump sequentially to make up to the fire header as header pressure drops to the PS setpoint.

The inspector reviewed TS amendment 159, dated December 27, 1988, which incorporated this requirement. The inspector reviewed the SI 4.11.B.1.f.(4), Simulated Automatic and Manual Actuation of the High Pressure Fire System, and discussed the TS requirement with cognizant fire protection engineers. No reference to 120 psig or to a calibration procedure for PS-26-44 could be found in the SI. The licensee calibration record indicated the PS was set at 100 psig. The SI was last performed on January 6, 1990.

The inspector concluded that the TS change had not been properly incorporated into the plant SI. This was identified as a violation of TS 6.8.1 (VIO 259, 260, 296/90-25-01, Inadequate Fire Protection Surveillance).

The inspector held discussions with applicable licensing personnel and noted that TS page 3.11/4.11-4 did not contain a vertical line on the side of the page to indicate a revision to the section. The licensee stated that the entire fire protection section had changed and the missing revision indicator should not have been a factor. The inspector noted that the approved changes which were sent from the NRC contained the revision indicator. The licensee stated that the changes received from the NRC are routinely reformatted before incorporation in TS.

The inspector will conduct a TS implementation inspection prior to restart to review some eighty TS changes that occurred since the plant shutdown. The practice of reformatting TS changes received from the NRC will be an IFI 259, 260, 296/90-25-02, TS Reformatting.

b. SLC System Functional Test

An inspector observed portions of 2-SI-4.4.A.2, SLC System Functional Test, performed on August 3, 1990. The testing was performed for completion of the system SPOC and replacement of the two Squib valves. Delays resulted from equipment problems and a needed revision to clarify several steps and correct several administrative errors within the procedure. A thorough pre-evolution briefing was conducted by the SOS with all associated personnel prior to the actual performance of the SI. The licensee's procurement requirements prevented the use of a new replacement Squib valve that was more than 2 years old. This is a conservative requirement since TS only require that replacement valves be less than 5 years old. The inspector determined that adequate controls existed in this area.

One minor deficiency noted was that during the system pipe flushing activities performed in accordance with step 7.10.10, two gallons of borated water overflowed from the collection barrel onto the floor. The inspector noted that the plastic barrels being used for this purpose were different from the older metal barrels used previously during flushing. The plastic barrels did not have the full diameter lids which could be removed allowing unobstructed view of the barrel contents. Although step 7.10.10 states that 30 gallons of demineralized water are to be flushed into the barrel to remove the borated water present in the piping, the operator had to view the barrel level through a small opening in the barrel. This contributed to the water spill. The inspector noted that the floor was not contaminated by the minor spill, and that the excess water was immediately mopped up by the ASOS at the scene. The inspector noted that the floor drain located only a few feet from the barrel station had been taped over immediately prior to the event as a precaution against borated water entry into the radwaste floor drain system.

An inspector observed the performance of 2-SI-4.4.A.2 conducted on August 6, 1990 to resolve a test deficiency from the performance on August 3. During the previous performance, the SLC flow "red" light failed to illuminate and the "SLC injection flow to reactor" annunciator (2-XA-55-5B, window 14) failed to alarm. The licensee determined that flow switch 2-FIS-63-11 was out of calibration, causing the deficiencies. The flow switch was recalibrated and the SI reperformed. No deficiencies were identified and both flow indicators operated properly.

One violation was identified in the area of Surveillance Observation.

3. Maintenance Observation (62703)

Plant maintenance activities were observed and reviewed for selected safety-related systems and components to ascertain that they were conducted in accordance with requirements. The following items were considered during these reviews: LCOs were met, activities were accomplished using approved procedures, functional testing and/or calibrations were performed prior to returning components or systems to service, QC records were maintained, activities were accomplished by qualified personnel, parts and materials used were properly certified, proper tagout clearance procedures were followed, and radiological controls were implemented as required.

Work documentation (MR, WR and WO) were reviewed to determine the status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which might affect plant safety. The inspectors observed the following maintenance activities during this reporting period:

The inspector reviewed and observed the licensee's activities involved with performing procedure EPI-0-000-BKR001, Electrical Preventive Instruction Maintenance of Molded Case Breakers, on electrical breaker 309, located on Unit 2 control room panel 2-9-9. The specific observation involved the testing of the thermal overloads of the breaker which supplies relay and instrument power to SBGT system Train C. Breaker 309 was a GE Circuit Breaker Model THED, with a 15 to 50 ampere rating. The work was authorized by WO 90-00387-00 and was performed in accordance with the procedure.

The inspector noted that the hold order, referred to as a clearance, was initiated by the work order. During the review of this activity the licensee could not readily determine which clearance this activity was performed under. The current system being used can indicate which items were worked under a particular clearance number. However, if only the activity, such as a PM or WO, is known the licensee does not have a system that will indicate in a timely manner which clearance was given to perform the activity. The current system is a manual system which makes it very difficult to tie the activity to the clearance if the clearance number is not known. The licensee is implementing a computerized system to alleviate this problem. This item is identified as IFI 259, 260, 296/90-25-03, Documenting and Controlling Clearances for Multiple Activities and will remain open pending a review of the licensee's new system.

No violations or deviations were documented in the Maintenance Observation area.

4. Operational Safety Verification (71707)

The NRC inspectors followed the overall plant status and any significant safety matters related to plant operations. Daily discussions were held with plant management and various members of the plant operating staff. The inspectors made routine visits to the control rooms. Inspection observations included instrument readings, setpoints and recordings, status of operating systems, status and alignments of emergency standby systems, verification of onsite and offsite power supplies, emergency power sources available for automatic operation, the purpose of temporary tags on equipment controls and switches, annunciator alarm status, adherence to procedures, adherence to LCOs, nuclear instruments operability, temporary alterations in effect, daily journals and logs, stack monitor recorder traces, and control room manning. This inspection activity also included numerous informal discussions with operators and supervisors.

General plant tours were conducted. Portions of the turbine buildings, each reactor building, and general plant areas were visited. Observations included valve position and system alignment, snubber and hanger conditions, instrument readings, housekeeping, power supply and breaker alignments, radiation and contaminated area controls, tag controls on equipment, work activities in progress, and radiological protection

controls. Informal discussions were held with selected plant personnel in their functional areas during these tours. The following items were noted during the observations:

a. Equipment Clearance

Equipment clearance 2-89-987 concerning the HPCI suppression pool, CST suction valves, and steam supply valves was verified by an inspector. No problems were identified.

b. Water in Diesel Generator Building

During a routine tour of the DGs buildings on July 23, 1990, the inspector found the Unit-1/2 DGs (B and C), 1C batteries, and the 120V logic panels were wet and receiving a large downpour of water from the roof area. Water from a rain storm was entering the building through holes bored in the roof that had not been sealed. Immediate action was taken by plant operators to seal two 6" x 6" holes in the roof and stop the leak. Partially plugged roof drains contributed to the leak. This event resulted in the 1C DG being declared inoperable and "tagged-out" until the batteries and logic panels were dried and the equipment verified to be operable.

Discussions with the operating personnel revealed that this problem had previously occurred on July 11, 1990 when similar conditions existed.

The inspectors reviewed Modifications work plan WP2396-90 which was the implementing document to install conduits through the roof of the DG building. During this review, the inspector noted hand written work instructions in the work package that required water tight covers be placed over open penetrations prior to grouting. This requirement was to exist until the conduit was installed and grouted. This step had been signed by the craftsmen and dated July 12, 1990, certifying that the requirement had been complied with. This is identified as a violation of procedures (VIO 259, 260/90-25-04, Failure To Protect Emergency Equipment).

One violation was identified in the Operational Safety Verification area.

5. Field Activities (37700, 37828)

The inspectors maintained cognizance of field activities to support the restart of Unit 2. This included reviews of scheduling and work control, routine meetings, and observations of field activities.

a. Fuse Program

The licensee identified a significant problem involving the type and size of fuses installed throughout the plant. Three DCNs were issued to correct the deficiencies. The original scope of DCNs W1569,

W1847, and W2033, affected over 50 plant systems. At the end of this reporting period all three DCNs were still open and each DCN generated numerous FDCNs as follows:

DCN W1569 generated 25 FDCNs
DCN 1847 generated 16 FDCNs
DCN 2033 generated 30 FDCNs

Although the above fuse issues can be adequately resolved under blanket SPOC deferrals, a potential problem exists in that broad usage of blanket deferrals could take place. During discussions with Licensee Management personnel, the inspectors were told that Browns Ferry would not routinely use blanket deferrals and that the fuse program would be resolved prior to fuel load.

b. Security (81052)

The inspector and the security manager toured portions of the revised and updated security systems being implemented at the BFN facility. These included a new access portal which consisted of an improved detection system and a "Sally Port" for controlled vehicle search, and new security fence that had been installed to decrease the size of protected area at the Browns Ferry Facility. Portions of the new fence are to be relocated in the future because stored equipment prevented the fence from being positioned at its permanent location. Compensatory measures, which included security personnel monitoring portions of the fence that were not monitored by other detection devices, had been implemented.

c. Restart Test Program (37701)

The inspector reviewed the licensee activities associated with TE-11 to the test results of procedure 2-BFN-RTP-065, Standby Gas Treatment. The licensee issued DCN-W 11053A which superseded ECN E-0-P7217 to address this TE. The DCN which is considered a major modification, issued numerous DCAs such as W11053-070 thru 073. The DCAs in turn resulted in the writing of approximately 20 WPs which implemented the DCAs. The WPs included such activities as WPs 0465-90, 0466-90, Install conduit and junction boxes in the Control Bay, DG Building and Reactor Building; WPs 0471-90, 0472-90, Install and delete duct supports in the off-gas stack; and WP 0473-90, Install dampers and blank off plates in the off-gas stack duct work. The inspector observed the licensee work activities involved in the DCAs mentioned above. All activities were controlled and performed according to procedures and were adequately monitored.

d. Cable Separation (37701)

The inspector reviewed the licensee activities associated with cable separation. CAQR BFP 870860 identified a number of non-safety related cables which had been routed such that they mixed with both

redundant class 1E divisions. DCN W5236A was issued to address this item.

Exception to the separation requirements was permitted if non-safety related circuits were provided with a double means of class 1E isolation. The double isolation may be provided by the addition of a class 1E qualified protective device in series with the existing class 1E device located in a class 1E qualified enclosure. This DCN provides for double isolation by the addition of fuses in series with their existing breakers.

The specific work activities observed involved the installation of fuses for breakers 205 and 220 in control room panel 9-9. WP 1041-19 implemented the DCAs associated with the DCN. The work was being performed in accordance with procedures MAI-3.3, Cable Terminating and Splicing for Cables Rated up to 15,000 Volts, and MAI-3.8, Installation of Electrical Components. The work included terminations, inspecting for minimum bend radius, and use of proper tools. A QC inspector was present throughout these activities. No deficiencies were identified.

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

6. System Status Control

During this reporting period an inspector reviewed the licensee's process for maintaining the configuration of systems after turnover to the Operations group following SPOC completion. Procedure PMI-12.15, System Status Control, prescribes the methods to achieve and maintain configuration status control. The inspector reviewed PMI 12.15 and held discussions with licensee personnel responsible for system status and configuration control. The process includes the following controls:

- A System Status File which is maintained in the control room and contains the current status checklist for completed systems and any deviation forms issued for components in off normal configurations.

- A Configuration Log maintained in the control room which indicates deviations from, or changes to, a system's status contained the System Status File.

- A Daily Configuration Log Working Notebook which contains the changes to a systems' status within the last 24 hours. This notebook is reviewed by each oncoming operations shift and its contents are transferred to the Configuration Log by the midnight shift each day.

- Items that are not in their normal alignment but will not impact the system operability at the time of checklist completion, or the performance of other instructions may be deviated. Deviation forms are filed with the completed checklist.

- Checklists having components that cannot be aligned to the normal position because their configuration affects the intent of the instruction or system operability cannot be deviated. These checklists must be held open until the component can be aligned in its normal configuration.

- Each status file is required to be reviewed weekly by Operations and the review documented on a Weekly Review Form.

System 63, SLC, is the only system covered by PMI-12.15 to complete the SPOC process. The inspector reviewed the System Status File for System 63 and noted no discrepancies. The inspector noted that there were no deviations included in the file.

No violations or deviations were identified in this area.

7. System Preoperability Checklist (71707)

The inspector monitored the licensee's review of 81 systems per SDSP 12.7, System Pre-Operability Checklist (SPOC) for Unit 2 system return to service. Of the 81 systems reviewed, the licensee determined that 55 systems required a SPOC. SPOC is a systematic method for verifying that all activities that affect system operability for restart have been evaluated and dispositioned in accordance with approved plant procedures to support a recommendation for declaring a system operable for restart. The criteria for performing a SPOC was that the systems were essential to meet the criteria specified in Chapter 14 of the FSAR for plant safe shutdown and accident mitigation and to meet TS requirements.

The licensee determined that the remaining 26 systems were to be evaluated by a System Checklist (SCL). SCL is a systematic method for ensuring that outstanding work against minor plant systems has been reviewed and that work required for operation of those systems has been evaluated and dispositioned to support system status and configuration control. Per the licensee's requirements, the SCL can only be utilized for systems that do not have TS operability requirements.

As of August 16, 1990, 17 of the 81 systems had been returned to service. The results of the system reviews monitored by the inspectors were documented as follows:

a. Condensate, Makeup, and Demin Water Transfer (System 02)

The inspector accompanied licensee personnel during selected portions of the system walkdown associated with System 2. During the walkdown the following material deficiencies were noted:

- The heat tracing and insulation designed to prevent freezing of tank level instrumentation lines associated with the CSTs and Demin Water Tanks were in poor condition. Insulation was either temporary or damaged, and the heat tracing cables were damaged.

- The "B" Demin Transfer Pump had excessive seal leakoff. Although both pump discharge lines are connected there was significant difference in the readings between the two pump discharge pressure gauges without either pump operating.

- Over half of the flexible electrical conduit connections were not tight. Rigid conduit at base of the CSTs was missing clamps and/or appeared to have improper clamps.

- Each of the CSTs has an approximate 3/8 inch gap between the tank bottom and the concrete pad supporting the tank with evidence of large amounts of rust and/or moss that completely encircles the lower base of the tanks. Although the outer sides of the tanks appear in good condition, moisture is allowed to go under the tank base. This problem appears worse on CSTs number 4 & 5.

- During the walkdown the inspector noted that the fire extinguisher located in the 480 Volt Water & Oil Storage Board Building had not been checked since February 1990. Many fire extinguishers located in the turbine building had three sets of initials since May 1990 which probably corresponded to the June, July and August required checks. However, there were no dates in the column on the tag provided for that purpose.

- Several sections of heat tracing were energized and building heat in the 480 Volt Water & Oil Storage Board Building appeared to be on with the building outside door open although the outside temperature was above 80 degrees during walkdown.

The inspector was in the process of reviewing the SPOC package at the end of this reporting period.

b. Extraction Steam (System 05)

The System Checklist was completed on June 29, 1990. The inspector reviewed the completed checklist, and no deficiencies were identified.

c. Heater Vents and Drains (System 06)

The System Checklist was completed on July 18, 1990. The inspector reviewed the completed checklist with the cognizant system engineer on July 31, 1990, and no deficiencies were identified.

d. Turbine Ext. Traps and Drains (System 07)

The System Checklist was completed on June 23, 1990. The inspector reviewed the completed checklist with the cognizant system engineer on July 27, 1990, and no deficiencies were identified.

e. Turbine Drains and Misc Piping (System 08)

The System Checklist was completed on June 23, 1990. The inspector reviewed the completed checklist with the cognizant system engineer on July 27, 1990 and no deficiencies were identified.

f. Auxiliary Boilers (System 12)

The System Checklist was completed on August 5, 1990. The inspector will review the completed checklist during a future reporting period.

g. Raw Cooling Water (System 24)

The inspector attended a meeting on July 24, 1990, concerning modification of the RCW piping system to the control and service air compressors. The compressors are often taken out of service because of high temperature caused by MIC buildup in the RCW system. The results of the meeting were that the licensee is modifying the piping to the compressors and initiating a long term study to evaluate controls for MIC.

This system is forecast for a SPOC date of September 7, 1990. The system will receive further review as part of the system return to service.

h. Raw Service Water (System 25)

The inspector reviewed the licensee activities involved with the SPOC process for System 25 which was accepted on August 5, 1990.

System 25 was given a full SPOC in the summer of 1989 for the Integrated Cold Functional RTP. This system was SPOC updated and received a limited SPAE. The inspector accompanied the system engineer, an operations representative and a QM inspector on the final walkdown of the system. No significant deficiencies were identified.

System 25 is shared by all three units and is designated a Unit 0 system. One minor item was discussed with the licensee which involved 3A and 3B Raw Service Water Pumps. These pumps are operable but are not needed to support Unit 2 operations; therefore, they will be tagged out.

i. Vacuum Priming (System 34)

This system was turned over to Operations control and the System Checklist was completed on June 28, 1990. The inspector reviewed the completed checklist with the cognizant system engineer on August 7, 1990, and identified no deficiencies.

j. Building Heating (System 44)

The System Checklist was completed on July 9, 1990. The inspector reviewed the completed checklist with system engineers on July 10, 1990, and identified no deficiencies.

k. Temperature Monitoring (System 56)

A full SPOC was completed for this system on August 2, 1990. The inspector reviewed the completed package with the system engineer. The scope of this review included the temperature detectors and recorders which comprise the Reactor Pressure Vessel Temperature Monitoring Subsystem. This system is primarily designed to monitor temperature at various points of the reactor vessel in order to map its temperature gradient during startup and shutdown operations. The data is recorded to provide the basis to establish the rate of heating or cooling the vessel to keep the stress set up between sections of the reactor vessel within the allowable limit. The locations monitored are the feedwater nozzles, the shell at or near the waterline and the flange studs.

This system had two primary/critical drawings. One drawing discrepancy was evaluated and dispositioned for a primary/critical drawing and six secondary drawing discrepancies were determined not to affect plant operability. The inspector reviewed the two drawings in the control room. They were found to be legible and were the same drawings identified in the SPOC package.

No CAQ's were issued against equipment, components or procedures associated with the Temperature Monitoring system. The system engineer reviewed a listing of generic CAQRs to determine if any were applicable to this system.

Two SPOC deferrals, 56-01 and 56-02, were taken against DCN-M0079 and DCN-B0060. These DCNs were to replace cables damaged during a drywell fire. The work was completed for system 56 but several other systems were covered by the DCNs. By procedure, the DCN must be closed or a deferral is required. The deferral was tied to drywell closure.

l. Switchyard and 24V/48V DC Distributions (System 57-6)

The System Checklist is scheduled to be completed by August 29, 1990. The inspector reviewed the SMPL with the cognizant system engineers and identified no concerns. The inspector noted that paper closure for ECNs made up the bulk of the open items for these systems.

m. Standby Liquid Control (System 63)

This system underwent a full SPOC review which was completed on August 11, 1990. The inspector accompanied the systems engineer and

operations personnel on a preliminary system walkdown on July 17, 1990. Several minor deficiencies were identified which required work to correct. The inspector also participated on the final system walkdown on August 1, 1990. Some minor work was required and was completed. The inspector reviewed a portion of the system functional test, 2-SI-4.4.A.2, conducted on August 6, 1990, (see paragraph two). The inspector reviewed the system status file and configuration log for this system and identified no deficiencies. The inspector was in the process of reviewing the completed SPOC package at the end of this reporting period.

n. Reactor Building Closed Cooling Water (System 70)

The inspector was informed by the system engineer of a problem with the RBCCW HXs. Recent eddy current examination of the 2A HX revealed numerous indications. Of 740 admiralty brass (70% copper and 30% zinc) tubes, 195 indicated greater than 40% through wall defects. Of these, 19 tubes had indications greater than 90% through wall. The tubes are 40 feet long with carbon steal tube sheets.

This system contains demineralized water on the RBCCW side (shell side) with RCW on the tube side. Examination of the defects revealed numerous transgranular cracks perpendicular to the tubes and originating on the tube outside diameter. The failure mode was reported to be transgranular stress corrosion cracking. An evaluation of the RBCCW demineralized water system revealed the presence of 1/2 ppm ammonia in each of the three units. This environment is considered to be the cause of the tube cracking. The source of ammonia is most likely the reduction of nitrite used in the system as a carbon steel inhibitor. Bacteria were not controlled in the system and may have provided the mechanism by which the nitrite was reduced to ammonia. The source of ammonia was considered to be an unknown.

The licensee is planning a number of options to resolve the problem prior to restart. Inspection is planned of the "2B" HX to determine the extent of the problems. Some of the options are as follows:

1) Tube plugging with calculation of heat load, removal capability during winter months of operation.

2) Replacement of tubes with like tubes and adding a multiple inhibitor scheme.

3) Replacement of tubes with stainless steel tubes.

Other areas of the plant are being examined to determine the extent of the problem site wide. The licensee initiated CAQR BF900249 to document the problem.

This problem will be further reviewed as part of the system return to service for RBCCW.

o. Primary Containment Temperature Monitoring (System 80)

The inspector accompanied the system engineer and an operations representative on a preliminary walkdown of System 80. Several minor deficiencies were identified and documented by the system engineer. No significant deficiencies were identified.

p. Neutron Monitoring (System 92)

The inspector accompanied licensee personnel during selected portions of the system walkdown associated with System 92. During the walkdown material deficiencies were noted as follows:

- Various uncompleted work activities were still outstanding. These included replacement of 11 LPRM strings and completion of repairs associated with LPRM cables.

- Within Control Room Panel 2-P-5, the rear covers for several NI recorders were removed to allow the temporary placement of leads associated with the Transient Analysis System which will be used during the unit startup and power ascension testing. Two of the covers were lying on the top of the respective recorders within the panel. The covers were of substantial metal construction and would have invalidated the seismic qualification of the panel. The problem was noted by the system engineer who removed the covers and gave them to the instrumentation personnel for safekeeping.

- Loose cable connectors were noted on the SRM Detector Drive Motors.

- A clearance tag associated with hold order 2-89-871 was installed on panel 2-25-14, located in the reactor building. Although the tag specified that leads were lifted in the panel, no lifted leads could be found. This appeared to be a violation of the licensee's clearance procedure. The problem was jointly discovered by the AUO and Quality Organization representative during the walkdown and the problem was immediately reported to the SOS. The inspectors will followup on the licensee's actions in this area during the next reporting period.

The inspector observed several different portions of the system walkdown including activities within the drywell, under vessel area, reactor building and the control room. The inspector noted that a member of the Site Quality Organization was continuously involved in the walkdown and that the system engineer displayed an excellent overall knowledge of the status of outstanding work items associated

with this system. The inspector was in the process of reviewing the SPOC package at the close of this reporting period.

q. Microwave Transmission (System 315)

System 315 was plant accepted on July 9, 1990. This system was a SPOC checklist system.

Within the areas reviewed no violations or deviations were identified.

8. Reportable Occurrences (92700)

The LERs listed below were reviewed to determine if the information provided met NRC requirements. The determinations included the verification of compliance with TS and regulatory requirements, and addressed the adequacy of the event description, the corrective actions taken, the existence of potential generic problems, compliance with reporting requirements, and the relative safety significance of each event. Additional in-plant reviews and discussions with plant personnel, as appropriate, were conducted.

a. (CLOSED) LER 259/87-25, Technical Specification Violation for Failure to Perform Required Surveillance on Diesel Generator due to Procedural Inadequacy.

This item was identified in September 1987, when a surveillance requirement for the DG had not been incorporated into plant instructions. The surveillance required that the diesel start from ambient conditions and energized the emergency buses with the permanently connected loads. Contrary to this, the normally connected 480V shutdown boards which supply loads required for safe shutdowns were not tested. The failure to test the 480V shutdown board loads was attributed to a programmatic problem with procedures which has been corrected through a procedures upgrade process.

The inspector reviewed Surveillance Instructions, O-SI-4.9.A.1.b-1, O-SI-4.9.A.1.b-2, O-SI-4.9.A.1.b-3, O-SI-4.9.A.1.b-4 associated with emergency load acceptance testing of the Unit 1/2 diesel generators.

It was noted that acceptance criteria, Section 6.1, subsections 6.1.3 thru 6.1.7 now clearly indicated that all loads required to start were addressed including 480V shutdown boards.

b. (CLOSED) LER 296/88-07, Overheating of DG 3C Due to Loss of EECW.

The apparent cause of this event was valve misalignment during alignment of the EECW per the SI for hydrostatic testing. An error on the drawing was discovered when the hydrostatic test was being written and a drawing discrepancy was issued. In the eight months that followed, the error on the configuration control drawing was not

resolved and the drawing discrepancy remained open. The untimely implementation of the drawing correction was considered the root cause of the event. The immediate corrective action included a pre-performance walkdown of the remaining hydrostatic testing SIs and correction of the flow diagrams. Recurrence control for this problem was a revision to the procedure for processing drawing discrepancies. This procedure now provides a specified overall closure time of various categories for drawing discrepancies.

The inspector reviewed the licensee's corrective action which included revisions to procedures 0-OI-82, Unit 0 Standby Diesel Generator System Operability Instructions and 3-OI-82, Unit 3 Standby Diesel Generator System Operability. These revisions cautioned the operators to check for cooling water through the DG coolers prior to and during the operation of the DGs. The inspector also noted that untimely resolution of drawing discrepancies was a contributing factor to this event. The resident inspectors have documented the DD item as Deviation 90-18-02. Based on the revision of the procedures and resolution of the deviation, the LER was adequately addressed.

c. (CLOSED) LER 259/88-23, Inadequate Water Seal of Piping Floor Penetration and Piping Floor Penetrations and Possible Flooding of Residual Heat Removal Service Water Pump Rooms During Design Basis Flooding.

During an inspection of the RHRSW pump rooms on June 17, 1988, ground water was observed entering the pump room through a subterranean pipe penetration. A review of the penetration drawings revealed that a water seal at the pipe penetration had not been provided and the seal at the floor penetration was inadequate. The inspector reviewed the licensee's closure package for this LER. Design Change H1888A was implemented which installed floor piping penetration seals in all RHRSW pump rooms. The reactor buildings, intake structure, DG rooms, and radwaste buildings were inspected and repaired as necessary. The inspector reviewed the inspection records performed in 1988. Procedure MMI-19, Inspection and Maintenance of Flood Protection Devices, lists the penetrations to be inspected in the various locations. The inspector inspected the RHRSW pump rooms on August 3, 1990 and no penetration seal problems were noted. The inspector concluded that these actions were adequate to correct the problem.

d. (CLOSED for Unit 2 Only) LER 259/88-32, Electrical Separation Requirements Violated Due to Inadequate Design Control.

This item was originally identified in October, 1986, during the implementation of a design change which upgraded the Unit 2 primary containment electrical penetrations to meet EQ requirements. Discrepancies were discovered in electrical cable classifications and cable routings indicating possible violation of the electrical divisional separation requirements. Subsequent reviews and

evaluations identified approximately 950 division separation discrepancies in either labeling or actual physical separation. Of these discrepancies, approximately 230 require physical modifications or further evaluation prior to Unit 2 startup.

The licensee indicated that the root cause of this condition was inadequate design control.

The licensee documented the corrective action on the following CAQRs:

- BFP 870860 documented violation of installation criteria where non-safety related circuits were routed with both redundant safety divisions.

- BFP 881105 documented the violation of installation criteria where safety related cables were routed in non-safety related raceways.

- BFP 881106 documented the violation of installation criteria where safety related cables were associated with both redundant safety divisions.

- BFP 881107 documented the violation of installation criteria where safety related and non-safety related cables were improperly tagged with an incorrect suffix.

All four CAQRs resulted in extensive work on the part of the licensee. The LER is part of the cable separation electrical issue which is being monitored and reviewed by the NRC. Because of these reviews and the CAQRs, the LER was adequately addressed. This item is closed for Unit 2 only.

e. (CLOSED) LER 259/89-04, Unmonitored Release of Condensate Water Because of Failure of Instrumentation Heat Trace.

This event is the same event described in VIO 259, 260, 296/89-35-04 closed in this report. Therefore, this LER is also closed.

f. (CLOSED) LER 260/89-08, Electrical Fault on Transformer Causes Engineered Safety Feature Actuation.

An ESF actuation occurred due to an electrical fault on the unit station service transformer, USST 2B. The transformer fault occurred because of inadequate insulation above the bus joint. The design of the bus duct allowed collection of condensation, and vendor recommended preventive maintenance was not performed.

The original LER was issued on April 7, 1989 and was revised three times with revision 3 being issued on September 29, 1989. Each revision indicated a change in the corrective action.

The inspector reviewed DCN H5249A, Modify the 2B USST Y Secondary 4160V Winding Bus, which required that the bus be extended 14 inches and that 15000 volt Raychem insulation be used for taping. This DCN was implemented by WP 2235-89. A review of records indicated that this DCN was implemented and tested. The inspector reviewed PM procedures EMSIL 103.1 and EMSIL 103.2. Procedure 103.2 was required to be performed each refueling outage, not to exceed 24 months, and procedure 103.2 was required to be performed every other refueling outage, not to exceed 4 years. The inspector noted that both procedures require visual inspections as well as megger testing. The difference between procedure 103.1 and 103.2 is that 103.2 required high potential testing as well. The inspector reviewed MRs 911567, 1006083, and 863275 which indicated that Units 1, 2, and 3 main and unit service transformers were inspected and electrically tested.

The inspector reviewed records which indicated approximately 90 personnel received live time training on LER 260/89-08, the USST 2B event. Additional discussions with operations personnel indicated that this training was adequate. The inspector also noted that an operator aid, number 0-89-100, dated 5/17/89, on a Unit 2 control panel, was a single line diagram of the BFN 500 KV system, 161 KV system, switchyard transformers, and 4KV plant electrical boards.

Based on these reviews, the licensee has adequately addressed this LER.

g. (CLOSED) LER 260/89-09, Unplanned Scram and Main Steam Line Isolation Due to Spurious Spikes on Main Steam Line Radiation Monitors.

This item was identified when on April 11, 1989, Browns Ferry Unit 2 received spurious spikes on the independent main steam line MSL radiation monitors which resulted in completion of the initiation logic for a full scram and a main steam line isolation valve MSIV isolation.

The specific cause of the spurious spikes was not determined. The spurious spikes may have been caused by vibrations generated by personnel working in the area however, attempts to recreate the spikes were unsuccessful. The subsequent investigations included a response check of the monitors, visual and signal checks of the cables and connections and generation of potential sources of electromagnetic interference.

The inspector reviewed the licensee activities in trying to determine the cause of the spikes. During the review the inspector noted that the MSL high radiation monitor system did not have adequate signal conditioning. This made it difficult for the system to differentiate between spurious signals and legitimate high radiation signal. Since this occurrence the MSL high radiation monitors have been replaced with updated digital monitors through DCN H1263B.

h. (CLOSED) LER 260/89-13, Failure to Meet Technical Specifications Because of Inadequate Control of Flood Protection Barriers.

This item was discovered by a TVA system engineer when manway covers in RHRSW pump room A and D were found not bolted down. The manways provide a flood barrier for the rooms. The inspector reviewed the licensee's closure package for this item. Inspection of the manway covers was added to plant procedure, GOI-300-1, Operations Routine Sheets. The inspector inspected the RHRSW pump rooms on August 3, 1990, and found all manways bolted in place. An URI (259, 260, 296/89-19-01) was opened on this same issue and closed in IR 90-18. Based on these actions, this LER is resolved.

i. (CLOSED) LER 260/89-23, Loss of Secondary Containment Due to Loss of Two Trains of Standby Gas Treatment.

On July 23, 1989, both SBGT trains A and C were inoperable in violation of TS. SBGT train C was declared inoperable when its emergency power supply, the 3D DG, became inoperable due to failed pinion failure relay. SBGT train A was previously declared inoperable due to problems with the relative humidity heater breaker. According to the TS in effect at the time, secondary containment was required and in order to have secondary containment, two trains of SBGT were required to be operable. The cause of this event was the failure of the diode installed across the operating coil of the start failure auxiliary relay. This failure caused the relay contacts in the pinion failure relay to fuse in the closed position. This prevented the diesel from being shutdown by normal means. The diode and relays were replaced. The diesel and SBGT train C were returned to service July 24, 1989.

Each of the eight diesel generators has 19 relays of the same type and configuration. No pattern of failure could be determined by the investigation. No other diodes were identified as failed. The licensee is attributing this failure to random end of life failure.

The inspector has reviewed the LER, the Incident Failure Report, the incident investigation, and the MRs used to troubleshoot and repair and they were acceptable. All three units at BFN have been shutdown for an extended outage and thus there was little safety significance to this event.

j. (CLOSED) LER 260/90-02, Unplanned Reactor Protection System Actuation Due to Undetermined Reason During Functional Testing of Scram Discharge Instrument Volume Level Switches.

This LER was about an unplanned RPS actuation during functional testing of the SDIV level switches. The cause of the event could not be determined. The immediate corrective action was to stop the functional test and determine the cause. The valve alignment was

verified correct and the functional test completed. The sequence of events recorder was out of service at the time making it impossible to pinpoint the exact cause of the actuation. The recorder was restored to service and the channel was retested successfully six times. No further problems were identified and the exact cause could not be determined. The inspector reviewed the licensee's closure package for this item. The licensee's troubleshooting actions were appropriate to resolve the actuation.

k. (CLOSED) LER 296/90-02, Unplanned ESF Actuation During Electrical Board Power Transfer Due to Personnel Error.

The ESF actuations which occurred on March 1, 1990, were caused by failures to follow procedures while transferring shutdown board 3A from its alternate electrical source to its normal source. The ESF actuations were reset following the return of shutdown board 3A to its normal lineup.

The inspector reviewed the LER, dated April 2, 1990, and verified that it met the reporting requirements of 10 CFR 50.73. The inspector noted that the LER was submitted beyond the 30 day limit allowed by 10 CFR 50.73 (a)(1). Violation 90-05-03 was issued for the failure to follow procedures which resulted in the reported event. The violation is closed in this report. The corrective actions included in the LER were verified during followup of the Violation.

l. (CLOSED) LER 259/90-03, Failure to Maintain Secondary Containment Requirements Following Inoperability of Second Standby Gas Treatment (SBGT) Train due to Damper Closure by Unknown Cause.

On February 1, 1990, during performance of O-SI-4.7.B.3.C, licensee personnel discovered the "B" train inlet damper, O-FCO-65-39, closed. This normally open fan inlet damper had become closed after a mechanical stop in the associated motor actuator became mispositioned when screws holding it in place loosened. This caused SBGT train "B" to be inoperative. Since SBGT train "C" was already out of service for other maintenance, secondary containment integrity could not be maintained.

The licensee's investigation did not identify any history of similar damper failures. The inspector reviewed MR 893139, which documented repositioning of damper and retightening of screws for the failed damper. The inspector noted that the respective screws on the "A" train inlet damper were also checked under this MR and found not to require tightening. Since the "C" train inlet damper is of a different design without an external mechanical stop, there was no need to include it in the licensee's corrective actions. The inspector also reviewed Final Event Report, II-B-90-017, which documented the licensee's investigation of the failure. Based on the

above reviews, the inspector concurs with the licensee's determination that the failure was an isolated case.

m. (CLOSED) LER 259/90-05, Failure to Take All Raw Cooling Water Compensatory Samples Due to Personnel Error Results in Operation Prohibited by Technical Specifications.

This event occurred on April 4, 1990. The inspector reviewed the LER and determined that it met the reporting requirements of 10 CFR 50.73. Violation 90-08-01 was issued for this event and is closed in this report. The corrective actions included in the LER were verified during followup of the violation.

n. (CLOSED) LER 259/90-07, Isolation of Plant High Pressure Fire Protection Systems Resulting in Technical Specification Violation.

This LER resulted from valve manipulations on the HPFP system in an attempt to isolate a broken water pipe thought to be in the HPFP. Non-licensed fire protection personnel, not cognizant of the HPFP system configuration, isolated the north header supply from the west supply while the north header supply from the east supply was isolated for maintenance, without contacting the SOS. This combination resulted in the isolation of the HPFP system that placed the plant outside TSs. A contributing factor in this event was that fire protection personnel at the scene of the event perceived that an emergency situation was forming. The corrective action for the event was to return the HPFP system to service, repair the leak which was actually on a potable water line, and return the potable water system to service.

To prevent reoccurrence of this event, fire protection personnel were trained on independent work limitations, the requirements for control room oversight, and control of all plant evolutions. They were counseled on proper communications and protocol techniques.

The inspector reviewed the licensee's closure package for this LER. The licensee conducted an incident investigation of this event which was complete and thorough. Copies of the training and counseling sessions and attendance sheets were reviewed. The actions taken addressed the problems which resulted in the LER.

o. (CLOSED) PART-21 259, 260, 296/P21-86-01, Mangetrol Model 402 Level Controls Shipped Without Torque Check.

An identical IFI(259, 260, 296/86-11-02) was opened for this problem. The IFI is closed in IR 86-40.

p. (CLOSED) PART-21 259, 260, 296/P21-90-07, Brown Boveri Inc-ABB 27/59 211L Relay has Deteriorated Leads Due to Thermal Stress.

The inspector reviewed the licensee's closure package for this Part 21. The licensee conducted a survey of the locations in which Brown Boveri voltage relays installed on February 28, 1990. No 211L relays were found installed. Power Stores stock records were checked and no 211L relays were found in stocks. The inspector reviewed the survey tabulation results and concluded the licensee actions were appropriate to address the Part 21.

9. Action on Previous Inspection Findings (92701, 92702)

a. (CLOSED) IFI 259, 260, 296/88-04-04, Single Failure Criteria Involving Emergency Core Cooling Systems Identified as Part of the Restart Test Program.

This IFI involved a licensee identified condition where single failure design criteria was not applied to the design of subsystem 280, Battery Boards, and subsystem 231, 480 Volt AC SDBD. The finding was documented on CAQR BFP 880067, Revision 1. This IFI involves only equipment modifications associated with CAQR BFP 880067. The resolution of this problem was the reassignment of the 250V DC control logic power supplies of the 480V AC shutdown boards 1A, 2A, 1B, and 2B from the unit batteries to the 4160V AC SDBDs 250V DC SDBD batteries (SB-A, SB-B, SB-C, and SB-D). Now with the failure of a single DC control power source, such as SB-D, only the associated 4160V AC board, its associated DG, and the 480V AC boards fed from them would be affected, thereby preserving single failure design criteria.

b. (CLOSED) IFI 259, 260, 296/88-10-02, Lack of Stack Effect for Anticipated Air Circulation Using Smoke Medium.

The item was originally identified during the RTP. It was initiated to document a possible discrepancy in the RTP and to identify and track a significant hardware related TE. The licensee issued CAQR BFP 880304 and LER 259/88-39 to document the effect of this problem on plant operations.

A review of the CAQR indicated that the description of condition stated 2-BFN-RTP-065, Revision 1 was performed to determine if a natural draft existed within the stack, to prevent a ground level release with only SBGT operating. Credit could not be taken for the stack dilution fans or the cubicle exhaust fans and their associated ductwork since they were not previously identified as safety related. Testing indicated a convective flow did not exist. TE-11 to 2-BFN-RTP-065 also addressed this problem.

As a result of this testing, the licensee initiated DCN W11053A which required the installation of twelve bubble tight isolation dampers to specifically identified lines, such as the Unit 2 and 3 dilution ducts, the filter cubicles and offgas building ventilation exhaust duct, the steam packing exhaust duct, and Unit 2 and 3 dilution of SBGT crossties. Additional blank-off were to be installed in the Unit 1 dilution duct and the off-gas line to the dilution duct. Based on this review, the inspector determined that the RTP did identify a significant hardware related TE. A CAQR was initiated to document the item and the licensee issued a DCN to correct the deficiency. This indicated that the RTP was effective in this area.

c. (CLOSED) IFI 259, 260, 296/89-47-03, Failure of TS Change to Implement SI Task Force Recommendation.

During a NRC TS Team Inspection a problem was identified with a TS submittal concerning containment venting. To fulfill a commitment made in LER 260/89-01, Fuel Load Without Adequate Neutron Monitoring Due to Inadequate Safety Review of TS Amendments, a licensee task force conducted an assessment of Unit 2 TS. The task force recommended as a restart item that TS 3.7.F.1 concerning the vent path for primary containment be changed. The inspector reviewed the TS submittal dated August 4, 1989, and concluded that the submittal did not address the task force concern. No statement was added to allow the preferred vent path. Part of the LCO statement was moved to the bases.

The TS was resubmitted to the NRC on June 4, 1990. This proposed amendment revised TS 3.7.F14.7.F and the associated bases to more accurately reflect the intended operations of purging and venting of the primary containment.

The inspector reviewed the licensee's TS submittal for this item. The TS change is being tracked as a restart TS change.

d. (CLOSED) URI 260/89-06-06, Configuration Control of Instrument Line Slopes.

This item concerned the system used to maintain configuration control of instrument line slopes and an earlier commitment from Sequoyah Nuclear Plant to issue the walkdown isometrics from their instrument project to maintain configuration control. The inspector reviewed the licensee's closure package for this item. Configuration control is maintained through implementation of Engineering Requirement Specification ER-BFN-EEB-001, Instrument and Instrument Line Installation and Inspection. This procedure was effective October 2, 1987. Sequoyah had agreed to maintain their walkdown isometrics as controlled drawings but this requirement was deleted once they implemented their ER specification. The ER specification contains all the requirements necessary to ensure that all field work conforms

to the appropriate standards. All routing changes are performed under a DCN or ECN package and must meet all the requirements of the ER specification, including slope. Normal maintenance activities are controlled by IMSI-3014, Instrument Maintenance Special Instruction, which implements the ER specification. The inspector reviewed the ER specification and IMSI-3014 and concluded that a system was in place to maintain configuration control. The approach used at Sequoyah and Browns Ferry is consistent. Based on these conclusions, a violation did not occur. Instrument sensing lines are an item to be checked when the plant systems walkdowns occur as part of the system return to service program. This will provide an additional check that sensing lines are acceptable.

e. (CLOSED) DEV 259, 260, 296/89-49-02, Failure to Make Timely Notification to the NRC of Senior Management Changes.

In Revision 6 of TVA's CNPP, Volume I, TVA committed to keep the NRC advised of changes in senior management at the earliest possible time. In that same book were listed, by name, senior TVA managers.

In the fall of 1989, both the chairman of the NSRB and the Director, Division of Nuclear Training, who were listed as senior managers, were replaced by TVA. The NRC was not notified, either formally or informally till some time after the new individuals assumed their positions. This was a deviation from a commitment in the CNPP, Volume I. Subsequent to the deviation, TVA submitted to the NRC notification of the management changes and an updated list of Nuclear Power Senior Managers.

TVA has submitted the Nuclear Power Organization Description Topical Report for NRC approval. When approved, this topical report will be revised as necessary to reflect major organizational changes at least annually in accordance with the requirements of 10 CFR 50.71. TVA has requested and received NRC permission to discontinue the formal notification required by CNPP, Volume I. The inspector has reviewed the documentation provided relevant to this issue and has determined it is acceptable.

f. (CLOSED) DEV 259, 260, 296/89-53-03, Failure to Submit a Special Report in Accordance With a Licensee Commitment.

This deviation concerns the failure of TVA to submit a special report to the NRC as committed to in a letter dated April 1, 1988. In February 1988, TVA's PORS group determined that three events recorded on a CAQR were reportable. A four hour non-emergency ENS telephone report was made to the NRC and preparations began on a 30 day written LER 259/88-04. In March 1988, TVA's PORC group rejected LER 259/88-04 as not reportable. In April 1988, TVA sent a letter to NRC stating that LER 259/88-04 would not be submitted, but that the three concerns would be addressed and submitted to the NRC in a special

report. The special report was never submitted. Subsequent to this deviation, the licensee reevaluated the three conditions and did submit LER 89-25.

TVA has combined the reportability of LERs and commitment tracking into the Site Licensing group instead of separate group responsibility to eliminate the recurrence of this kind of missed commitment. TVA has also committed to advise the NRC by letter within 30 days in cases where an event is initially determined to require an LER and it is determined through subsequent evaluation than an LER is not required to be submitted under 10 CFR 50.73. This commitment was made in a letter to the NRC dated September 21, 1989 dealing with NRC IR 89-27.

The inspector has reviewed the program and selected examples where TVA has submitted the 30 day letters. No discrepancies were noted in the sample selected.

g. (CLOSED) VIO 259, 260, 296/88-36-01, Failure to Properly Establish and Implement a Procedure for Configuration Control.

During a previous inspection, it was identified that OSIL 43, System Status Control, was issued by the Operations Manager without review and approval of the PORC as required by TS 6.8.1.2. This instruction was the document governing the configuration control process and the completion of OI checklists for component alignment. In addition, the previous inspection identified the following deficiencies in the OSIL 43 program:

- System alignment checklists were being initialed even though the components were not positioned in accordance with the checklist. No indication was made on the checklist to identify that a TACF, clearance sheet, or an abnormal status sheet existed that documented the actual position of the components; or that the components were not in the checklist position because the system was running. This was contrary to PMI 12.12, Conduct of Operations, which stated that initialling a procedure step means that the step was completed "as stated."

- Deviations from OI checklist steps during initial checklist performance did not receive the level of approval required by TS for a temporary change to a procedure.

- Abnormal Status Sheets controlling deviations from the specified positions during OI checklist performance were not being controlled as quality assurance records and were discarded when the deviations were cleared.

These deficiencies were acknowledged by plant management and included as part of the violation for future NRC inspection. This item was reviewed further in IR 89-03 and the inspector identified more administrative problems in the system status files.

During this report period, an inspector reviewed the licensee's response dated May 5, 1989, and the licensee's closure package for this violation. The licensee issued new procedure PMI 12.15, System Status Control, on December 30, 1988, to prescribe the methods to achieve and maintain cognizance of operational status and configuration status control. The inspector reviewed PMI-12.15 and held discussions with licensee personnel responsible for system status and configuration control. The new procedure and programs include controls to preclude the problems identified during previous inspections.

In the response to the violation the licensee identified four other OSILs which needed to be upgraded to include PORC review. These OSILs were OSIL 11 "Environmental Data System - Trouble Reporting Procedure", OSIL 33 "Records Control - Handling QA Records in Operations", OSIL 63 "Electrical Circuit Breaker Rack -In/Rack-Out", and OSIL 66 "Checklists, Logs, Inspections, and Routine Sheets." The inspector reviewed the licensee's procedures and noted that the contents of OSIL 11 and OSIL 33 had been incorporated into PMI 12.12, Conduction of Operations; OSIL 63 had been upgraded to GOI-300-2, Electrical General Operating Instructions; and OSIL 66 had been upgraded to GOI-300-1, Operations Routine Sheets. All PMI's and GOI's require PORC approval.

h. (CLOSED) VIO 260/89-06-02, Failure to Have a Procedure to Control QA Records of Instrument Calibrations.

This violation was identified regarding the use of calibration cards to record vital instrument information and results of calibration activities. These cards were not controlled by plant administrative procedures and their status as QA records was indeterminate.

The inspector reviewed the licensee's response, dated July 7, 1989, which stated some generic calibration instructions required instrument mechanics to obtain instrument setpoint, accuracy, and range information from calibration cards.

IMs were instructed that uncontrolled sources shall not be used to obtain calibration information on technical specification or other safety-related instruments. The particular instruction in which this problem was found, SCI 511, was revised to refer to the applicable system instrument maintenance indexes, SIMIs, for calibration information.

The inspector reviewed procedure 2-SIMI-3, Feedwater System and the data for instruments 2-FI-3-13, 2-FM-3-13, 2-FS-3-13A, B, C, and 2-FT-3-13. A review of procedures 2-SIMI-3, SCI-204.4 and SCI-212.1 indicated that controlled procedures exist for the calibration of safety related instrumentation and calibration data are handled as QA records.

i. (CLOSED) VIO 259, 260, 296/89-10-02, Apparent Failure to Establish an Effective Program to Promptly Identify and Correct a Known Condition Adverse to Quality.

Contrary to 10 CFR 50, Appendix B, Criterion XVI requirements, licensee personnel failed to document a known design deficiency associated with nonseismically qualified vitrified clay pipe. The clay pipe present in three separate EECW discharge flow paths was not identified on a CAQR until February 3, 1989, even though licensee Nuclear Engineering personnel had knowledge of the condition as early as January 11, 1989. Plant operations was not made aware of the condition until issuance of the CAQR.

The inspector reviewed the licensee's response to the violation dated June 14, 1989. In that response the licensee attributed the violation to the lack of sensitivity among NE personnel regarding Browns Ferry becoming operational, being covered by, TS and the necessity of timely problems identification and documentation at an operating nuclear plant.

The inspector reviewed documentation provided by the licensee to verify completion of training for NE and other site personnel on sensitivity to timely identification of problems, TS significance, and importance of escalation of potential problems. Additionally, the inspector reviewed Site Director Memorandums dated March 13 and March 14, 1989, which stated Browns Ferry site policy on sensitivity to timely identification and escalation of potential safety problems. During the review the inspector noted that NE personnel are now included as a non-voting representative on PORC and that there has been a general improvement in communications between the various organizations on site since the violation occurred. The inspector determined that the licensee has adequately addressed the problem and corrective actions should be adequate to preclude recurrence.

j. (CLOSED) VIO 259, 260, 296/89-35-04, Failure to Respond in a Timely Manner to Off-Normal Conditions.

The inspectors had identified that on February 10, 1989, control room personnel failed to respond to CST level instrumentation information resulting in uncontrolled and unmonitored loss of 200,000 gallons of water from the CST. This loss of potentially radioactive water was not immediately recognized by licensed personnel and not acted on by operations until almost 16 hours after first becoming aware of the condition.

The inspector reviewed the licensee's response to the violation dated August 31, 1989. In that response the licensee attributed the violation to the failure of the Unit Operator to adequately investigate an abnormal indication resulting in the incorrect conclusion that the CST level instrumentation had malfunctioned and indicated erroneously because of cold weather conditions.

The inspector reviewed various IIRs and LERs which occurred during 1989. Based on this review the inspector determined that a large number of personnel errors occurred in this area. The licensee experienced 10 separate events during this period that involved failure to control fluid systems resulting in spills, flooding, or uncontrolled loss of large amounts of potentially contaminated water. Two of these failures resulted in NRC violations for failure to respond promptly to off normal conditions.

The inspector held discussions with management representatives from plant operations and the Site Quality Organization to determine the extent of corrective actions associated with this problem. Based on this discussion and examination of various additional documentation provided by the licensee, the inspector determined that the problem has been adequately resolved due to the following corrective actions which took place in December 1989:

- Reassignment of an experienced SRO to the newly created position of Water and Waste Coordinator.

- Assignment of operations personnel to newly created Radwaste Unit Operator position which is now fully manned around the clock.

- Each SOS was counseled with increased emphasis placed on attention to detail and prompt response to off normal conditions.

- Training conducted with all operations personnel on the above events.

The inspector noted that these actions appear to have been effective by the absence of any similar events during 1990. This is made further evident in the decrease in the overall average radwaste input rate (which represents plant leakage) from 25 gpm to 10 gpm during the same time period. Based on the above review of the licensee's corrective actions in this area the inspector determined that adequate measures have been taken to preclude recurrence.

k. (CLOSED) VIO 260/89-53-01, Failure to Respond in a Timely Manner to Off-Normal Conditions.

The inspectors had identified that on December 2, 1989, control room personnel failed to respond in a timely manner to the fuel pool

skimmer surge tank high level alarm resulting in water from the Unit 2 Spent Fuel Storage Pool overflowing into the ventilation system and leaked onto areas of the reactor building.

The inspector reviewed the licensee's response to the violation dated March 5, 1990. In that response the licensee attributed the violation to the failure of the Unit Operator to follow the alarm response procedure and the failure of the AUO to close the condensate supply valve to the skimmer surge tank.

Since the NRC staff considered this violation similar to VIO 259, 260, 296/89-35-04 closed in this report, the inspector considers the completed measures adequate to prevent recurrence.

l. (CLOSED) VIO 260/89-53-02, Failure to Initiate CAQRs for Disposition of Test Exceptions.

The inspector reviewed the licensee's closure package for this violation. The licensee initiated CAQR BFP 900186 to address that the control bay chilled water pumps failed to supply the design flow rate. CAQR BFP 900187 was written to document operational problems resulting from the design of the C and D shutdown board room emergency cooling units. The licensee committed to make modifications to resolve the operational problems. In IR 89-53, an extensive review of TEs by the licensee is discussed. The inspector's review concluded that the licensee's review was adequate. The resolution of the CAQRs will receive additional review as part of the SPOC process.

m. (CLOSED) VIO 259, 260, 296/90-05-03, Failure to Follow Operating Instruction.

This violation was issued for the failure to follow O-OI-57B, 480V/240V AC Electrical System Operating Instruction, step 8.6.3 prior to transferring shutdown board 3A from its alternate power source to its normal power source. Step 8.6.3 required that the normal feeder breaker AC voltage indicate greater than 450 volts prior to transferring the board power supply. By failing to verify the voltage, the operator did not notice that the 4KV feeder breaker was open. The transfer resulted in unplanned ESF actuations. A contributing factor to the event was that operations did not follow procedures in returning shutdown board 3EA to service. This resulted in the 4 KV feeder breaker for shutdown board 3A being left open.

The licensee responded to the violation by letter on May 18, 1990, and admitted the violation. The NRC accepted the licensee's response by letter dated June 12, 1990. The inspector reviewed the licensee's response to the violation and the closure package. The corrective actions taken included closing the 4KV feeder breaker and reenergizing shutdown board 3A; the operator involved was individually counseled concerning the use of plant procedures and

disciplinary action was taken; and operations personnel reviewed the event. In addition, procedure 0-OI-57B was revised to include a caution before step 8.6.3 to make this step more noticeable during future performances. The inspector verified that the corrective actions had been completed.

n. (CLOSED) VIO 259, 260, 296/90-08-01, Missed RCW Samples.

This violation was issued for the failure to take complete RCW compensatory samples while the RCW effluent radiation monitor was inoperable on April 4, 1990. Compensatory sampling was completed following identification of this occurrence.

The licensee responded to the violation by letter on June 4, 1990, and admitted the violation. The NRC accepted the licensee's response by letter dated June 20, 1990. The inspector reviewed the licensee's response and the closure package for this violation. The corrective actions taken included counseling the responsible individual on the importance of complying with plant procedures. The inspector noted that the individual who committed the mistake was also the one who identified the problem to his management. In addition, the chemistry control group issued a memorandum concerning compliance with procedures to all affected personnel and the chemistry staff held discussions on the details of this violation. The inspector verified that the corrective actions had been completed.

No violations or deviations were identified during the Followup of Open Inspection Items.

10. Essential Design Calculations

During the review of the licensee's closure documentation associated with IFI 89-06-07, Reactor Vessel Level Setpoint, the inspector identified a concern associated with the licensee's essential calculation program. This IFI had been identified during a special NRC team inspection conducted at Browns Ferry to review the licensee's program for testing, calibration, maintenance and configuration control of safety related instrumentation. The inspector was concerned that new setpoint calculations were required to support proposed new setpoints associated with RPV water level instruments 2-LT-3-203A, 2-LT-3-203B, 2-LT-3-203C, and 2-LT-3-203D. These instruments provide redundant channels for Reactor Building and PCIS isolations and SBGT actuation. New setpoints would have to be selected that would not be affected by normal plant operations and yet would have sufficient margin for error so that the "as found" value would not exceed the technical specification value during periodic functional testing and calibration. The value stated in TS 3.2.A is greater than or equal to 538 inches above vessel zero. The licensee had committed to resolving this issue prior to Unit 2 restart.

The inspector reviewed new scaling and setpoint calculations ED-Q2003-880177, ED-Q2003-880178, ED-Q2003-880179, and ED-Q2003-880180, which were to support a new setpoint of 539 inches for each of these instrument channels. The inspector noted that although 539 inches complies with the TS requirement, the calculations did not support closure of the open item since the calculated "allowed value" in each case was less than 538 inches. All four of the calculations used the same setpoint methodology, and due to conditions unique to the individual instruments, resulted in a different resulting value of PV3. PV3 was defined as the calculated allowable value and varied among the four calculations from 537.8 to 537.9. Since these values of PV3 included only those margins based on normal operating conditions, and not accident conditions, the calculated allowable value would be that value that the instrument channel could be expected to reach prior to periodic functional testing and calibration.

The inspector discussed this issue with site compliance and engineering personnel and members of the TVA engineering staff from Knoxville. Compliance personnel agreed that the open item was not ready for closure and the closure package was withdrawn. The inspector was further informed by members of the licensee's engineering organization that there existed an ongoing program for verification of scaling and setpoint calculations and that these four calculations were now part of the defined scope of that program. The licensee stated that the program scope was defined on an internal punchlist, and had included approximately 450 calculations with remaining work down to 88 revised calculations and 3 new calculations pending. Although licensee engineering personnel were unable to show the inspector conclusive evidence that these four calculations were tracked on that internal punchlist the inspector was provided with a copy of Project Engineer memorandum dated June 13, 1990 (B22 90 0613 099) which documented a proposed TS change. The proposed change was based on 6 parameters that had calculated allowable values that disagreed with the existing TS. The inspector was also informed that the proposed change was disapproved by licensee management, which required the licensee to again revise the calculations. This item will remain open pending further review of the licensee's program for calculations to support setpoints on safety related instrumentation.

11. Modifications and Unit 3

On March 30, 1990, TVA issued the Browns Ferry Nuclear Plant Unit 3 Integrated Restart Action Plan. This plan outlined a six phase integrated approach for the Unit 3 restart. The six phases are:

* Planning - which was completed by issuing of the Restart Action Plan
* Scope Development - will complete the detailed planning required to begin the walkdowns and analysis of as-installed conditions. This plan will develop, validate, and implement the Restart Equipment List used to complete Unit 3 discovery activities.
* Discovery - will complete the integrated walkdowns and engineering analysis required for Unit 3 modifications.

* Design Production - will provide bulk design and long lead time procurement.
* Implementation - will install and perform post-installation testing, at the component level, of the modification.
* Restart - will include integrated system testing, surveillance testing, fuel load, restart, and power ascension.

In July 1990, TVA issued the Browns Ferry Nuclear Plant Unit 3 Development Phase Plan. This plan included detailed schedules for all the major activities of this phase. The overall six phase restart plan was scheduled to start early 1990 and culminate on January 1, 1993 with the closure of the generator breaker on the grid. In mid July 1990, the Development Phase Plan was put on hold by TVA due to the slippage of the Unit 2 schedule. One of the key elements of the Unit 3 plan is the roll over of certain key individuals from the Unit 2 restart effort to the Unit 3 plan development phase. With the slip in Unit 2 these lead individuals cannot be released from the current responsibilities.

Some efforts on the Development Phase Plan continue, but not on any defined schedule. The key individuals and approximate staffing needs have been developed. For example, the Unit 3 DNE will be comprised of 18 TVA engineers in the three main disciplines, and about eight support people, all from the current Browns Ferry Project Engineering Group. These engineers will not perform the engineering work, but serve as lead engineers and liaisons between BFN and the AE. No new date has been established for reinitiating the Unit 3 schedule.

The inspector has reviewed both the Unit 3 Integrated Restart Action Plan and the Development Phase Plan, and has attended several development meetings.

Within the Unit 2 Modifications effort, productivity is increasing but still not at normal industry rates. Field rejection rates have been reduced to about four percent. One item still causing schedule delays is the amount of field changes and discovery. Partially as a result of field changes, material availability has caused a delay in field work completion. Specific examples are documented in earlier sections of this report.

No violations are deviations are identified.

12. Exit Interview (30703)

The inspection scope and findings were summarized on August 17, 1989 with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. Although proprietary material was reviewed during the inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Item Number	Description and Reference
259, 260, 296/90-25-01	VIO, Inadequate Fire Protection Surveillance, paragraph two.
259, 260, 296/90-25-02	IFI, TS Reformatting, paragraph two.
259, 260, 296/90-25-03	IFI, Documenting and Controlling Clearances for Multiple Activities, paragraph three.
259, 260, 296/90-25-04	VIO, Failure to Protect Emergency Equipment, paragraph four.

Licensee management was informed that 14 LERs, 2 PART 21s, 3 IFIs, 1 URI, 2 deviations, and 8 violations were closed.

13. Acronyms

ASOS	Assistant Shift Operations Supervisor
AUO	Auxiliary Unit Operators
BFNP	Browns Ferry Nuclear Plant
CAQ	Condition Adverse to Quality
CAQR	Condition Adverse to Quality Report
CFR	Code of Federal Regulations
CNPP	Corporate Nuclear Performance Plant
CRD	Control Rod Drive system
CS	Core Spray
CST	Condensate Storage Tank
DBVP	Design Baseline Verification Program
DCN	Design Change Notice
DD	Drawing Discrepancy
DEV	Deviation
DG	Diesel Generator
ECN	Engineering Change Notice
EEB	Electrical Engineering Branch
EECW	Emergency Equipment Cooling Water
ENS	Emergency Notification System
EQ	Environmental Qualification
ER	Engineering Requirement
ESF	Engineered Safety Feature Actuation
FDCN	Field Design Change Notice
FPC	Fuel Pool Cooling
GE	General Electric
GEMAC	General Electric/Manual Automatic Controller
GOI	General Operating Instruction
HPCI	High Pressure Coolant Injection
HPFP	High Pressure Fire Protection
IFI	Inspector Followup Item
IIR	Incident Investigation Report
IM	Instrument Maintenance

IMSI	Instrument Maintenance Special Instruction
IR	Inspection Report
KV	Kilovolt
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LRED	Licensee Reportable Event Determination
MIC	Microbiological Induced Corrosion
MMI	Mechanical Maintenance Instruction
MR	Maintenance Request
MSIV	Main Steam Isolation Valve
MSL	Main Steam Line
NRC	Nuclear Regulatory Commission
NSRB	Nuclear Safety Review Board
OI	Operating Instruction
OSIL	Operations Section Instruction Letter
PCIS	Primary Containment Isolation Systems
PM	Preventive Maintenance
PMI	Plant Manager Instruction
PORC	Plant Operations Review Committee
PORS	Plant Operations Reportability Section
PPM	Parts Per Million
PS	Pressure Switch
PSIG	Pounds per Square Inch Gauge
QA	Quality Assurance
QC	Quality Control
QM	Quality Monitoring
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RCW	Raw Cooling Water
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RTP	Restart Test Program
RWCU	Reactor Water Cleanup
SBGT	Standby Gas Treatment System
SCI	Standard Calibration Instruction
SCL	System Checklist
SDBD	Shutdown Board
SDIV	Scram Discharge Instrument Volume
SDSP	Site Directors Standard Practice
SI	Surveillance Instruction
SIMI	System Instrument Maintenance Index
SMPL	Site Master Punchlist
SLC	Standby Liquid Control
SOS	Shift Operations Supervisor
SPAE	System Plant Acceptance Evaluation
SPOC	System Pre-Operability Checklist
SRO	Senior Reactor Operator
TACF	Temporary Alteration Change Form

TE	Test Exception
TS	Technical Specification
TVA	Tennessee Valley Authority
URI	Unresolved Item
USST	Unit Service Station Transformer
VIO	Violation
WO	Work Order
WP	Work Plan
WR	Work Request