



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

Report Nos.: 50-327/88-19, 50-328/88-19

Licensee: Tennessee Valley Authority  
 6N 38A Lookout Place  
 1101 Market Square  
 Chattanooga, TN 37402-2801

Docket Nos.: 50-327 and 50-328

License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah Units 1 and 2

Inspection Conducted: March 6, 1988 thru April 4, 1988, and April 15, 1988

Team Leader: *J.B. Brady* 5/27/88  
 K.M. Jenison, Senior Resident Inspector Date Signed

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 F. R. McCoy, Chief, Project Section I Dated Signed  
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Summary

Scope: This routine, announced inspection was conducted on site in the areas of: operational safety verification; review of previous inspection findings; followup of events; review of licensee identified items; review of IE Bulletins and Information Notices; review of Inspector Followup Items; review for closure of NRC Order EA 85-49; review of restart open NSRS recommendations; review for closure of Operational Readiness issues; and followup on issues related to the 1984 Thimble Tube event.

Results: Two violations and one inspector follow-up item were identified.

VIO 327,328/88-19-01, Installation of Penetration Seals, paragraph 6.

IFI 327,328/88-19-02, Long Term Corrective Actions, paragraph 11.

VIO 327,328/88-19-03, Inadequate Surveillance Procedure, paragraph 7.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

H. Abercrombie, Site Director  
J. Anthony, Operations Group Supervisor  
\*J. Arney, Quality Surveillance Manager  
R. Buchholz, Sequoyah Site Representative  
J. Bynum, Assistant Manager of Nuclear Power  
M. Cooper, Licensing Supervisor  
H. Elkins, Instrument Maintenance Group Manager  
R. Fortenberry, Technical Support Supervisor  
\*M. Harding, Licensing Group Manager  
\*G. Kirk, Compliance Supervisor  
\*J. La Point, Deputy Site Director  
L. Martin, Site Quality Manager  
R. Olson, Modifications  
R. Pierce, Mechanical Maintenance Supervisor  
R. Prince, Radiological Control Superintendent  
R. Rogers, Plant Operations Review Staff  
M. Skarzynski, Electrical Maintenance Supervisor  
E. Sliger, Manager of Projects  
\*S. Smith, Plant Manager  
J. Sullivan, Plant Operations Review Staff Supervisor  
B. Willis, Operations and Engineering Superintendent

#### NRC Employees

\*K. Jenison, Resident Inspector

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on April 15, 1988, with those persons indicated in paragraph 1. The Inspectors described the areas inspected and discussed in detail the inspection findings listed below. The licensee acknowledged the inspection findings and did not identify as proprietary any of the material reviewed by the inspectors during the inspection.

NOTE: A list of abbreviations used in this report is contained in paragraph 14.

#### Inspection Findings:

(Open) Violation (VI0) 327,328/88-19-01, Installation of Penetration Seals - (paragraph 6)

(Open) Inspector Follow Item (IFI) 327,328/88-19-02, Long Term Corrective Actions - (paragraph 11)

(Open) Violation 327,328/88-19-03, Inadequate Surveillance Procedure - (paragraph 7)

3. Operational Safety Verification (71707) Units 1 and 2

a. Plant Tours

The inspectors observed control room operations; monitored conduct of testing evolutions; reviewed applicable logs, including the shift logs, night order book, clearance hold order book, configuration log, and TACF log; conducted discussions with control room operators; observed shift turnovers; and confirmed the operability of instrumentation. The inspectors verified the operability of selected emergency systems and verified compliance with TS LCOs. The inspectors verified that maintenance work orders (WO) had been submitted as required and that follow-up activities and prioritization of work was accomplished by the licensee.

Tours of the diesel generator, auxiliary, control, and turbine buildings were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, excessive vibrations, and plant housekeeping/cleanliness conditions.

No violations or deviations were identified

b. Safeguards Inspection

In the course of the NRC inspection activities, the inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities, including: protected and vital area access controls; searching of personnel and packages; escorting of visitors; badge issuance and retrieval; patrols; and compensatory posts.

In addition, the inspectors observed protected area lighting, and protected and vital area barrier integrity. The inspectors verified interfaces between the security organization and both operations and maintenance. Specifically, the shift inspectors inspected security during the outage period and reviewed licensee security event reports.

No violations or deviations were identified

4. NRC Order EA 85-49 Review

a. This issue was inspected in several NRC inspection reports. The last of which was NRC inspection 327,328/88-15. This inspection found

that the licensee's corrective action system needed improvement in some specific areas in order to support the restrictions applied to Sequoyah. The NRC inspection team that performed inspection 327,328/88-15 unanimously considered the licensee's corrective action system to be adequately implemented if the specific items identified in the report were improved.

Inspections conducted during this inspection period followed certain corrective actions by the licensee. These actions included administrative actions by the Sequoyah Deputy Site Director (RIMS S00 880211 803) and administrative actions by the TVA Manager of Nuclear Power (RIMS A02 880212 018). These administrative actions require division manager review for CAQRs originating at Sequoyah and division director concurrence for CAQRs originating in Knoxville or Chattanooga. In addition, qualification requirements for reviewers have been established. Finally, an audit review function was established by the Sequoyah Deputy Site Director (RIMS S00 880219 801) to support unit 2 startup.

- b. The improvement items identified in NRC inspection 327,328/88-15 were:

- (1) Improve the speed and reliability of operability and significance determinations.

A sample of forty three CAQRs were reviewed by the inspectors. This sample included CAQRs which were initiated between inspection 327,328/88-15 and this inspection period, and CAQRs which were in escalation and/or review between inspection 327,328/88-15 and this inspection period. The above stated licensee corrective actions appeared to correct the issue of processing speed with respect to the CAQRs reviewed. The inspector found no operability or significance determinations that were nonconservative. The licensee's corrective actions appear to be adequate to address this issue.

The inspector reviewed the licensee's actions relative to timeliness on a Watts Bar CAQR (WBP 871237) designated as having a potential effect on operability. The CAQR was issued on February 17, 1988. It was reviewed and dispositioned by PORS on February 24, 1988 which is within the seven working day requirement. The licensee dispositioned the item as not affecting restart because the issue in question (blowout plugs in valve rooms) had been corrected at Sequoyah in November 1984 on ECN L6289, work plan 11373.

This item was acceptably addressed by the licensee.

- (2) Ensure those personnel who make operability and significance determinations in the generic CAQR and Nuclear Experience Review (NER) processes are adequately trained and possess the correct

qualifications to make operability and significance determinations.

The inspectors reviewed the qualifications of those personnel making operability and significance determinations following the licensee's administrative changes and concluded that personnel were qualified to make such determinations and were trained with respect to the CAQR process.

The inspector questioned the licensee's action relative to assuring that CAQRs issued at Watts Bar were reviewed, if they potentially affected operations at Sequoyah or Browns Ferry, by qualified personnel. The licensee has resolved this concern by assigning specific qualified personnel to review CAQRs generated at Watts Bar. In addition, all CAQRs previously generated at Watts Bar were rereviewed for effect on operability at Sequoyah or Browns Ferry. The inspector reviewed the licensee's action on this item and found the actions acceptable.

- (3) Improve the completeness and auditability of CAQR documentation required for adequate management reviews prior to closure.

A portion of forty three CAQRs were reviewed by the inspectors. This sample included CAQRs which were initiated between inspection 327,328/88-15 and this inspection period, and CAQRs which were in escalation and/or review between inspection 327,328/88-15 and this inspection period. The above stated licensee corrective actions appeared to correct the issue of documentation in that the CAQRs appeared to be adequately supported by documentation and were complete to the point that a reasonable management review could be performed.

- (4) Ensure managerial CAQR training requirements imposed by the order are current.

The licensee completed training of those managers identified by the NRC and those managers identified as a result of a larger scale TVA review. The inspectors reviewed the test validations for the NRC identified managers. In addition, the licensee is developing a separate CAQR training program for newly assigned managers. Finally, the licensee is strengthening General Employee CAQR Training. The licensee's corrective actions appear to be adequate.

- (5) Resolve specified technical questions unique to individual CAQRs.

- (a) CAQR SQP 870401 Revisions 0 and 1.

During this review it was noted that part C had been completed but that the operability block in Part B on the

original copy had not been completed. In addition, another CAQR SQP 870372 that was being reviewed for technical adequacy, had the same condition. A sample of five CAQRs that were considered complete and ready for filing were reviewed. On one of the five CAQRs (SQP 87158) the operability block had not been completed. The other four were complete.

Discussions with the licensee revealed that when a CAQR is received by the QA unit a copy is made of Page 2 which contains the Part 2 operability block and is sent to Plant Operations Review Staff (PORS) for the operability evaluation. This copied page is returned along with the appropriate signatures and the operability analysis. These documents were located in the QA records attached to the documentation package indicating that the analysis had been performed but that the operability block had not been checked on the original CAQR document. The Nuclear Quality Assurance Manual (NQAM) Volume I Section 2.16, Part 9.3 states "Within three working days of receipt, PORS shall determine and document in Part B of the CAQR whether the CAQ affects operability". The operability had been evaluated, but the block in Part B had not been completed.

- (b) CAQR SQP 870372. A review of QA record B41 87 0519 001, a letter to TVA from Wyle Laboratories dated May 18, 1987, stated that the one inch diameter Seriflex conduits, tested at an input acceleration that would simulate a seismic event at approximately the 720 foot elevation, sustained no damage during seismic testing. This indicates that these one inch diameter flex conduits can be used below the 720 foot elevation. The licensee has substantiated the location of these conduits and has determined that none of this type conduit has been installed above this 720 foot elevation during the interim period since the initial inspection to determine the location of flex conduit. This CAQR has not been closed because the drawings are in the process of being changed to reflect that the conduit should not be installed above a certain level. No physical modifications need be made for the resolution of this CAQR. This item had been determined not to be a restart item.
- (c) Seismic Anchor Movement. The inspector identified a concern relative to the licensee's need to consider Category (L) piping (items important to safety) and instrument lines for differential movement between buildings during a seismic event. The licensee assigned commitment tracking numbers CCTS NCO 870119001-Unit 1 and CCTS NCO 871119001-Unit 2 and CCTS NCO 88003600 for instrument lines. The licensee's position regarding disposition of this concern is as follows:

- The Alternate Analysis Category I piping, and Instrument and Control lines are covered by the Alternate Analysis Review Program (AARP). The AARP Program Description SQN-AA-001 (Reference: RIMS Access # B225870330329) indicates that anchor movements are considered. A transmittal to the NRC (Reference: RIMS Access# L44870408807) commits to include instrument lines as post-restart activity under the AARP phase 2. In addition, a draft of Engineering Requirements Specification ER-SQN-EEB-001 indicates that building interfaces are to be considered in all future installations of Instrument lines.
- The Category I (L) piping is the subject of a Data Base walkdown performed by EQE and reported in their report No. 8629-CI-04-001. This report indicates that seismic anchor point movements and specifically differential building settlement were considered and "that failure resulting in loss of position/pressure retention is not a credible concern." Procedures for analyzing and supporting category I (L) piping are being developed and will include the consideration of seismic anchor movement including differential building movements.

This item is considered resolved.

c. Structural Platform Loading

A review of CAQR-WBP 870759 at Watts Bar identified problems on structural components that required rework and re-analysis at Watts Bar. As a result of the CAQR Sequoyah generated SCR SQN CEB 8711. The corrective actions for this SCR required a structural evaluation of a minimum of five (5) platforms. The licensee performed the analysis on six (6) platforms and determined they were acceptable. The licensee subsequently identified a restriction of 1000 pounds of "live load" on any 10 square foot area if the load is imposed for durations longer than 72 hours.

This issue was left open and the licensee was asked to assure that by either posting restrictions which defined the live load limitation or by re-analysis, the maximum "live loads" were adequately considered.

The licensee issued several memorandums with the following planned commitments stipulated.

The live loads limitation was based on the evaluation of six representative platform samples out of approximately 200 platforms in Units 1 and 2. The conclusions are applicable to the entire population (200 platforms) until a larger sample is evaluated or a case-by-case review is performed.

A contractor is tasked and presently working on engineering task packages for Units 1 and 2 to survey all the access platforms in the safety-related structures or adjacent to the safety-related equipment in the plant. The work is scheduled for completion by November 7, 1988.

Until the engineering analysis is completed, the live load limitation is applicable to all the platforms in the buildings.

When maintenance or repair activity is required on safety-related platforms which impose loads of more than 1000 pounds for a 72 hour duration or more within any 10-foot square area (100 sq. ft.) or less, a prior evaluation must be made by engineering to determine the effect of the loading.

A posting which specifies the allowable load limits is being evaluated.

The inspector found the licensee's actions on this item to be acceptable.

d. Radiation Monitoring System CAQRs WBN 870806 and WBN EEB 8724

During the corrective action inspection at Sequoyah, inspectors reviewed issues from Browns Ferry that would have generic applicability to Sequoyah. The generic applicability of radiation monitoring system problems was examined due to the extensive nature of the problems at Watts Bar and known problems documented at Sequoyah. Generic reviews were conducted at Sequoyah as a result of CAQR WBN 870806 and SCR WBN EEB 8724. These documented both specific problems and generic problem areas with the radiation monitoring system. The inspectors concluded from the generic reviews and supporting documentation that the generic reviews were inadequate in documenting or referencing the extent of the problem. During the NRC exit, TVA committed to providing adequate documentation to support the generic reviews for the radiation monitoring system. This item was a startup commitment.

As a result of the commitment, TVA staff conducted a generic review to address all items in the Watts Bar CAQs and SCRs and cross referenced all documents using a matrix. The matrix referenced the Watts Bar document, the corresponding Sequoyah document, the problem, its applicability to Sequoyah, the monitors affected, the responsible department, and a summary. A response was prepared for each item with summary justification included. As a result of the review, several items were identified requiring corrective action. These items included drawing deviations, work requests, calculations, CAQRs and PIRs. The inspector discussed the specifics of each corrective item with TVA staff and reviewed the following documentation:



WATTS BAR	CAQ	PARAGRAPH	SEQUOYAH DOCUMENT
WBP 870892		1a	NONE
WBP 870892		1b	CAQR SQT 870548
WBP 870892		2a	Drawing deviation (DD) 88DD3530
WBP 870892		2b	DD 88DD3528 88DD3529
WBP 870892		3a	Drawings 47W610-90-2 47W600-106 Problem Identification Report (PIR, SQNEEB8806 47W610-90-2 47W600-106
WBP 870892		3b	47W610-90-2 47W600-106
WBP 870892		4	SCR SQNEEB8621 R1
WBP 870892		5	SCR SQNEEB8620
WBP 870892		6	47W600-107
WBP 870892		7	DD 87DD3415
WBP 870892		8	DD 88DD3522
WBP 870892		9	Work Request (WR) B257417
WBP 870892		10	NONE
WBP 870892		11	SQP870238 SQP871359 SQP871659
WBP 870892		12	SQP870286
WBP 870892		13	CAQR SQP870247
WBP 871094		1a	CAQR SQT870548
WBP 871094		1b	PIR SQNEEB8791 PRO 1-87-070
WBP 871094		1c	47W600-301
WBP 871094		1d	SQP870238 SQP871359 SQP871659
WBP 871094		1e	ECN 5194 PR SE605
WBP 871094		2a	CAQR SQT870548
WBP 871094		2b	CAQR SQT870548
WBP 871094		2c	CAQR SQT870548
WBP 871094		2d	CAQR SQT871548
WBP 871094		2e	CAQR SQT870548
WBP 871094		2f	PIR SQNEEB8802
WBP 871094		2g	PIR SQNEEB8802 PIR SONEEB8803
WBP 871094		2h	CAQR SQP880163
WBN 871094		2i	SQNEEB8614 R1
WBP 871094		3	47W610-90-2
WBP 871094		4a	PIR SQNEEB8702
WBP 871094		4b	47W610-90-3
WBP 871094		4c	SCR SQNEEB8761 SOI 90.1B
WBP 871094		4d	NONE
WBP 871094		5	PIR SQNEEB8804
WBP 871094		6	CAQR SQT870549 RIMS 850124235 RIMS 850123235
WSP 871034		7a	PIR SQNEEB8803 47W600-107
WBP 871094		7b	CAQR SQP870247
WBP 871094		8	PIR SQNEEB8807
WBP 871094		9a	TACF 1-88-03-90 SCREENING REVIEW, DCR 2369
WBP 871094		9b	CAQR SQP871359

The inspector concluded from the review and discussions with TVA staff that the revised generic review contained adequate documentation and specific items requiring corrective action would

not affect Sequoyah Unit 2 startup and operation. This item is closed.

The licensee has devoted a significant amount of managerial attention in order to affect these recent changes. In order to maintain these identified improvements the managerial attention may have to be directed long term.

The implementation of the CAQR system is adequate to support the operation of Unit 2 and it is appropriate to recommend the removal of order EA 85-49 from Sequoyah.

5. Follow-up On Items Related to the 1984 Thimble Tube Event: Violations 327/84-24-01 and 327/84-24-02

(Closed) Vio 327/84-24-01, Example a:

This example involved use of a procedure for instrument thimble cleaning at power which was prohibited by the procedure itself. Procedural adherence has been a problem at Sequoyah as evidenced by this and numerous other events, and NRC violations attributable to a willingness to deviate from approved procedures.

The revised response to this item details several corrective measures implemented by plant management to strengthen management controls in this area. Administrative Instruction (AI)-4 has been revised to include a warning of disciplinary action associated with willful violation of procedures. Additionally, an extensive training program was conducted for plant personnel to emphasize procedural adherence. The plant staff has shown progress in this area since increased management attention began in 1987.

The corrective action in this area appears adequate.

This example is closed.

(Closed) VIO 327/84-24-01, Example b:

The maintenance procedure used to perform the thimble tube cleaning was used even though the personnel involved realized the procedure was inadequate and inappropriate for the existing plant conditions. The requirement to process and implement a procedure change was not followed, which should have prevented the performance of the work at full system pressure.

The revised response to this example correctly identified the root cause as a failure to process a required procedure change, allowing a personnel error to go undetected. As in example 'a', additional management controls have been implemented to emphasize adherence to procedures and correction of procedural inadequacies before continuing work. A comprehensive review

of all safety-related procedures was performed in 1987 to clean up long-standing errors and inadequacies.

The licensee's response to this example appears adequate.

This example is closed.

(Closed) VIO 327/84-24-01, Example c:

This example involved a failure to implement procedures for controlling the process for issuance and review of Maintenance Requests (MRs). This failure allowed a deficient MR to be prepared, issued, and used in the thimble tube incident.

The root cause of this example is identified as a lack of management control to ensure procedural compliance and inadequate work planning controls. Corrective actions include the procedure adherence training described in examples 'a' and 'b' above, and changes to the Sequoyah Standard Practices for Maintenance Planning (SQM-2). SQM-2 now contains detailed checklists for determining equipment classification; guidance to incorporate approved instructions in workplans; requirements for QA review; and postmaintenance testing guidance.

The licensee's corrective actions appear to be adequate.

This example is closed.

(Closed) VIO 327/84-24-01, Example d:

This example involved an inadequate Administrative Instruction (AI-8) which contained no provisions to ensure the containment airlocks remained accessible. In addition, AI-8 did not clearly define permissible maintenance activities for removal of clearances (Hold Orders) on the incore flux monitoring system.

AI-8 was revised to clarify hold order requirements for maintenance on the incore flux monitoring system, and to ensure the personnel airlock remains clear and accessible with personnel inside containment.

The corrective actions for this example appear to be adequate.

This example is closed.

(Closed) VIO 327/84-24-01, Example e:

This example occurred because the hold order associated with the work was issued to operations personnel rather than to the person responsible for the work as required by AI-3.

The Licensee's initial response to this example was deemed inadequate by the inspector in that a similar instance occurred on February 1, 1987,

when a clearance for valve FCV-63-1 was issued to operations personnel instead of to the person performing the work (Steam generator tube inspection). As a result, valve FCV-63-1 was opened by operations personnel without adequate clearance, resulting in flooding of the steam generator primary side. This resulted in escalated enforcement action as outlined in IR 327,328/87-30. Subsequent to the NRC request to rerespond to violation 327/84-24-01 which was issued in IR 87-50, the licensee's corrective action was to change AI-3 to legitimize the issuance of hold orders to operations personnel for work performed by other groups. The licensee was informed that this response was also inadequate. The response has since been changed to revise AI-3 (Revision 40) to stipulate that hold orders must be issued to persons performing the work and to preclude the use of caution tags for clearance boundaries involving personnel safety. This revision is presently in place and is addressed by a submittal, in the form of a letter to the commission. The letter, dated March 16, 1988, access number L44-880316-800, serves as a commitment to revise the previous corrective action to violation 87-30-01, and is applicable to VIO 327/84-24-01, example e.

The corrective action for this example is considered adequate.

This example is closed.

(Closed) VIO 327/84-24-01, Example f:

This example occurred when workers entered the lower containment without verifying that clearances were in effect on the incore instruments as required by a Radiation Work Permit (RWP).

The corrective actions taken by TVA include revising AI-8 "Access to Containment" to require the shift engineer to initiate a hold order clearance on the incore system prior to allowing lower containment entry.

Radiological Control Instruction RCI-14 requires all containment entries to be made in accordance with AI-8.

The licensee's corrective actions for this violation appear to be adequate. This item is closed.

(Closed) Violation 327/84-24-02, Failure to Conduct Adequate PORC Reviews

This violation occurred when the Plant Operations Review Committee (PORC) inadequately reviewed the Maintenance procedure (SMI-0-94-1) used to perform the work on the incore thimble. The procedure was inadequate for the conditions in effect, and this was not recognized by the PORC prior to the implementation of the procedure.

The root cause of the inadequate PORC review has been identified as a weakness in the PORC review process in effect at the time.

The corrective actions taken to strengthen PORC includes a TS change to implement a "qualified reviewer" concept. This assures that technically knowledgeable individuals are used to review procedures and make recommendations to the PORC. In addition, AI-43, Independent Qualified Review, has been implemented to provide guidance for this review concept. This corrective action for this item appears adequate.

This item is closed.

6. Follow-up of Licensee Action on previous Inspection Findings (92702)

(Closed) VIU 327,328/82-25-01, Failure to Maintain EGTS Operable.

This event involves Technical Specification (TS) 3.6.1.8 requirement to maintain two independent emergency gas treatment system EGTS cleanup subsystems operable during Modes 1, 2, 3, and 4. This requirement was breached on September 1982 when access doors A64 and A65 were blocked open at the same time, an interlock designed to prevent this occurrence failed to operate properly.

The licensee has admitted the violation and has taken action, as follows, to prevent recurrence of this problem.

- Revised Surveillance Instruction (SI)-157 to not allow doors A64 and A65 (Unit 1) or A77 and A78 (Unit 2) to be open at the same time.
- Established a preventive maintenance (PM) program (PM 756-410).
- Upgraded the door interlock system per Engineering Change Notice (ECN) L5838.
- Revised Technical Instruction (TI)-77 ABSCE, Breaching the shield Building or Control Room Boundaries.

The inspector has reviewed the alleged violation, the licensee's response to the violation, SI-157, PM 756-410, TI-77 and ECN L5838. SI-157 has been reviewed to instruct personnel performing the procedure that the two doors can not be opened at the same time. PM 756-410 is presently being conducted on a weekly basis as an administrative preventive measure. ECNL5838 (an enhancement) is presently being worked, the first stage has been completed (installation of new electromagnetic interlocks on doors A64, A65, A55, A60, A151 and A152). These have been verified to be more reliable than the original interlocks. The second stage will be the replacement of other interlocks as defined by the Department of Nuclear Engineering (DNE). This will be tracked on the TROI system as 82-25-01. ICF 88-0191 has been issued to TI-77 to assure the requirements of TS 4.7.8.d.3 are met during periods when one unit's blast doors are open, with the other unit in Modes 1, 2, 3, or 4. The licensee has performed a second event analysis for LER 327/82-107 (memo L 44 870821 807) using a longer, more realistic amount of time in Mode 3 (operations logs) and the actual time the boundaries were breached (best estimation from records).

The reevaluation still concludes that the potential radiological consequences for a postulated loss of coolant accident would have been within 10 CFR 100 limits. The licensee's actions and analyses appear to be adequate.

This item is closed.

(Closed) Violation 327,328/86-26-01, Failure to Adequately Conduct TS 4.8.3.1 Surveillance Requirement and Failure to Establish and Maintain an Adequate SI.

As previously stated in inspection report 327,328/87-36, the required specific corrective actions relating to this violation have been implemented and determined to be acceptable. In addition, per letter from S. D. Ebnetter to S. A. White, dated 12-20-87, additional enforcement action is not needed.

This item is closed.

(Closed) VIO 327,328/88-28-01, Major Changes to Radioactive Waste Treatment Systems

The licensee changed the permanent lineup of the radwaste system to allow the CDWE to process all liquid radwaste produced by the plant. The licensee removed the original waste and auxiliary waste evaporators from service. Previously, the CDWE processed waste from the condensate demineralizer system and the floor drain collector tank. The new configuration allowed the CDWE to process the contents of the tritiated drain tanks. The licensee failed to evaluate these changes in accordance with Technical Specifications 6.15, failed to PORC review these changes, and failed to totally address these changes in the Final Safety Analysis Report updated dated April 11, 1985.

TVA responded to this violation by letter (Gridley/Grace) dated July 15, 1986, RIMS L44 B60715, and performed several evaluations. Office of Special Projects Inspection Division requested that the Office of Special Projects, Projects Division review these TVA evaluations to determine if the configuration changes were adequately described and acceptable with respect to the TS 6.15 criteria.

As a contributor to this inspection, Mr. J. Donohew, OSP Projects, reviewed these configuration changes and found that they were acceptable to support the startup of Unit 2. There were several issues that need to be included in a revision to the TVA evaluations and TVA has committed to address these issues. Finally, these issues will be individually addressed in the NRC Safety Evaluation Report which Mr. Donohew has drafted. The inspector has no further questions.

This item is closed.

(Closed) Violation 327,328/86-37-06, Test Deficiencies as Condition Adverse to Quality

This violation addressed the adequacy of the review of test deficiencies and the failure of the licensee to initiate a CAR. The inspector reviewed the licensee's response and reviewed the specific actions scheduled and/or taken to resolve the cited test deficiencies. The inspector had no technical questions.

This violation refers to a corrective action system (CAR) which no longer exists and has been replaced by the Condition Adverse to Quality Report. However, similar generic concerns were identified as a result of inspection 327,328/88-15 which was completed to recommend the closure of NRC order EA 85-49. The licensee took actions to correct the CAQR system weaknesses identified in report 327,328/88-15. Those corrective actions also apply to and resolve the generic aspects of this violation.

The implementation of the licensee's CAQR system was determined to be adequate given that recent corrective actions continue to receive the increased management attention at the upper levels of the TVA organization.

This violation is closed.

(Closed) Violation 327,328/86-49-01, Inadequate Corrective Action for Upper Head Injection (UHI) Isolation Valve Surveillance Failures

The NRC responded on October 23, 1986, to TVA'S letter (Domer/Grace) of August 19, 1986, and agreed with TVA that the portion of Violation 86-19-01 UHI hydraulic lock release valves, was inappropriately written against configuration control and withdrew that portion of the violation.

The hydraulic lock release valves are used to adjust the stroke time of the UHI system isolation valves. In researching TVA's response to 86-19-01, the NRC discovered that Sequoyah has had a repeated history of failed UHI isolation valve response time surveillances (20 of 24 failures between 1981 and 1985). Although physical security of the hydraulic lock release valves (as discussed in the response to Violation 86-19-01) may not be a problem, it is apparent that their throttle positions are changing due to system vibration during UHI isolation valve response time testing. Subsequent to Violation 86-19-01, the NRC identified that the Sequoyah UHI hydraulic lock release valves are equipped with a set screw type mechanism that is used at other plants of the same design to prevent inadvertent stem movement. Sequoyah was unaware of the existence of these set screws until notified by the NRC.

The cause of the repeated UHI isolation valve surveillance failures were not adequately determined by Sequoyah and corrective action was not taken to preclude further failures. This constitutes a violation of 10 CFR 50 Appendix B, Criterion XVI, the Nuclear Quality Assurance Manual, and

Administrative Instruction (AI)-12, and is identified as Violation 327, 328/86-49-01.

Inspection report 87-37 stated that TVA corrective actions to insure the set screws are tightened following adjustment of the UHI response time setting is satisfactory in that TVA has initiated a change to SI-196 that insures the locking set screw is tightened. The corrective actions implemented by the licensee are adequate.

This item is closed.

(Closed) Violation 327,328/86-53-01, Conditions Adverse to Quality.

This violation addressed the failure to successfully implement the licensee's established corrective action system. This issue was the subject of a meeting between NRC Region II management and TVA management that took place on October 29, 1986. TVA responded to this notice of violation in a letter (Gridley/NRC document control desk) dated February 23, 1987.

TVA's response stated that certain measures had been taken by them to address the causes for the excessive number of escalated audit deviations requiring upper management resolution and the failure of TVA to promptly correct conditions adverse to quality.

TVA's implemented corrective actions identified in the above response were inspected by the NRC in inspections 327,328/87-25,26, and 55, and several TVA quality assurance audits. The conclusions for all of these inspections was that corrective actions had not been fully effective. NRC inspection 327,328/88-15 was conducted to evaluate the CAQR system implementation and to consider if it was appropriate to remove the restriction placed on Sequoyah by NRC Order EA 85-49. The conclusion of the inspection team performing inspection 327,328/88-15 was that if certain improvements were implemented by the licensee, the CAQR process would be adequate. Inspection 327,328/88-15 was followed by inspection 327,328/88-19 in which the inspectors verified that the licensee had corrected the specific improvement areas identified in the 327,328/88-15 inspection. The conclusions of inspection 327,328/88-19 was that the licensee had adequately implemented the corrective actions for the 327,328/88-15 improvement areas and that it was adequate for Unit 2 startup and removal of NRC Order EA 85-49. The conclusions of both inspection 327,328/88-15 and 19 were discussed in a conference call among F. McCoy, K. Jenison, A. Belisle, J. Gilray, and J. Donohew, all of the NRC, on March 10, 1988. The conclusion of the conversation was that the Safety Evaluation Report was written accepting the program as adequate and that the referenced inspections appeared to indicate that the implementation was adequate. One member of the discussion still had reservations with respect to the implementation, however, no specifics could be referenced.



The conclusion of this report was that the improvements made in the CAQR process implementation were labor intensive and required intense participation by middle and upper management in order to be sustained. The process appears to be adequately implemented at this time. Long term performance needs to be reviewed and will be followed as a portion of Inspector Follow-up Item 327,328/88-19-02, Long Term Licensee Corrective Actions.

This item is closed.

(Closed) Violation 327,328/86-68-07, Section 2.3.2, Deficiency D2.3-6, Feedwater System Support Installation and Drawing Deficiencies.

The licensee generated a condition adverse to quality report (CAQR) SQP 871047 to address the deficiencies. This CAQR corrective action generally explains that calculations support the actual installation and that the actual installation was agreed upon by the design and modification engineers as stated in NRC inspection report (IR) 327,328/87-60. Four items were identified in this IR that were not addressed by CAQR SQP 871047. They are:

- a. Modifications not in accordance with design drawings were installed and accepted.
- b. Changes to the drawings were not processed at the time of installation.
- c. TVA did not specify what changes to the program would be made to prevent reoccurrence.
- d. TVA did not specify when correct drawings would be issued to support the installation.

CAQR SQN 871730 was generated to answer these concerns.

The inspector has reviewed CAQRs SQP 871047 and SQN 871730, drawings 2-HD-322 and 2-HD-282, M&AI-11, and CAQR SQE 871727802, referenced in SQN 871730, to address the programmatic problem of not referencing NRC violations on generic CAQRs. The root cause was identified as a lack of attention to detail by the cognizant engineer, the QC inspector and the DNE engineer. The drawings have been corrected and issued and M&AI-11 has been revised. The licensee's actions appear to be adequate.

This item is closed.

(Closed) Violation 327,328/86-73-03, Failure to Issue Potential Generic condition Evaluation Reports and Untimely Response by Other Plants.

The violation resulted from a team inspection performed at all TVA sites and involved various CAQRs where Potential Generic Condition Evaluation Memos (PGCEMs) were responded to in an improper or untimely manner. TVA's

response to the violation of July 10, 1987, was acknowledged and accepted by the NRC by letter dated October 6, 1987. TVA's corrective action included focusing management attention on the resolution of open CAQs, prioritization and scheduling of open CAQs, and implementing a new reporting system to highlight late/outstanding CAQs that require further management attention. In addition revisions were made to TVA's NQAM and implementing procedures to provide more controlled and centralized requirements for the conduct of generic reviews.

The inspectors reviewed CAQRs generated at other sites that were received at Sequoyah since September 1, 1987, and required a Sequoyah generic review. In addition the inspector reviewed CAQRs generated at Sequoyah since September 1, 1987. The reviews and generic determinations generally appear to be timely.

Significant improvement has been made in the CAQ program since the implementation of those corrective actions which resulted from previously identified TVA QA audits and NRC inspection 327,328/88-15.

During this inspection a sample of generic conditions was selected and no examples of improper evaluations were identified. Some cases of untimely resolution were identified, however, the vast majority were processed within TVA stipulated timeliness goals.

As a result of this inspection effort, it was determined that the recent corrective actions TVA has implemented appear to be adequate to correct the area needing improvement identified in NRC inspection 327,328/88-15. However, the corrective actions implemented by the licensee are labor intensive and involve intense middle and upper management involvement. If this attention wanes the improvements in operability/significance determinations and timeliness may not be realized in the long term.

The inspector will review the continued long term implementation of the CAQR process as part of IFI 327,328/88-19-02, Long Term Licensee Actions.

This violation is closed.

(Closed) Violation 327,328/86-73-04, Conditions Adverse to Quality

This violation was a generic issue related to each of the TVA sites involving examples where dispositions of conditions adverse to quality (CAQs) were not sufficient to meet specific requirements. The inspector reviewed the licensee's response dated June 17, 1987. In addition the inspector reviewed the specific actions scheduled and/or taken to resolve the cited Corrective Action Reports (CARs). The inspector had no technical questions and identified only administrative issues with no safety significance or unit 2 startup significance.

This violation refers to a corrective action system (CAR) that no longer exists and has been replaced by the Condition Adverse to Quality Report (CAQR). However, similar generic concerns were identified as a result of

inspection 327,328/88-15 completed to recommend the closure of NRC order EA 85-49. The licensee took actions to correct the CAQR system weaknesses identified in report 327,328/88-15. Those corrective actions also apply to and resolve the generic aspects of this violation.

The implementation of the licensee's CAQR system was determined to be adequate given that recent corrective actions continue to receive the increased management attention at the upper levels of the TVA organization.

This violation is closed.

(OPEN) Violation 327,328/87-18-01, Failure to Properly Control Post-Modification Testing.

As a result of a special testing inspection, NRC inspection report 87-18 identified several concerns regarding test procedures not containing requirements, tests not conducted in accordance with requirements, and test results not documented and evaluated. These concerns were detailed in 9 examples of Violation 87-18-01. Because of the broad scope and numerous examples of the violation, each example and corrective action for that example is detailed separately. This will allow continuity of inspection efforts without duplication and separate remaining action to be accomplished. The TVA response to the violation dated July 24, 1987 admitted all examples except 5, 8 and 9. The NRC acknowledgement of the response dated December 9, 1987 accepted the denial for example 5. The denial for example 8 and 9 was not acceptable and additional information was requested. TVA submitted a supplemental response on January 26, 1988. The TVA responses and corrective actions have been reviewed. Inspectors concluded that corrective action is complete and adequate on all examples except example 8 which involved work activities conducted without adequate work instructions, inspections, and 2 party verification of joint makeup.

Example 1 involved WR 219442 and WR 219444, hand written changes to approved test packages, incorrect test instructions, missing signatures/initials, and changes to test instructions to meet test results. CAQR SQP87073 was written to document problems associated with the performance of this test. Corrective action required by the CAQR included training all modification group personnel in procedure adherence and the conduct of testing and the reperformance of the tests to verify adequacy. From a review of training documentation, the completed work requests and the CAQR, inspectors concluded that this example had been adequately addressed. This example is closed.

Examples 2 & 3 involved inadequate test specification and control under modification work package 12337. During component cooling water tests, breakers could not be closed, and inadequate control resulted in an inadvertent start of a component cooling water pump. TVA corrective action included writing CAQR SQP870341 to document the test discrepancies and conducting training for all ampacity personnel. A new procedure AI-47,

Conduct of Testing, was issued to improve test control and performance. Revision 0 of AI-47 was issued on July 15, 1987. The inspector reviewed the corrective action for these examples and concluded they were adequate. This example is closed.

Example 4 addressed failure to follow test procedures for 4 boron injection tank isolation valves under maintenance work packages B219665 through B219668 and operation of a valve with a hold tag on the control switch. CAQR SQP87037 was written to retest 20 valves using a MIL STD 105D scheme to verify the adequacy of previously performed functional tests. Adherence to administrative instructions regarding hold orders was reemphasized in a shift night order issued on June 26, 1987. Issuance of AI-47, Conduct of Testing strengthened requirements for control and documentation of testing. The inspector reviewed the CAQR and associated work requests which retested the valves. No specific problems were found during the retests to indicate a necessity to broaden the scope of sampling. Inspectors concluded that corrective action was adequate. This example is closed.

Example 5 involved valve indication used during an acceptance test. This example was denied by the licensee. The denial was accepted by the NRC in an acknowledgement date December 9, 1987. This item is closed.

Example 6 involved inadequate piping class boundaries on control room drawing 47W809-5 and inadequate test conditions in SI-304 on the boric acid transfer pump. SI-304 was changed by Temporary Change (TC) 87-379. Revision 10 incorporated the temporary change and was issued on January 21, 1988. The design drawings reflected the correct piping class boundaries and were incorporated into the "as-constructed" drawings. Inspectors concluded that corrective action on this example is adequate. This item is closed.

Example 7 involved missing and improperly located vibration monitoring markings on the AFW pumps, CCS pumps, one RHR pump and a boric acid transfer pump. All locations for vibration testing were reported reverified and remarked by TVA. Inspectors concluded that corrective action on this example is adequate. This example is closed.

Example 8 involved the conduct of "Safety Related" work such as assembly and disassembly of bolted flanges and other joints and cleanout of instrument lines without work instructions, inspections, or second party verification of joint makeup. This item was denied by TVA in their July 24, 1987 response. The NRC rejected the denial in their December 9, 1987, acknowledgement of the TVA response to the violation. The supplemental TVA response did not address all NRC concerns for long term corrective action. NRC has acknowledged the supplemental response by letter and requested additional information on this issue. Corrective action on this example is adequate to support Sequoyah Unit 2 startup, however, this item will remain open.

Example 9 involved an improper step signoff on a diesel generator room exhaust fan functional test. Corrective action for this example included training on the conduct of functional testing accomplished under the corrective action of CAQR SQP 87034 and CAQR SQP 870373. Additional corrective action included preparation and issuance of AI-47, Conduct of Testing. Inspectors concluded that the corrective action was adequate. This example is closed.

All examples of this violation are resolved except for example 8 which has all Unit 2 restart action completed.

(Closed) Violation 327,328/87-23-02, DNE Calculation SQN-E1-005 Was Not Properly Implemented and Controlled

This violation was TVA's improper corrective action in resolving an employee concern related to a lack of installation drawings for mounting of safety related instruments. This action was being implemented using EEB calculation SQN-E1-005. This calculation was in fact a procedure involving field inspections, document reviews and evaluations by engineering personnel. NRC review of the implementation of the calculation identified numerous problems with incomplete and erroneous documentation and erroneous summary/conclusion statements. TVA's response, dated September 22, 1987, indicated the reason for the violation was that the EEB calculation exhibited an inadequate scope, inconsistent preparation of the calculation and a lack of proper review. These were identified as being inconsistent with administration procedures. Corrective action consisted of cancelation of the EEB calculation and incorporating the concern about a lack of installation drawings into the resolution of Corrective Action Report (CAR) 87-14. TVA considered that this inadequate calculation was an isolated case, based on an extensive review of calculations which did not show other problems of this type.

The inspector reviewed the calculation revision voiding SQN-E1-005. Completed procedure SQN-ISL-001 for identifying instruments to be examined and Special Maintenance Instruction SMI-0-317-61 that detailed the field walkdowns were also examined. A sampling of the problems originally noted in the performance of SQN-E1-005 was checked against SMI-0-317-61 results. All of the original concerns that were rechecked had been properly incorporated and the problems identified and documented. TVA's current program to address the concern related to the lack of instrument mounting details appears to be thorough and in accordance with site procedures. The improper use and implementation of a calculation in this instance appears to be an isolated incident.

This item is closed.

(Closed) Violation 327,328/87-24-03, Failure to Notify NRC of the April 29, 1987 Reactor Coolant System Spill Event.

This issue involved a spill that occurred when the RCS was partially drained and open at the primary side manway for steam generator repairs.

This event resulted in the loss of approximately three thousand gallons of water through the steam generator manways and the potential contamination of several workers. The spill was caused by an operator stroking valve FCV-63-1 and allowing refueling water storage tank water to drain into the RCS.

This violation was denied by the licensee in a letter (Gridley/NRC Document Control Desk) dated July 10, 1987. In subsequent correspondence dated February 4, 1988, the licensee admitted the violation (Gridley/NRC Document Control Desk). The inspector reviewed the licensee's corrective actions as stated in the second response to the violation and the corrective actions appear to be adequate.

This item is closed.

(OPEN) Violation 327,328/87-30-01, Loss of Control Over Plant Activities.

This issue concerns multiple examples, identified in Inspection Report (IR) 87-30, of inadequate procedure implementation which cause concern for the licensee's ability to control operational activities, particularly in the area of system and equipment status and testing. At an enforcement conference conducted June 18, 1987 in the NRC Region II offices TVA outlined their understanding of the issue and corrective actions. With the exception of TVA's use of hold orders, both parties (TVA and NRC) were in agreement with the intended corrective actions. TVA was notified they would be informed at a later date of any enforcement action that may result. NRC issued the Notice of Violation (NOV) in March 1988 citing six specific examples. The inspector has reviewed TVA's corrective actions to this issue. The following procedures, as revised or implemented, were reviewed:

AI- 3, Revision 40 dated 2/20/88, Clearance Procedure. This revision prohibits the use of caution orders as clearance boundaries for protection and safety of personnel.

AI-43, dated 10/16/87, Independent Qualified Review. This new procedure requires an independent review for activities that affect nuclear safety including procedures required by TS 6.8.1. A qualified reviewer insures technical adequacy and guidance is provided to the performer for safe implementation and conduct of each procedure.

AI-47, Dated 7/15/87 and revised 11/30/87, Conduct of Testing. This new procedure provides guidance and requirements for personnel involved in testing for all testing activities. A trained and qualified test director, is assigned responsibility for the conduct of testing. Section 8 clearly states that procedural adherence is required for all testing activities.

AI-58, Dated 12/08/87, Maintaining Cognizance of Operation Status-Configuration Status Control. This new procedure replaces operations section letter, OSLA 58. AI-58 details the requirements

and procedures for maintaining status of critical systems, structures, and components in system status files and the configuration control log.

SI-45.1, Essential Raw Cooling Water Pumps. This procedure has been revised to remove the flow rate for bearing water cooling requirement. The current requirement verifies flow and limits bearing temperature.

SI-46.3, Component Cooling Water Pump 2A-A. This procedure was not changed as a result of this issue.

SI-166, Full Stroking of Category "A" and "B" Valves During Cold Shutdown. This procedure was revised to provide a stroke testing method of valve FCV-63-1 during conditions which existed at the time of the event.

SI-102 M/M, Diesel Generator Monthly Mechanical Inspections. This procedure was revised to require AUO sign off for isolation of the air start system.

TVA has conducted training, involving some 900 plus plant personnel. Senior level management conducted portions of this training. Discussions with licensee personnel indicate strong emphasis was given to plant policy regarding procedural adherence, changes to procedures, configuration control, and supervisory responsibilities.

This item remains open pending review of the licensee's formal response.

This item is closed.

(Closed) Violation 327,328/87-52-01, Example B. Failure to Comply with Cable Installation Instructions.

TVA report "Routing Inconsistencies of Appendix R Cables, Unit 1 and 2, Revision 0" investigated 276 cables required for Appendix R to determine cable routing discrepancies. Discrepancies were found between actual routing and the compatec cable data base. Each discrepancy was evaluated, separately, for train separation, voltage segregation, cable ampacity, tray loading, environmental qualification and Appendix R considerations. The report provided justification that the disagreements between actual and design cable routing schedules had no safety impact and were technically adequate with the exception of two Unit 1 cables which would be addressed by the long term cable management program. Based on a review of this report and discussions with licensee personnel the inspectors concluded that the results appeared to be adequate to justify the discrepancies and that the cable management program completion date of January 1990 is acceptable. The interaction of routed cables in free air was inspected and closed in report 87-65, as unresolved item 327,328/87-18-01. The surmountable response for this violation example requested in NRC inspection report 327,328/87-52 for long term resolution

of free air space issues will be reviewed when submitted. The issue and commitment will continue to be tracked under TVA, Sequoyah, CCTS NCO 870324035. The short term actions and evaluations are adequate to support Unit 2 restart.

Violation 327,328/87-52-01, Example B is closed.

(Open) Violation 327,328/87-56-02, Failure to Perform an Adequate Safety Evaluation on Condensate Demineralizer Waste Evaporator

This item involved a failure by the licensee to perform an adequate safety evaluation for a change in the laundry and hot shower waste water process which directed all waste water to the CDWE in lieu of only that which is above the discharge limit, as implied by the FSAR. The change was made for ALARA reasons to reduce the total activity in liquid effluents. The effect of this change was to cause higher quantities and concentrations of laundry contaminants to appear in the CDWE bottoms since previously, only a minor amount of this waste was processed through the CDWE. Consequently, an adverse chemical reaction occurred during waste solidification which resulted in an overflow of the vendor's rad waste liner and unnecessary exposure to the rad waste operators.

Measures taken by the licensee to preclude future liner overflows include: (1) reducing the amount of waste introduced into a liner, and (2) restrictions on the use of a laundry detergent (Turco 4324 NP) which was found to be especially reactive with the vendor agents when concentrated in the waste as a residue from the processing of the laundry and hot shower drain tank contents through the CDWE. This is presently under discussion between OSP and TVA management, and is not considered to be a restart item. Consequently, this item has been satisfactorily resolved for restart, but will remain open until the safety evaluation aspect is resolved.

(Closed) Violation 328/87-60-01, Inoperable Hydrogen Monitor In Modes 1 and 2.

Technical Specifications 3.6.4.1 requires that two trains of containment hydrogen ( $H_2$ ) monitors be operable while in modes 1 and 2. The action statement for this specification requires that, with one hydrogen monitor operable, restore the inoperable monitor to OPERABLE status within 30 days or be in at least hot standby within the next six hours.

Section 6.2.5.2 of the Sequoyah FSAR specifies the sampling compatibility of the hydrogen monitoring system and states that: when the system is actuated, containment atmosphere is continuously drawn through a series of sample conditioners...The atmosphere from the upper and lower compartments is mixed before entering the analyzer. As a result of the analyzer capability and the mixing afforded by the hydrogen collection system which draws from compartments within the containment and the containment dome, a true indication will be given of hydrogen concentration within containment.



Contrary to the above, with the unit 2 reactor in modes 1 and 2 on numerous occasions since initial licensing, train A of unit 2 containment hydrogen monitor has been inoperable since installation, due to design and construction errors associated with water traps and sample point location, and was unable to perform its intended function as stated in the FSAR.

The licensee has addressed these H<sub>2</sub> analyzer deficiencies individually as follows.

- (1) Existence of sample line water traps that exceed vendor recommendations. The licensee has walked down the system for unit 2 and has rerouted the sample lines for both trains A and B.
- (2) Revision to specified H<sub>2</sub> analyzer accuracy in SQN FSAR. The licensee performed an unreviewed safety question determination (USQD) for the subject FSAR change on March 26, 1987, which concluded that the indicated accuracy of the H<sub>2</sub> analyzers would not exceed  $\pm 1.5\%$  Hydrogen. This item was reviewed in an inspection (50-327,328/87-42) and was dispositioned as follows: "Licensee actions taken to resolve this specific violation and corrective steps taken to avoid similar future violations (B45 861114 257 -DNE program plan for update FSAR revisions; 144 870203 805-ECN Close out and FSAR updates) appear to be satisfactory.
- (3) Removal of train A containment leak test valve. The licensee replaced valves and caps as part of design change notice X0C006. The valve has been added to the appropriate locked valve list and will be verified locked closed as part of the containment integrity surveillance.
- (4) Train B containment leak test valve installation at incorrect location. The licensee performed a review as part of PRO 2-87-011 on April 3, 1987, and determined that the configuration would not have resulted in an inability to leak test the closed loop Hydrogen Analyzer System. The test valves have been relocated and drawings have been revised to show proper location.
- (5) Train A sample line did not extend to upper containment. The licensee initiated PRO 2-87-58 and extended the sample line to meet the FSAR requirements.

The inspector has reviewed the isometric drawings for trains A and B, has discussed the acceptability of the rerouted sample lines with the resident inspector who walked down the sample lines with the licensee, has contacted DNE for clarification of isometrics and reviewed licensee's response (L44 871224 801) to violation 50-328/87-60-01. The root cause of the sample line installation with excessive water traps was a lack of administrative guidance. The design baseline and verification program has documented other deficiencies relative to the design change control process and the licensee has implemented a design change process

improvement program that provides the appropriate methods to strengthen the identified weaknesses. The licensee's actions appear to be adequate to cover the items presented in this violation.

This item is closed.

(Closed) Violation 327,328/87-60-05, Operation of Essential Raw Cooling Water (ERCW) Strainers And Screen Wash Without Procedures.

This violation was identified originally during inspection 87-52. The procedures in actual use to operate the ERCW strainers and screen wash pumps were implemented by an operations section night order, rather than through a controlled procedure change which deactivated the automatic screen wash and strainer backflush functions and implemented compensatory measures in the form of periodic, manual wash and backflush.

The corrective actions taken by the licensee included the preparation of a USQD to justify continued manual operation, procedural changes to legitimize manual operations, and changes to the night order instructions to preclude future abuses by that vehicle. Physical changes included the addition of instrumentation to expand the range of strainer differential pressure indication to allow control room annunciation. Response to a high d/p alarm includes dispatching an operator to manually flush the strainers. The licensee is presently reviewing design modification options for restoring the system to fully automatic status.

The licensee's response to the violation and the corrective actions implemented appear adequate.

This item is closed.

(Closed) Violation 327,328/87-65-01, Inadequate Corrective Actions.

10 CFR 50, Appendix B, Criterion XVI, as implemented by TVA's QA topical report, TVA-TR-75-1A, Revision 9, paragraph 17.2.16, requires that significant conditions adverse to quality be promptly identified and corrected. Additionally, the cause of the condition should be determined and corrective measures to preclude repetition must be identified. 10 CFR 50.71.(e).(4) requires that revisions to the FSAR be filed no less frequently than annually and shall reflect all changes to the plant up to a maximum of six months prior to the date of filing.

- a. Contrary to the above, CAR 86-04-021 (which documented the fact that TVA had not established adequate controls to ensure the requirements of 10 CFR 50.71 were satisfied) did not ensure that adequate corrective measures were established to prevent recurrence, in that, the transitional design change program implemented by AI-15 and SQEP-13 did not ensure that FSAR updates reflect changes to the facilities within six months of filing.

- b. Contrary to the corrective action requirements above, resolution of significant test deficiency DN-6 of post modification test PMT-39 (specified on test deficiency report 2-PT-789 concerning unexpected opening of reactor head vent throttle valves) was inadequate, in that, it did not ensure that emergency procedures were revised or personnel trained to minimize the impact on reactor coolant inventory loss.

Licensee's action.

- a. The licensee has revised standard practice SQA 180 amending the Sequoyah updated final safety analysis report (FSAR) to require the FSAR to reflect the "As-constructed" condition of all modification work affecting the FSAR, after the modification has been verified complete (i.e. the ECN/DCN is field complete). Administrative Instruction (AI)-19 (Part IV) "Plant Modifications after Licensing," has been revised to require second person verification of marked-up primary drawings to ensure that the modification information was transferred accurately and that modifications branch notify the site licensing staff, by memorandum, when post-7000 series ECNs and DCNs are field complete.
- b. An unreviewed safety question determination was written to evaluate this concern and it was determined that the valve performance was satisfactory. Functional restoration guideline FR-I-3 was revised (page 9) to add a caution note stating that when the reactor head vent block valve is opened, the throttle valve will cycle open and closed. If the throttle valve does not close, then close both block valves. Also, on page 10, a caution note was added stating that the throttle valve position indicator may not be accurate and that the pressurizer relief tank pressure, level and temperature should be monitored to verify throttle valve closure.

The inspector has reviewed the documentation changes made by the licensee with respect to the violation and has concluded that the licensee's actions appear to be adequate to prevent further violations of this nature.

This item is closed.

(Closed) Violation 327,328/87-65-02, Failure To Meet The Requirements of TS 4.3.2.1.3.

This violation identifies that the containment spray pump start interlock was not included as part of the response time for containment spray actuation.

The inspector reviewed the licensee's response dated February 16, 1988. The inspector also reviewed the associated PRO, CAQ, and LER associated with this violation. The inspector verified that SI 247.9000 and IMI -99 had been revised and performed on Unit 2 prior to entry into mode 4.

This item is closed.

(Closed) Violation 327,328/87-65-03, Failure To Control Drawing Changes.

10 CFR 50, Appendix B, Criterion VI, document control, requires that measures shall be established to control the issuance of documents, such as instructions, procedures and drawings, including changes thereto, for all activities affecting quality. These measures shall assure that documents, including changes thereto, were reviewed for adequacy and approved for release by authorized personnel.

Contrary to the requirements above, changes to the primary control room drawings are made by plant modifications engineers with no second party verification to ensure the adequacy or accuracy of the changes to those drawings.

The licensee has revised Administrative Instruction AI-19 (part IV) "Plant Modifications After Licensing" to require that the cognizant engineer will have an STA initial and date his mark-up to verify accuracy and legibility of information transferred from the work plan drawings.

The inspector has reviewed AI-19 (part IV) and various control room drawings to verify that the revisions are being implemented and the licensee's actions appear to be acceptable.

This item is closed.

(Closed) Violation 327/328/87-71-02, "Failure to Perform Required Generic Review of CAQR SQP 871246

This item involved the licensee's failure to adequately review CAQR SQP 871246 to determine whether similar conditions exist at other TVA nuclear facilities. This CAQR identified improper isolation of containment penetration test lines but did not require that a review for generic applicability be performed.

As documented in TVA memo from W. C. Ludwig to J. M. Stitt, dated March 8, 1988 (RIMS L37-880308-800) the above condition has now been assigned to TVA's Division of Nuclear Engineering to perform the required generic review. The overall programmatic concerns relating to the CAQR program will be addressed in the licensee's response to Inspection Report 327, 328/88-15. The inspector has reviewed the above licensee actions and considers them to be adequate.

This item is closed.

(Closed) Violation 327,328/87-71-03, Inadequate Surveillance Instruction

This violation involved the failure to adequately verify the operation of the auxiliary feedwater bypass level control valves due to inadequate incorporation of the requirements of TS 4.7.1.2.b.1 into SI-118,

"Motor-Driven Auxiliary Feedwater Pump and Valve Automatic Actuation". All revisions up to, and including, revision 14 of SI-118 verified proper valve operation only on receipt of a low-low Steam Generator Level signal and not on receipt of signals from safety injection, blackout, loss of both main feedwater pumps (MFWP), or loss of one MFWP with the plant above 80% power.

On April 17, 1987, revision 15 to SI-118 was issued to incorporate the above referenced testing requirements. The inspector reviewed this revision and determined that SI-118 now adequately reflects the requirements of TS 4.7.1.2.b.1.

This item is closed.

(Closed) Violation 327,328/87-71-04, Failure to Notify NRC of a Violation of Technical Specifications.

This violation involved the licensee's failure to notify NRC of a violation of TS surveillance requirement 4.7.1.2.b.1 (as required by TS 6.6.1 and 10 CFR 50.73) regarding testing of the Auxiliary Feedwater Bypass Level Control Valves, due to an inadequate reportability review of potential reportability occurrence 1-87-129.

The licensee has determined that the cause of the inadequate reportability review was a misunderstanding by the reviewer as to the performance of the bypass level control valves. The licensee has counseled the reviewer to ensure that future reportability reviews will be accurately accomplished.

On December 30, 1987, the licensee submitted LER 327/87-075 to NRC in accordance with 10 CFR 50.73. The results of NRC review of the licensee's actions taken regarding this LER are addressed in paragraph 7 of this report.

This item is closed.

(Closed) 327,328/86-55 Deficiency 6.14 Project Evaluation of SQEP-12. TVA did not consider the application of the maximum credible ac and dc potential to safety-related circuits within the equipment cabinets, panels, and racks. In addition TVA should confirm the acceptability of relay contact to contact electrical isolation of class 1E to non-class 1E circuits. Part 1, maximum credible ac and dc potential to safety-related circuits, was closed during a follow-up closeout inspection conducted during the week of October 30, 1987. This review concerns corrective actions for part 2, contact to contact electrical isolation of class 1E to non class 1E circuits. The inspector reviewed the licensee's Short Circuit Isolation Analysis, SQN-CSS013, Revision 1, dated 1-28-88, which determines that the contact to contact isolation for devices such as relays, limit switches and circuit breaker auxiliary switches is adequate to provide isolation between class 1E and non-class 1E circuits. Based on this review the inspector agrees that this analysis adequately demon-

strates the acceptability of class 1E to non class 1E contact to contact electrical isolation for such devices.

Deficiency 327,328/86-55 Deficiency 6.14 is closed.

(Closed) Unresolved Item 327, 328/87-18-01, Potential for Secondary Bridging, Potential for Use of Flamemastic as an Alternative to Solid Barriers, and the Lack of Criteria for Separation of Safety Related Conduits.

NRC special test inspection 50-327, 328/87-18 raised concerns regarding secondary bridging, potential use of Flamemastic, and lack of any specific criteria for the separation of opposite trains of tray/conduit or conduit/conduit crossings. Follow-up inspections on this item were reported in NRC report 87-65 and 87-76. All specific examples and all generic concerns except the lack of criteria for separation for safety related conduits were addressed and closed by those reports. Report 87-76 reported TVA was providing a formal response to address raceway separation. The TVA formal response dated February 18, 1988, was submitted and reviewed by the TVA Special Projects, Reactor Operations Branch. Rational provided in the response included raceway construction to IEEE-279 (1971), IEEE-308 (1971) and Regulatory Guide 1.6, revision 0, 10 CFR 50, Appendix R calculations and analysis, and the coating of non-IEEE-383 qualified cables with Flamemastic fire retardant. Exceptions to present Regulatory Guide 1.75 guidance was noted and accepted in an NRC Safety Evaluation Report conducted in March 1979. Additionally, The NRC TVA Special Projects, Reactor Operations Branch had reviewed a special cable test conducted by Sandia Laboratories which demonstrated faulted cables with flame retardant coatings exhibit conductor burn through and self extinguish with a low probability for fire or fault propagation. The inspector discussed this issue with Reactor Operations Branch on March 17, 1988, and received technical concurrence that the generic concern regarding raceway separation was adequately resolved. All specific technical issues for this item have been addressed in reports NRC reports 87-65 and 87-76.

This issue is closed.

(Closed) Unresolved Item 327,328/87-26-01, Medium Voltage Circuit Breaker Sizing.

NRC inspection report 50-327, 328/87-26-01 identified concerns regarding the sizing of Sequoyah 6.9KV shutdown and unit board circuit breakers. The concern related to the fault interruption ability of the breakers. NRC inspection report 50-327, 328/87-60 presented status and background. NRC had reviewed a TVA calculation and documented the concern in a March 23, 1987 TER and issued an SER on April 2, 1987. TVA response to the SER concurred with the concern and committed to post Unit 2 restart corrective action. The breaker manufacturer demonstrated the ability of the breakers to interrupt the available current based on limited testing, but would not certify the breaker to that value. NRC conducted an

evaluation of the breaker sizing and based on additional discussions with TVA issued an SER on February 23, 1988. The SER concluded that with the limits placed on the unit generator output voltage, the vital 6.9KV system (the shutdown boards and associated circuit breakers) fault calculations are appropriately conservative and the vital system is in substantial conformance with the applicable regulations, FSAR commitments, and industry standards. The SER concluded that the 6.9 KV system would support Unit 1 and Unit 2 operation. TVA has committed in its letter of August 10, 1987, to resolve this problem after Unit 2 restart. TVA committed to submitting an analysis and resolution schedule to the NRC before June 30, 1989. The analysis and calculations are required to show that after corrective action, all circuit breakers will always operate within their service capability as defined by appropriate standards and verified by test or manufacturers guarantee.

This item is closed.

(Closed) Unresolved Item 327,328/87-30-09, Component Cooling Water System Baffle Testing.

On May 18, 1987, the inspector observed portions of testing performed under WP 12456, for component cooling system baffle testing. The procedure was being followed and the inspector verified portions of the valve lineups.

The WP (12456) was designed to ensure that the safety-related baffle plate separating the two trains of CCS in the CCS surge tank was in place and intact. Train "B" (Unit 2) was drained to the bottom of the tank thus isolating approximately 3000 gallons of water on the train "A" side of the baffle plate. After draining the "B" train of CCS, the drain valve was left open to monitor for any leakage.

Initially, the leakage was quite substantial. Operations personnel tightened hand operated valves in the isolation line-up, and the procedure was changed to double isolate certain lines to the tank. Following this effort the leakage was reduced to approximately 500 ml in 2 hours. The acceptance criteria for the test was no leakage.

The Mechanical Testing group requested DNE to establish a less stringent acceptance criteria. The DNE engineer returned an acceptance criteria of less than 180 gallons/month leakage. This was incorporated into an instruction change form and was PORC reviewed.

The inspector interviewed the DNE engineer on the establishment of the new acceptance criteria. The engineer stated that he knew that the leak rate was a "slow drip" and assumed 1 liter per hour would be limiting on the leak. This calculated to be 180 gallons per month. The engineer stated that the test would be signed to verify that the baffle plate would remain intact for a 30 day period. The 180 gallons was small compared with the 3000 gallons remaining in the tank. The inspector questioned the adequacy of the calculations.

The licensee stated that the NRC had questioned the adequacy of the baffle plate during DBVP inspections. In order to answer this question, the licensee reviewed the design basis for the surge tank. The surge tank was purportedly designed to allow for NPSH of the CCS pumps.

The licensee provided the inspector with calculations to show that net positive suction head can be achieved with the water level several feet below the tank. This would remove the need for train separation in the tank. Therefore, the licensee would not be required to test the baffle plate.

As a result of the above testing and review the licensee wrote CAQR # SQP 871056 to analyze the inventory needs of the CCS system. Further testing was performed under WP 12456 to verify the source of the leakage. Operators isolated the CCS surge tank from the sample point. The rate of dripping did not change. Hence it was concluded that the dripping leak was from the demineralized water line and not from the baffle plate. Secondly, the water level in the "B" portion of the surge tank was monitored for the entire duration of the test. From the sample leakage collected approximately one quarter inch drop in the tank level would have been observed should the leakage have come through the baffle plate. This variation would have been within the accuracy of the test instruments.

The various observations made as mentioned above leads to the conclusion that there is no leakage through the baffle plate in the surge tank.

During the review of this issue with licensee engineers, it was determined that the CCS seal leakoff pumps, which return seal leakage back to the surge tank in order to facilitate CCS pump NPSH, may not be safety-related. The CCS pumps leak approximately one gallon per minute by design. This leakage is collected and pumped back to the surge tank by the seal leakoff pumps. Should these pumps fail to perform their intended function the CCS pumps could lose NPSH within a short period of time.

Licensee personnel reviewed the above and determined that during the original design of the CCS, DNE cognizant personnel did not realize that pump seal leakage could deplete the CCS inventory for the postulated event. The cause of this event was lack of analysis for and determination of CCS pump seal leakage rates during system design, which allowed for the design of a non-safety-related normal makeup via the demineralized water system. Therefore, no operating or emergency procedures were written to address the loss of CCS inventory through the seal leakage collection system.

The makeup water available in the CCS surge tank is 2,665 gallons (low end of the operating band). With two pumps in the same train in operation when a LOCA coincident with a loss of offsite power occurs, both pump seals are assumed to be leaking at 1.6 liters per minute (highest leak rate) for each pump or 3.2 liters per minute (51 gallons per hour) total leakage. This leak rate will deplete the volume in the surge tank in



approximately 52 hours. A study was then performed to confirm that the loss of inventory could be identified and a spool piece from the ERCW to the CCS surge tank could be installed within 48 hours following a LOCA coincident with a loss of offsite power (allowing a 4-hour margin). It was confirmed that the task can be performed based on projected dose rates in route (ingress and egress) and at the spool piece location for a 30-minute installation period.

The inspector reviewed AOI-15F, Aligning ERCW Emergency Makeup, the Mission Dose calculations and the design and installation of the metering spool piece. The design appears to be adequate to maintain operability of the CCS system during LOCA and seismic events.

TS 3.7.3 states that at least two independent component cooling water loops shall be operable while in modes 1-4.

Contrary to the above, the plant was operated from initial licensing until the shutdown in August 1985 without the capability for the CCS system to perform its intended function during a design basis seismic event or a LOCA coincident with a loss of offsite power.

In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Action," 10 CFR Part 2, Discretionary Enforcement, the event described above meets the following criteria:

- The Licensee was forced into an extended shutdown, related to poor performance over a long period of time following their August 1985 shutdown.
- The Licensee has developed and is aggressively implementing their Nuclear Performance Program for problem identification and correction.
- NRC concurrence is needed by the licensee prior to restart.
- Enforcement action is not necessary to achieve remedial action.
- The violation occurred prior to the August 1985 shutdown.
- The violation was non-willful and would not have been categorized as higher than Severity Level III under the NRC's enforcement policy.

Therefore, a Notice of Violation will not be issued, and no additional response is required from the licensee. Corrective actions are complete and considered acceptable for operability of the CCS System.

This item is closed.

(Closed) Unresolved Item 327,328/87-54-02, Adequacy of Sequoyah Seismic Qualification Program.

This issue involves the discovery (during an NRC inspection) that the mounting configurations of several components within safety-related electrical panels were not as originally installed by the vendor, thus placing their seismic qualification in question. The licensee has documented these deficiencies on CAQR SQN871457, Revision 1.

Corrective actions which have been taken by the licensee are as follows:

- TVA Division of Nuclear Engineering (DNE) has performed a detailed evaluation of the as-found mounting configurations identified in the CAQR and has determined that they are seismically adequate to perform their intended function until the individually identified deficiencies can be corrected. This detailed evaluation is documented in DNE Calculation SCG-4M-00148, Revision 1, dated March 2, 1988. The inspector reviewed the calculation and determined that the licensee's evaluation is acceptable.
- In order to ensure that similar conditions do not exist in other electrical panels not included within the scope of the original NRC inspection, the licensee has performed additional inspections, which revealed no further deficiencies. The inspector reviewed a sample of the completed inspection documentation (PMs 2407-202, 2406-202, 2413-2-1, and 2411-201) and determined the additional inspections to be acceptable.
- To insure that future maintenance activities do not cause similar deficiencies in mounting configurations, Instrument Maintenance Instruction IMI-134, and "Configuration Control of Instrument Maintenance Activities" and Maintenance Instruction MI-6.20, "Configuration Control During Maintenance Activities" have been revised to include double-signature verification for the reinstallation of mounting hardware following maintenance activities. These procedural revisions were accomplished by ICF 88-051 and 88-0420, respectively.

The above completed actions are determined to be adequate to demonstrate the ability of the identified components to perform their intended function during a seismic event. Therefore, it is determined that all actions, pertaining to this issue, which are necessary to support restart of Unit 2 have been adequately accomplished.

Corrective actions remaining to be completed after restart of Unit 2 are as follows:

- Licensee has initiated work requests (WRs) to correct the individual deficiencies identified in CAQR SQN 871457, Revision 1. These WRs are B231383, B231382, B281452, B234582, B257857, B231381, B257858, B257892, B231384, B297897, B285372, B257893, B231385, B231386, B285373, B131151, B226340, B247913, and B285374.

- A procedure is being developed to address the requirements for maintaining seismic qualification of electrical components. This procedure is anticipated to be in place by April 15, 1988.
- Preventive maintenance instructions are being prepared to address the inspection of seismically qualified electrical components. These instructions are anticipated to be in place by June 1988.
- A briefing lesson plan is being developed to enhance the level of awareness of appropriate personnel on the proper installation and/or reinstallation of mounting hardware to maintain seismic qualification. This lesson plan is anticipated to be in place by April 15, 1988.

Successful completion of the above long term post restart corrective actions will be tracked as Inspector Follow-up Item 327,328/88-19-02.

This item is closed.

(Closed) Unresolved Item 327,328/87-60-03, Review Operability of Mechanical Sleeves in Polar Crane Wall Penetrations.

Inspection reports 87-54 and 87-60 discussed six apparent discrepancies in the as-constructed configuration of the polar crane wall penetrations on Unit 2. As a result the licensee inspected all sleeves located in the crane wall to verify that they were sealed per the design drawings. Additionally, the seals were inspected for damage and deterioration. Twenty discrepancies were noted and corrected during this effort. Including those originally noted by NRC inspectors, 15 of these discrepancies were determined to be penetrations not sealed in accordance with the design drawings. This effort was documented as corrective action for CAQR 871428.

The inspector reviewed four of the above discrepancies to determine that corrective action was complete. Additionally, two more penetrations were selected for inspection. One of these two was determined to be a different type than the design drawing required. The licensee stated that this was caused by a WR error following the walkdown and was not a result of a faulty review process. This brought the total number of incorrect penetrations in the polar crane wall to 16.

As a result of this error, the inspector selected an additional six penetrations for walkdown. The six were found to be installed as designed.

10 CFR, Part 50, Appendix B, Criterion V, Instructions, Procedures and Drawings states that, Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Contrary to the above, 16 polar crane wall penetrations were not sealed in accordance with design drawings 47W470-4 and 47B473.

Additionally, during corrective action of the above discrepancies WR B237496 was not performed per procedure resulting in an additional discrepancy between the as-constructed and as-designed plant. This is identified as violation 327,328/88-19-01.

Licensee corrective action to date has been reviewed and been determined to be sufficient for containment sump operability and for restart of Unit 2. The licensee's design modifications practices have been upgraded and reviewed extensively during the current extended outage and determined to be acceptable. The licensee's response to this violation should include a discussion of the corrective actions taken to correct work deficiencies under WR B237496.

Violation number 327,328/88-19-01 is not required to be closed prior to restart of Unit 2 as evidenced in the discussions above.

This item is closed

(Closed) Unresolved Item 327,328/87-65-04; Apparent Interference Problems between Testing and Maintenance Activities.

The licensee has revised administrative instruction AI-47, "Conduct of testing," to address this problem and prevent interference by : (1) assigning testing activities to a test director who assumed responsibility for operations communication and test status, and (2) assigning a test coordinator to handle planning of test activities for the daily work list (DWL) to ensure no interference exists. The DWL is an approved list of workable items that ensures the planning process is performed before an item is worked.

The inspector has reviewed the revisions to AI-47 and the licensee's actions appear to be adequate to eliminate interference between testing and maintenance.

This item is closed.

7. Licensee Event Report (LER) Follow-up (92700)

The following LER's were reviewed and closed. The inspector verified that: reporting requirements had been met; causes had been identified; corrective actions appeared appropriate; generic applicability had been considered; the LER forms were complete; the licensee had reviewed the event; no unreviewed safety questions were involved; and no violations of regulations or Technical Specification conditions had been identified.

(Closed) LER 327/86-02, Main Control Room Ventilation Isolation While Performing an Instrument Calibration

During calibration of a heating, ventilating and air conditioning system overtemperature switch a main control ventilation isolation (MCRI) occurred. The leads to the switch were not disconnected prior to calibration and thus, the MCRI occurred when the temperature of the switch was raised to the setpoint during calibration.

Corrective action included disciplinary action for the involved craftsmen and their foreman and insertion of a warning of the potential for a MCRI during calibration into Instrument Maintenance Instruction IMI-311, "Control Building Heating, Ventilating and Air Conditioning, Unit 0." The inspector verified the revision to IMI-311. The licensee has implemented a program for surveillance instruction and procedure enhancement. The licensee's corrective actions appear to be adequate.

This item is closed.

(Closed) LERs 328/86-11, 328/87-08, 328/87-09, 328/87-10. These are events of a similar nature with a general title of "Containment Ventilation Isolation (CVI) Due to Electromagnetic Interference (EMI) Radiation.

These events involve isolation of containment ventilation due to actuation signals that were generated by noise spikes from unknown, but postulated, sources. The licensee initiated a CVI task force to determine the root cause and corrective action required to mitigate this type of event. The task force report was signed off January 25, 1988 and states that "the cause of the CVI was attributed to electromagnetic interference (EMI) generated from low sample flow switch actuations and the electro-mechanical buzzer on the local panel. DCR 2372, Reduced ESF Actuations Caused by Rad Monitoring Spiking, was initiated requesting modifications addressed in the CVI task force report be implemented. The task force also addressed a modification completed in 1979 and not incorporated in appropriate drawings at the time of investigation and DCR 2276 (added 600 volt, .22 mfd capacitors and MOVs across process Rad monitor switch contacts and motor windings, requested in August 1984) that was not assigned an implementation date until December 1987.

A review of the LERs, the CVI task force report; CAQR SQP 871448, Design Control - Design Basis is Inadequate to Assure Accomplishment of Safety Function; CAQR SQP880036, Corrective Action for Root Cause Not Identified and Subsequent Failures Resulting in Adverse Trends; DCR 2276; and DCR 2372 indicate that the licensee is expending sufficient energy at this time to resolve the problem. This was not the case initially. LER 328/86022 (Closed) initiated DCR 2276 that requested modifications be made to help eliminate EMI generated CVIs. This DCR was initiated in August 1986, signed by the plant manager in October 1987, and an implementation date was set in December 1987, after a series of CVI (EMI initiated) events were experienced. This DCR is presently in ALARA review (no ECN issued). CAQR SQP871448 deals with TS CVI test response times. The conclusion reached was that the calculations required to define the test time requirements would not violate the present 10 second test time of the valve closure (system response is not tested). This CAQR is

declared to not effect operability and the calculations will be done post restart. Operability of the system will be validated when the calculations are complete. CAQR SQP 880036 is not clear as to what root cause corrective action is in question, the restart determination states in part that this modification is to be worked on a priority basis. This probably refers to DCR 2372 but can not be confirmed (CAQR is deficient). DCR 2372 is a result of the CVI task force recommendations with a statement that the vendor suggested modifications, i.e. DCR 2276, will resolve equipment malfunctions. Three of the four recommendations were included, however, the recommendation to show the reed switches on the drawings where applicable was not addressed. LERs 328/86011, Revision 3, 328/87008R1, 328/87-09 and 328/87-10 are closed. The modifications recommended by the CVI task force and partly identified in DCR 2372 as well as the short term chemistry actions, short term administrative actions and other actions specified in CVI task force report, "Investigation of CVI events on Unit 2," period November 27 - December 21, 1987 will be tracked by IFI 327,328/88-19-02.

These items are closed.

(Closed) LER 327/86-20, Failure to Perform a TS Required Quarterly Functional Test. As identified in inspection report 87-65, a number of questions were raised with regard to the adequacy of procedures SI-244 and SI-244.2, "Periodic Functional Tests of Radioactive Effluent Monitoring Instruments". The licensee has addressed these questions as follows:

- a. On November 6, 1987, SI-244 and SI-244.2 were revised, via change ICFs 87-2074 and 87-2163, to provide guidance to the person performing the work as to the correct positioning of valve FCV-15-43 following completion of the test.
- b. Attachment 1 to PRO 3-86-031 has been changed to correctly reflect that channel F-15-43 is not used for auto isolation flow control, and the above referenced ICF's indicate that this channel need only function in the manual mode.
- c. ICF 87-2163 revises SI-244.2 to delete the unnecessary testing of channel F-15-43 in the auto mode.

The inspector has reviewed the above actions and find them to be acceptable.

This item is closed.

(Closed) LER 327/86-47, Standby Diesel Generator Start on Loss of Voltage to a Shutdown Board as a Result of a Start Bus Normal Feeder Breaker Trip.

On October 17, 1986, following maintenance on Breaker 1414, the normal supply to the 2B start bus, the breaker opened approximately 2 minutes after closing. An investigation could not determine the reason for the breaker's failure to remain closed as designed. In September 1986 breaker

1414 exhibited a similar failure (see LER 86-30). Contacts on the close trip switch were suspect, the switch was replaced and the breaker tested without failure. The subsequent failure of Breaker 1414 indicates additional problems with the breaker or associated electrical circuits. Investigation of the October failure could not identify a specific fault. The breaker was placed in service after determining that the failure could not be duplicated. A commitment tracking number (NCO 860416001) was assigned to track the installation of test equipment to monitor the logic and undervoltage relay scheme to attempt to locate the cause of the trip and provide assessment to the plant reporting section for potential LER revision. A commitment due date of July 1, 1986, was assigned, however the assigned due date was revised to a Unit 1 restart milestone in a memo from electrical maintenance to site licensing, dated June 18, 1987. Licensing agreed to the requested due date. Based on a review of the investigation conducted in November 1986 which could not determine a specific failure mechanism for breaker 1414, the satisfactory performance of the breaker from October 1986 to present, and the licensee's commitment (tracking No. NCO 860416001) to continue efforts to resolve the cause of the breaker trip before Unit 1 restart, the inspector considers the licensee's actions to be adequate.

This item is closed.

(Closed) LER 327/86-48, Inadequate Verification of ECCS Flow Due to Procedural Inadequacy

During the Surveillance Instruction review program SI 260.2, "BIT Cold Leg Injection Flow Balance, Pump Performance and Check Valve Test," was identified to be inadequate to assure that technical specification surveillance requirements were met. When corrected SI 260.2 was performed on Unit 2. CCP 2A-A failed to meet the SI requirements. Westinghouse has evaluated this pump and determined that it is able to perform its intended safety function.

The corrected SI 260.2, or equivalent SI 260.2.1 for Mode 6 performance, will be run on Unit 1 prior to startup. This action is being tracked by TVA through CCTS NCO-86-0421-001. The NRC will track closure of this item through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 328/87-01, Fire Breach Permit Not Initiated When Damaged Kaowool was Discovered, Resulting in a Failure to Comply With TS Action Requirements

On January 10, 1987, it was discovered that a fire breach permit had not been written when damaged kaowool was discovered on a conduit in the Unit 2 personnel air lock. On November 15, 1986, when a maintenance employee observed the damaged kaowool, maintenance request (MR) B129253 was written to repair the damage. However, the employee was unaware that Physical Instruction-13 "Fire" also requires that a fire breach permit be

issued. Therefore, LCO 3.7.12 was inadvertently violated in that a continuous or hourly fire watch was not assigned. The licensee's analysis of this event revealed the following: (1) an hourly fire watch routinely inspects the unit 2 personnel air lock, (2) no fires occurred in this area during the period of time the kaowool was damaged, and (3) failure of the cable within the subject conduit would not have prevented any safety system from performing its intended function. In order to preclude this failure to initiate a fire breach permit, an explanatory memorandum was sent to craft personnel on March 2, 1987, and briefings were conducted with craft personnel between March 11 and March 20, 1987. The inspector has reviewed the licensee's actions and finds them to be acceptable.

This item is closed.

(Closed) LER 328/87-05, Train B Containment Ventilation Isolation Caused by an Unknown Source.

The licensee had a condition where only the sample line containment isolation valves for train B were closed. The licensee investigated and found no specific cause for the isolation. A CVI signal had initiated the valve closure. This signal required resetting before the closed valves could be reset. No high radiation alarms were received, no spikes were noted on the radiation monitor recorders and only the train B CVI signal was present. The licensee responded properly to the instrument malfunction alarm, no high radiation levels existed. There was no threat to plant personnel or to the general public.

The inspector has reviewed the event and the actions by the licensee appear to be adequate.

This item is closed.

(Closed) LER 328/87-07, Technical Specification Requirement Not Met on A Containment Hydrogen Analyzer Due to a Combination of Deficiencies.

The licensee identified three items that violated the Technical Specification (TS) requirement for LCO 3.6.4.1, which requires that two independent containment hydrogen monitors be operable when in modes 1 and 2. They are:

- a. The sample line from lower containment was partially plugged between the sample inlet and the hydrogen analyzer system isolation valve (FCV-43-201) with a foreign material. This material was analyzed (RIMS E13 071006 252) and found to be tobacco.
- b. The upper containment could not be sampled because a sample line was not installed as required by design drawings. This has been addressed by DCN X00006.
- c. A 25 foot long low point in the field routed line located in a condensate tray was discovered which could potentially cause the



vendor recommended maximum allowable inlet pressure drop to be exceeded. The sample line routings were addressed in DCN X00006.

The inspector reviewed DCN X00006, the field routing of the sample lines and the plug material (tobacco) report No. JLR-10/2/87-4. The licensee's actions appear to be acceptable.

This item is closed.

(Closed) LER 327/87-25, Failure to Meet the Surveillance Requirements for the Hydrogen Mitigation System due to an Inadequate Procedure.

This event report describes an inadequacy in Surveillance Instruction (SI)-305.1 and SI-305.2, "Hydrogen Mitigation System Operability" (Units 1 and 2 respectively) in defining coverage regions for hydrogen igniters to assure that acceptance criteria of the technical specifications (TS) were met. Corrective actions included revisions to SIs 305.1 and 305.2 and clarification of TS section 4.6.4.3.a to assure agreement with NUREG-001, Supplement 6 (Sequoyah Safety Evaluation Report).

SI-305.2 has been revised. SI-305.1 will be revised prior to Unit 1 restart and is being tracked by CCTS NCO-87-0183-003. The revised SI must also be successfully performed prior to Unit 1 restart. The clarification of the TS is being tracked by TVA CCTS NCO-87-0183-001. NRC follow-up of remaining TVA corrective actions will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Open) LER 327/87-27, Surveillance Requirement was not being Fulfilled Because Four Essential Raw Cooling Water (ERCW) Valves were not Being Verified in the Correct Position Due to Procedural Error.

Surveillance Instruction SI-33, ERCW Valves Servicing Safety Related Equipment, incorrectly listed 4 ERCW valves as OPEN. The correct position is Throttled as reflected in SI 682, ERCW Flow Balance Valve Position Verification. The valves deleted were from SI-33, and added to SI-682 (31 day requirement portion) to properly fulfill the required surveillance requirement. In addition to the above corrective action, the licensee conducted a formal investigation, Investigation of ERCW valve Mispositions in Association with SI-682, dated March 3, 1988, to determine the cause of ERCW valve mispositions. The inspector reviewed the investigation report. The report recommended the following actions:

- a. Formation of an operations SI crew. This was implemented prior to the final report issue date.
- b. Conduct root cause determination training. Completed March 1988.

- c. Install valve position (template) indicators on RCP motor and CRDM coolers and revise SI 682 to correspond to the template. Schedule completion date 4/29/88.
- d. Provide locks for main control room and electric board room chiller flow balance valves. Schedule completion date 3/31/88.
- e. Require flow balance valves on lower compartment coolers to be locked in all modes and revise SI-682 to reflect this change. Scheduled completion date 3/31/88.

The licensee, based on the investigation, will submit a revised LER 87-27. Based on the above actions and discussions with licensee personnel, LER 87-27 is removed as a restart requirement. However LER 87-27 remains open pending review of the revised submittal.

(Closed) LER 327/87-030, Blown Fuse in Emergency Start Circuits Result in Spurious Emergency Diesel Generator Starts on Two Occasions.

A review of the fuses indicates that the failed fuses came from (FLAS-5) lot no. 3. As of July 13, 1987, 69 FLAS-5 fuses have failed with 67 confirmed from lots 2 and 3 and two indeterminate. A change in manufacturing process was initiated (between lots 3 and 4) by the manufacturer as improvements in the production process. The licensee is in the process of changing out all FLAS-5, lot 2 and 3 fuses. The emergency diesel generator, emergency start circuit fuses have been verified or replaced with fuses from lots manufactured after lot 3. The licensee's corrective actions appear to be acceptable.

This item is closed.

(Closed) LER 327/87-34, Containment Penetrations Identified As Not Meeting General Design Criteria (GDC) 56.

This issue involves the discovery that thirteen containment pressure indicating instrumentation lines had been installed with test connections sealed with only a threaded tubing cap, thereby not providing the necessary containment isolation capability as required by GDC-56 of 10 CFR 50, Appendix A.

As previously stated in inspection report 327,328/87-71, violations 87-71-01 and 87-71-02 were issued to address the licensee's failure to implement the appropriate design criteria and failure to affect appropriate corrective actions. The remaining issues, involving design document control, have been resolved as follows:

- WP-12635 indicated that flow diagram 47W866-1 was for reference only and did not require markup in the control room, whereas Administrative Instruction AI-25, "Drawing Control After Unit Licensing", lists this diagram as a "critical" drawing requiring prompt as-built markup in the control room. The licensee has issued field change request

FCR-6886 to revise the above work plan to correctly identify drawing 47W866-1 as a "primary" or "critical" drawing.

- Flow diagram 47W866-1 was inaccurate in that instruments 30-310 and 30-311 were not shown, and that the root valves for the containment pressure instruments were not shown. The above referenced FCR-6886 now correctly shows instruments 30-310 and 30-311. Regarding the valves not shown on this flow diagram, the licensee has supplied additional information which reveals that the valves in question are not root valves, per se, but shutoff valves mounted in close proximity to the pressure transmitters, and that TVA practice is to not show such shutoff valves on a system flow diagram. However, as these shutoff valves are the first valves in line from the process, TVA has taken the following actions: 1) DCN X00046 has been issued to assign unique identification numbers to these shutoff valves, including a "Z" suffix to indicate first valve from the process. These unique valve numbers will be shown on the 47W600 series instrument panel drawings. 2) The shutoff valves are now listed in SI-604, "Essential Instrumentation Operability Verification", Revision 9, Appendix B, page 10, as requiring periodic position verification.
- Drawing 47W600-153 was inaccurate in that the as-built configurations of the instrument lines for 30-46A, 47A, and 48A were not correctly depicted. Drawing 47W866-1, Revision DD, shows the implementation of FCR-4996, which revised the configurations of the above instrument lines. These lines are now as depicted on drawing 47W600-153.

The inspector reviewed the above licensee actions. They appear to adequately resolve the questions posed in report 327,328/87-71.

The inspector reviewed completed documentation for performance of SI 14.2, "Verification of Containment Integrity for Unit 2," dated January 18, 1988.

The Unit 2 containment pressure and containment purge system instrument test lines have been modified to provide additional valves and pipe caps to meet 10 CFR 50 General Design Criteria 56 and design criteria SQN-D.C.-V-2.15.

Modification of these lines on Unit 1 to conform to requirements is in process and is being tracked by CCTS NCO 87-0254-001 and NCO 87-0254-003. Revision and performance of SI 14.1, "Verification of Containment Integrity for Unit 1," is being tracked by CCTS NCO 88-034-002. NRC follow-up for these items will be tracked with IFI 327,328/88-19-02.

This item is closed.

(Open) LER 327/87-37, Engineered Safety Features Equipment Coolers' Capacity Determined Inadequate for LOCA Conditions Due to HVAC Calculation Errors.

The licensee has issued instruction change form (ICF) 87-2236 and ICF 87-2339 to incorporate the air flow requirements determined by Engineering Change Notices (ECN) L-7242 and L-7243 to Drawing 47W866-8. Special Test Instruction (STI)-70 has been completed to verify Engineered Safety Feature (ESF) cooler Heating, Ventilation, and Air Conditioning (HVAC) air flow rates meet the minimum requirements. Backflow damper C penetration room coolers A-A and B-B, also identified in LER 327,328/87-35, have been replaced with new units per Work Request (WR) B124174, B131916, B131947, and B131948. The licensee issued ICF-880057 to allow operation of ERCW coolers that do not meet Drawing 47W866-8 minimal requirements until the intake water temperature reaches a high of 72°F.

The inspector has reviewed the ICFs indicated above, the WRs, and STI-70 (Revision 1). STI-70 (RI) indicates that air flow can be met in most cases for increased requirements per ECNs L7242 and L7243 to Drawing 47W866-8. The systems that cannot meet the minimum requirements per Drawing 47W866-8 are 714 foot elevation penetration room coolers; 1A-A, 2A-A, and 2B-B Auxiliary Feedwater (AFW)/Boric Acid Transfer (BAT) room coolers; A-A and B-B CCS/AFW and the CCS/Spent Fuel pool.

The licensee has performed an Unresolved Safety Question Determination (USQD) review (Reference QIR MEB SQN 87170, Revision. 2) which determined that sufficient cooling could be obtained for ERCW intake temperatures less than 72°F. Surveillance Instruction SI-3, "Daily, weekly and monthly logs" has been revised via ICF 88-0057 to require that LCO 3.0.3 be entered if ERCW intake temperature reaches or exceeds 72°F. The licensee's actions appear to be adequate to allow restart of Unit 2. The revision of LER 327,328/87-37 has not been completed and the testing of Unit 1 has not been completed.

This LER is resolved for restart of Unit 2, but will remain open until the LER is revised and determined acceptable and ERCW cooler requirements are determined to be satisfied.

(Closed) LER 327/87-40, Shield Building Mechanical Penetration Seals Not Qualified Due to a Material Misapplication.

This LER reported that reactor shield building mechanical penetration sleeves might not be hydraulically leak tight. The "Analysis of Event" portion of the LER also addressed the other functions of the penetration seals; as fire barriers and air pressure seals between the annulus and outside areas. TVA performed analyses and evaluations which concluded that the seals would perform their functions as fire barriers and air pressure seals. These analyses also determined that the probability of a design basis flood occurring before the seals can be upgraded during the next Unit 2 refueling outage was very low. The evaluations also indicated that leakage would not have significant adverse effects on the containment structure or electrical cables in the shield building. An NRC review of TVA's evaluation of these penetration seals identified a number of significant omissions and discrepancies in the bases for concluding that

the seals would perform their design functions. These concerns are detailed in NRC inspection report 327,328/87-71. TVA has performed their inspections and analyses and has included these findings in Revision 1 to this LER.

The NRC inspector reviewed the additional inspection and evaluation work and discussed this issue with responsible licensing and engineering personnel. The LER revision more accurately and completely describes the scope of the problem and the actions required by TVA for final resolution. TVA has performed a detailed review of pipe movements and their effect on seal function. All shield building penetration seals were reinspected by TVA to verify their acceptability as fire barriers and to verify integrity of Unit 2 boot seals that provide hydraulic and air sealing (where installed). Repairs were made to penetration fire barriers as required.

One of the bases TVA had used for justifying acceptability of the penetration foam seals in various safety evaluations and documents related to this issue, was that the seals had been periodically inspected and found acceptable per Surveillance Instruction SI-233.1, "Visual Inspections of Penetration Fire Barriers-Mechanical System 302 (Penetrations)". The NRC Inspector reviewed Revision 4 of SI-233.1 and noted that inspections for penetrations with fabric boot seals installed (for hydraulic considerations) did not require removal of the boot seal or inspection of the foam fire barrier seal from the other, uncovered, penetration end. Therefore, Surveillance Requirement 4.7.12 of the Technical Specification (TS), which requires a periodic visual verification that fire barrier penetrations are functional, was not met. TVA subsequently established a fire watch in the annulus, issued a potentially reportable occurrence report, revised SI-233.1 and reinspected all piping penetration fire barrier seals in the shield buildings with satisfactory results. The failure to adequately implement the surveillance requirements contained in TS 4.7.12 is considered a failure to establish, implement, and maintain written procedures as required in TS 6.8.1 and is designated violation 327,328/88-19-03

In summary, TVA has now taken appropriate action on this issue to support startup of Unit 2. Concerns related to the inadequate corrective actions initially taken by TVA and TVA's long term corrective actions and actions related to Unit 1 penetration seals, will be tracked by TVA CCTS NCO-87-0259-004, NCO-87-0259-005, NCO-87-0259-006, NCO-87-0259-002. The NRC will track this item as part of IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/87-41, Revision 1, Loss of RHR Flow Resulting From Mispositioning of a Breaker Due to Personnel Error.

This event involves lack of attention to detail. While performing a routine initial plant lineup for performance of instrument maintenance instruction (IMI)-99 RT 6999B, a student AUO, after being instructed to verify breaker 2 on the 120 volt AC vital instrument board was closed,

opened the breaker, realized his mistake and immediately closed the breaker. This closed flow control valve 1-FCV-74-2 which isolated the RHR pump 1A-A suction from loop 4 of the hot leg.

The student AUO (Level III) was counseled on the need for good communications, attention to detail and of following procedures. A Level IV student AUO is one step away from being an AUO and therefore, with proper supervision, should be capable of doing AUO level duties. The licensee's actions appear to be acceptable.

This item is closed.

(Closed) LER 327/87-47, Potential for Inadequate Containment Cooling After A Non-LOCA Event As A Result Of Design Deficiency.

This LER reported a potential for exceeding the environmental qualification temperatures for equipment inside containment. The cause for this condition was determined to be a design deficiency when it was assumed that a LOCA event was bounding for development of the long term temperature profile of the containment. However, TVA has determined that the long term containment temperature profile for non LOCA events exceed the LOCA event assumption causing the environmental qualification of equipment inside containment to be non conservative. TVA resolution to this potential problem has been to upgrade the lower containment compartment coolers to meet safety grade requirements. It has been determined that these coolers have sufficient heat removal capabilities to maintain the containment temperatures within the present environmental qualification profile for events inside and outside the containment. The inspector reviewed the licensee's documentation supporting the upgrade of the lower containment compartment coolers to safety related. It is noted that the original installation of this equipment was classed as safety related. The licensee downgraded the system based on justification as stated in Engineering Change Notice ECN (L6459) which states per NUREG 0588 a category 'C' and class 1E classification was not needed for the lower compartment cooling fan motors. The efforts per this LER have been to restore the system to safety related status. Based on this review and discussions with licensee personnel the effort to reestablish safety related status to the lower compartment ventilation system is adequate. TVA actions for upgrading of the Unit 1 lower compartment coolers is being tracked by TVA Commitment Tracking No. NCO 87-0257-001.

This item is closed.

(Closed) LER 327/87-49, Inadequate Procedure During Construction Resulted in Improperly Sized Motor Thermal Overload Protection.

The licensee identified the root cause of this event as an inadequate procedure during construction. A significant condition report (SCR) SQN EEB 86167 was initiated describing a condition in which motor overloads were improperly sized on motor-operated 10W voltage induction motors (460 volt). ECN L 6883, WP 12521, WP 12558 and , WP 12636 were field completed

for Unit 2. WP 1252, WP 12558 also required revision of SI-251.1, SI-251.2, SI-275.2, and SI-258.2. The licensee also obtained Technical Specification (TS) change 87-29. The licensee identified approximately 59 motor overloads that were not sized properly, during calculations for ECNL 6883. New calculations were completed using motor name plate power and power factor data. DCNs 169, 170 and 171 were issued; WP 169, 170-01, 170-02, 170-03, 171-01, 171-02, and 171-03 were issued.

The inspector has reviewed the LER, SCR SQN EER 86167, ECN L 6883 and WPs. All WPs were completed with the exception of 170-02, which includes some overloads for Unit 2 (170 series is for Unit 1 and common). The licensee is presently revising 170-02 to breakout the items required for Unit 2 restart. The licensee has obtained TS change 87-29 and the SIs listed have been revised. The licensee is not taking credit for MOVs not under full load and the tests run to date are verifying the latest calculations. The work required for Unit 2 restart has been completed. Unit 1 work is not complete and is being tracked by TVA's CCTS NCO-87-0283-001.

This LER is closed.

(Closed) LER 327/87-52, Design Error Resulting in Nonrepresentative Load Testing of Diesel Generators.

The licensee identified in a Significant Condition Report issued March 20, 1986, a condition where the capability of emergency diesel generator 2B-B to recover from the transient of the containment spray pumps starting following a phase B containment isolation with other random loads connected was uncertain. A calculation was initiated to determine what the maximum acceptable loads required were, which resulted in Engineering Change Notice (ECN) L 6715 being issued to delay the containment spray pump start from 30 second to 180 seconds and require the 480 V electrical air handling unit to delay start until after the containment spray pumps started during a loss of offsite power. The licensee has obtained a revision to the Technical Specification to agree with the ECN L6715 requirements. The licensee has also initiated changes to the associated test documentation.

The inspector has reviewed the load calculations, the TS changes, and the revised Surveillance Instructions SI-26.1B, -26.2A, -26.2B (completed). The diesel generators have been tested to the new load requirement. The TS changes have been incorporated and the systems modified per ECN L6715. The licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 327/87-55, Potential Loss of AFW Due to Inadequate Installation of Instrument Sense Lines.

This LER identified that a loss of water supply to the AFW system may occur as the result of the inadequate location of the process line taps for the pump suction pressure switch sense lines.

As a result of this deficiency, the licensee initiated ECNs 7171 (Unit 2) and 7172 (Unit 1) to move the sense line taps from the top of the process line to the bottom quadrant of the process line and install a loop seal in the sense lines to prevent draining of the sense lines in case of an AFW pump suction line break. The licensee has also modified the instrument sense lines to ensure a constant downward line slope from the high point vent to the process instruments. The inspector held discussions with cognizant licensee personnel and verified that work had been completed on Unit 2 prior to entry into mode 3. ECN 7172 has not been completed on Unit 1, however it is in progress and will be completed prior to Unit 1 restart. This item is being tracked by TVA as TROI Item SCRSQNEEB8743. NRC follow-up for this action will be tracked by IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/87-58 Inadvertent Diesel Generator Start Due to Not Rendering Diesel Physically Inoperable Before Pulling Fuses.

The licensee issued this LER to document the event, determined that the root cause was personnel error (i.e. inadequate preplanning), and issued a training letter to all assistant shift engineers (ASE), shift engineers (SE), unit operators (UO) and shift technical advisors (STA) emphasizing the importance of preplanning.

The inspector has reviewed the LER and training letter. The licensee's actions appear to be adequate.

This item is closed.

(Open) LER 327.87-61, Appendix R Associated Circuits That Share a Common Power Supply With Appendix R Circuit Lacking Selective Coordination Due to Improper Cable Lengths Used in Impedance Calculations.

During calculation reviews the licensee identified several cases where a fault on Appendix R associated circuits could cause interruption of a required circuit. The cause of this deficiency was due to use of design cable lengths for fuse/breaker sizing. Modifications have been completed on the identified circuits to correct the fuse/breaker sizing deficiencies utilizing actual as constructed cable lengths in the Calculations Procedure Method PM 87-26 (EEB) titled Cable Length Values to be Used in Electrical Calculations. This procedure has been implemented by the licensee to insure the most conservative values are used in all electrical calculations which require cable footage. Sequoyah Engineering Procedure (SQEP-34), Procedure for implementation of Electrical Fuse Tabulation, Revision 0, dated December 5, 1986, is provided in the LER as the corrective action to provide fuse coordination. A review of SQEP-34 and discussions with TVA personnel revealed that this procedure does not provide fuse coordination, in addition, procedure SQEP-34 was approved for use in December 1986 approximately 15 months prior to the occurrence date of the LER, August 1, 1987. The licensee has agreed that SQEP-34 is not



appropriate corrective action for this event and intends to submit a revised LER.

This LER is open pending review of the revision. However, based on review of the modification work plans and discussions with TVA personnel all field work is complete, except permanent drawing changes. This LER is removed from restart requirements.

(Closed) LER 327/87-67, Monitor Tank Dilution Flow Was Not Verified During a Liquid Effluent Release as the Result of Personnel Error"

On October 27, 1987, a portion of System Operating Instruction SOI-77.1, relating to the batch release of liquid radiological effluents, was incorrectly performed in that an inoperable flow transmitter was used to estimate the dilution flow rate. Use of this transmitter was prohibited by the SOI because the diffuser pond was not at a required minimum level. Licensee analysis of the event reveals that since the release rate was administratively controlled (by radiation release permit 87-278-07-146) at less than 125 gpm, a dilution flow rate of only 1100 gpm would be sufficient to reduce the monitor tank concentration to below the TS required release limit. As the actual dilution flow rate at the time can be estimated to have been approximately 25,000 to 30,000 gpm, the actual release of radionuclides to unrestricted areas was well below the limits imposed by TS 3.11.1.1 and 10 CFR 20, Appendix B. As this event was determined to have been solely a result of personnel error, and as no procedural inadequacies were noted, no further action is necessary.

This item is closed.

(Closed) LER 327/87-68, Technical Specification Surveillance Interval Exceeded Due to an Incomplete Work Package.

On October 27, 1987, a data sheet (one page) was found to be missing from completed surveillance instruction SI-234.6. As a result, related fire alarm and annunciation equipment for zone 198 (125 volt battery board room II) exceeded its surveillance interval required by TS 4.3.3.8.1. The licensee determined that the event resulted when Electrical Maintenance personnel failed to verify the performance package complete. No procedural controls were required to ensure that work packages were complete when issued or on completion of work. The licensee's stated corrective actions were to counsel EM personnel as to the importance of verifying that all work packages are complete and to revise Administrative Instruction AI-4, "Preparation, Review, Approval and Use of Site Procedures/Instructions" to include a review of work packages for completeness prior to issuance. The inspector's review of these actions indicates that personnel counseling was completed on November 30, 1987, and the required enhancement to AI-4 was accomplished via issuance of revision 66 on January 3, 1988.

This item is closed.

(Closed) LER 327/87-71, Potential Degradation of ERCW Flow to Both Units.

This item involved two separate conditions involving the Essential Raw Cooling Water (ERCW) system. The first condition was the discovery that the electrical interlocks required to prevent an ERCW strainer from automatically backwashing concurrent with the backflushing of a strainer in the same train had been disabled without the performance of a 10 CFR 50.59 safety evaluation, thereby placing in question the ability of the system to provide sufficient flow. In addition, appropriate revisions to design documents, as required by Administrative Instruction AI-9, "Control of Temporary Alterations and Use of Temporary Alteration Order", had not been made. The second condition was the discovery that the automatic features of the ERCW screen wash and strainer backwash systems had been disabled (i.e. these systems are being manually operated) without the performance of a 10 CFR 50.59 safety evaluation. In addition, System Operating Instruction (SOI)-67.1, "Essential Raw Cooling Water" had not been revised to reflect the manual operation of these systems.

The licensee has determined that, in both cases, the root cause was the failure of personnel to comply with the requirements of existing procedures, and, therefore, no enhancements to the violated procedures are necessary. The inspector agrees with this determination.

Corrective actions performed by the licensee are as follows. Safety evaluations, in accordance with 10 CFR 50.59, have been performed to ensure that the present configuration and operation of the ERCW screen wash and strainer backwash systems do not constitute an unresolved safety question. SOI-67.1, Revision 34 was approved on December 30, 1987, to describe the manual operation of these systems. Abnormal Operations Instructions AOI-7, Revision 13, "Probable Maximum Flood", AOI-8, Revision 17, "Tornado Watch/Warning", and AOI-9, Revision 9, "Earthquake" have been issued to require the ERCW traveling screens and strainers to be placed in continuous backwash within three hours of the initiation of the accident. Operations personnel have been made aware of the revisions to the above referenced instructions, with formal training to be completed prior to March 31, 1988. The requirement for this formal training is being tracked by the licensee under CCTS number NCO-87-0370-001. The inspector reviewed the above actions taken by the licensee and determined them to be acceptable.

This item is closed.

(Closed) LER 327/87-73, Inadequate Design of Centrifugal Charging Pump's Auxiliary Lube Oil System Could Result In The Failure Of High Head Safety Injection To Start On A Manual Signal.

This item involved the discovery that, during accident conditions, the CCPs may not start using the manual handswitch in the control room. The control logic for manually starting the CCPs contains an interlock that requires the Auxiliary Lube Oil Pump (AOP) to start before allowing the CCP to start. However, since the AOPs and associated interlocks are not

qualified class 1E components, it cannot be assumed that they would be available during accident conditions, thereby preventing the CCPs from performing their required function. It should be noted that the Auto-Start circuitry for the CCPs does not include a similar interlock to the AOPs. Therefore, upon receipt of a safety injection signal, the CCPs will start without the necessity for the AOPs to be available. The licensee determined the cause of this condition to be an inadequate design review, which caused the AOPs to be incorrectly classified as NON-1E components.

Licensee actions to resolve this issue are as follows:

- The CCP manual start circuitry has been modified, via DCN-133, to add a time delay function which will allow the AOP ten seconds to start and provide lubrication to the CCP, but would cause the CCP to start at the end of the ten second delay if the AOP fails to start. In Unit 2, the circuitry modification has been completed and functionally tested.
- The licensee has committed to complete the Unit 1 circuitry modification prior to Unit 1 entry into mode 4. This commitment is being tracked by TVA's Corporate Commitment Tracking System (CCTS) under control number NCO-87-0354-003.
- System Operating Instruction SOI-62.1, "Chemical and Volume Control System", Revision. 38, was issued on March 2, 1988, to include a description of the above referenced circuitry modification.
- To ensure that future surveillances to assure CCP operability include the above modification, the licensee will revise MI-13.1.11 prior to its next scheduled performance. The accomplishment of this revision is being tracked by TVA's Tracking and Reporting of Open Items (TROI) system under tracking number 187410.
- Recurrence control for future items of a similar nature have been implemented by the licensee through the use of Nuclear Engineering Procedures (NEP) 3.1, "Calculations," NEP 3.2, "Design Input," and NEP 6.1, "Change Control," which were not in place at the time of the inadequate design review that caused this condition to exist.

The inspector has reviewed the above licensee actions. They appear to be adequate. NRC follow-up of TVA Unit 1 corrective actions will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/87-74, Operating Procedures Do Not Adequately Address ECCS Requirements in Mode 4.

This issue involved the discovery that 1) plant procedures required the BIT inlet and outlet valves be de-energized in mode 4 contrary to the

requirements of TS 3.5.3, and that 2) plant emergency instructions did not address manual realignment of the RHR system for ECCS operation in mode 4 in order to comply with TS 3.5.3. The licensee determined the cause to be inadequate procedural reviews prior to issuance and/or revision.

Corrective actions taken by the licensee are as follows:

- GOI-1 "Plant Startup from Cold Shutdown to Hot Standby" and GOI-3, "Plant Shutdown from Minimum Load to Cold Shutdown" have been revised to require that BIT isolations valves remain energized in mode 4.
- AOI-6, "Small Reactor Coolant System Leak or Shutdown LOCA" has been revised to address ECCS operation of the RHR system in mode 4.
- Recurrence control has been accomplished through revision to Instruction AI-4, "Preparation, Review, Approval, and Use of Site Procedures/Instructions" and creation of AI-43, "Independent Qualified Review" to ensure that procedural content and procedural revisions receive an adequate technical review.

The inspector reviewed the above licensee actions. They appear to be adequate.

This item is closed.

(Closed) LER 327/87-75, Inadequate Procedure and Misinterpretation of AFW BPLCVs Operational Modes Results In An SR Not Being Met and Condition Not Being Reported.

This item involved 1) the discovery that revision 14 of SI-118, "Motor-Driven Auxiliary Feedwater Pump and Valve Automatic Actuation", did not adequately test the AFW BPLCVs as required by TS 4.7.1.2.b.1, and 2) the licensee's failure to notify the NRC, via LER, of the above TS violation. The procedural inadequacy was originally identified during the licensee's SI Review Program and documented on PRO 1-87-129, on March 25, 1987. However, due to a misinterpretation by the PRO reviewer as to all of the modes of operation of the BPLCVs, the PRO was incorrectly evaluated as being "not reportable". NRC review of the PRO revealed both the TS violation and the failure to report, resulting in the issuance of violations 327,328/87-71-03 and 327,328/87-71-04, which are also addressed in paragraph 6d this report.

Licensee actions regarding this LER are as follows:

- Revision 15 to SI-118 was issued to include all testing required by TS 4.7.1.2.b.1. The inspector reviewed this procedure and determined that it adequately reflects the TS requirements.
- Testing of the Unit 2 AFW BPLCVs, in accordance with the revised SI-118, was successfully completed on February 16, 1988.

- The licensee has committed to perform the required testing of the Unit 1 AFW BPLCVs prior to Unit 1 entry into mode 3. This commitment is being tracked via TVA's Corporate Commitment Tracking System (CCTS) control number NCO-87-0363-001.
- In order to preclude future TS violations caused by inadequate procedures, the licensee has implemented an SI Review Program, covered under SI-1, Appendix F.
- Management has counseled personnel performing reportability reviews to assure that such reportability determinations are performed accurately in the future.

The inspector reviewed these actions and determined them to be acceptable. NRC follow-up of Unit 1 corrective actions will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/87-76, A Containment Ventilation Isolation (CVI) Occurred as the Result of Test Personnel Connecting Test Equipment to Incorrectly Specified Terminals.

The licensee initiated an inadvertent CVI while performing work request (WR) B244973 which incorrectly detailed the terminal numbers to be used pursuant to the testing. Operations verified that the CVI was the result of incorrect terminal designation in the WR and then reset the CVI. The personnel who initiated the WR were counseled as to the need for attention to detail. The work was suspended on WR B244973 until the corrections could be made to the WR. The test was then continued without incident.

The inspector has reviewed the LER and WR and the licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 327/87-77, Inadequate Design of the Containment Isolation System Hydrogen Analyzers Could Result in Bypass Leakage Following a Loss Of Coolant Accident.

The licensee defined the following four items associated with this LER that required action:

- a. Replace inboard Hydrogen Analyzer System (HAS) isolation valves FCV-43-201,-202,-207 and -208 with fail-closed solenoid operated valves.
- b. Add temporary plug in calibration and reagent gas lines between H<sub>2</sub> analyzer and Auxiliary Building Secondary Containment Enclosure (ABSCE).

- c. Designate FSV/43-200A and -210A as outside containment isolation valves and add test connection for Local Leak Rate Test (LLRT).
- d. Replace current reagent air supply (control air) with air bottles capable of maintaining reagent air pressure greater than 12 psig.

The licensee has completed items 1 and 2 per ECN 7332 for Unit 2 and field completed items 3 and 4 per ECN 7333 for Unit 2 as of February 29, 1988.

The inspector has reviewed the ECNs and conferred with the licensee's technical representatives and the NRC inspector that reviewed the LER for mode 4 completion, the functional test, and the installation. The licensee's actions appear to be adequate for Unit 2 restart. The Unit 1 H2 analyzer rework has not been completed and is being tracked on TVA CCTS NCO-87-0364-001, 003, 005 and 007. These actions will be followed up by NRC IFI 327,328/88-19-02.

This LER is closed.

(Closed) LER 327/88-01, Inadequate Computer Database Causes Technical Specification Surveillance Intervals to be Exceeded.

This issue involved the discovery (on January 11, 1988) that Technical Specification (TS) surveillance requirement SR 4.8.1.2 had been exceeded, thereby requiring that all four EDGs be declared inoperable. SR 4.8.1.2 requires sampling of the diesel fuel oil to be performed at least once every 92 days. This SR is implemented by SI-116, "Quarterly Chemistry Requirements on Diesel Generator Fuel Oil." The failure to perform SI-116 within the required timeframe was caused by an inaccuracy in the computer program used by the Maintenance and Surveillance Scheduling (M&S) department. The inaccuracy occurred during the recent (November 1987) conversion to a new M&S computer program, at which time the mode requirements for the performance of SI-116 were incorrectly changed from "all modes" to "modes 1-4."

As a result of declaring the EDGs inoperable, a number of components which utilize the EDGs as an emergency power source (and are required in mode 5) were also declared inoperable, and the appropriate TS LCO actions were complied with. These are:

- All four motor-driven high pressure fire pumps (LCO 3.7.11)
- Both trains of the Auxiliary Building Gas Treatment System (LCO 3.9.12)
- All four centrifugal charging pumps (LCOs 3.1.2.1 and 3.1.2.3)

In addition to complying with the action statements contained in the above referenced LCOs, the licensee has performed the following corrective actions:

- On January 12, 1988, SI-116 was successfully completed, the EDGs were returned to operable status, and all EDG-related LCO action statements were exited. In addition, the M&S computer program was revised to indicate that performance of SI-116 is required during all operational modes.
- A review was performed of all TS SIs to ensure that the mode requirements listed in the scheduling program were accurate. This review revealed four additional errors. However, only one of these errors caused a TS SR to be exceeded (SR 4.0.5), which involved SI-166.17, "CVCS and SI Check Valve Test During Cold Shutdown." Upon discovery, SI-166.17 was successfully completed on January 24, 1988, and all four errors were corrected in the computer program.
- Actions to be taken to prevent recurrence include an evaluation of all aspects of the acquisition and utilization of scheduling data, an expanded QA audit schedule, establishment of an "SI Coordinator" within each SI performance organization, and a requirement that the postponement or rescheduling of TS implementing SIs may only occur with the approval of the plant manager. These actions are expected to be implemented by June 1, 1988, and are being tracked by TVA's CCTS under control numbers NCO-88-0014-003, -004, -005, and -006.

The inspector reviewed the above licensee actions. They appear to be adequate. NRC follow-up of TVA long term corrective action commitments will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 328/88-01, Containment Spray Heat Exchangers Lower Support Frame Design Deficiency.

This issue involved the discovery that: 1) due to a design deficiency, the lower support frame for the CS heat exchangers could be overstressed during a design basis seismic event (DBE), and that 2) due to the close proximity of the residual heat removal (RHR) heat exchangers to the CS heat exchangers, there existed a potential for physical interaction between these components during a DBE.

Actions taken by the licensee to resolve this issue are as follows:

- The lower support frames for the Unit 2 CS heat exchangers have been modified to provide adequate support during a DBE. These modifications were performed in accordance with design change notice (DCN) X00210A and were completed on January 19, 1988.
- DCNX00138A has been issued to modify the lower support frames for the Unit 1 CS heat exchangers. Licensee has committed to complete this modification prior to Unit 1 entry into mode 4. This commitment is being tracked by TVA's Corporate Commitment Tracking System under control number NCO-88-0028-001.

- TVA DNE has performed an evaluation of the CS and RHR heat exchangers and determined that, when the characteristics of all the equipment, associated piping, and support structures are considered, there would be no physical interaction between these components during a DBE.
- Licensee determined the root cause of this condition to be the failure of revised vendor-supplied data to be adequately factored into the design calculations for the lower support frames. Recurrence control for this condition is implemented through the use of Nuclear Engineering Procedure (NEP) 3.1, "Calculations," NEP 3.2, "Design Input," and NEP 6.1, "Change Control," which were not in place at the time the erroneous design calculations were performed.

The inspector has reviewed the above licensee actions which appear to be adequate. NRC follow-up of Unit 1 corrective actions will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/88-02, An Essential Raw Cooling Water Radiation Monitor was Declared Inoperable Without Complying with the Limiting Condition for Operation (LCO) as a Result of Misinterpretation of the LCO.

The licensee did not enter LCO 3.3.3.9 when Train B radiation monitors were declared inoperable. This was due to a misinterpretation of LCO 3.3.3.9 and the LCO was entered when the error was discovered. The LCO was exited when the train B radiation monitors were put back in operation. The licensee has issued Technical Specifications (TS) interpretation 88-114 stating that one channel for each ERCW effluent line discharge header is required. A TS change request has been issued and will be tracked on the CCTS by numbers NCO 880017001 and NCT 880017002.

The inspector has reviewed the LER, LCO 3.3.3.9, TS interpretation 88-114 and CCTS commitments and the licensee's actions appear to be adequate. NRC follow-up of TVA's long term actions will be tracked through IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 328/88-02, An Inadequate Review of a Plant Modification Caused An Inadequate Response Time Measurement Resulting in a Noncompliance With a Technical Specification Surveillance Requirement.

The licensee, in September 1983, responded to NRC IE Bulletin 80-20, "Failures of Westinghouse Type W2 Spring return to Neutral Control Switches," by implementing ECN L5591. This required a change to IMI-99RT604. This change was accomplished by TC-84-0493 (March 1984). In April 1984, Unit 1 valve LCV62-136 was correctly measured; however, in May 1984, the subject TC expired and was removed from IMI99RT604 and in October 1984, LCV62-135 and LCV62-136 (Unit 2) response times were incorrectly measured. To correct this problem, the licensee issued



permanent procedure changes 88-105 and 88-106 (January 19, 1988) and reviewed all IMIs that are used for ESF-actuated equipment to verify that similar problems did not exist; in October 1987, the licensee issued NEP 6.3, "Operating Plant Modifications"; NEP 6.4, "Plant Modifications Packages;" NEP 6.5, "Plant Modifications Studies;" and NEP 6.7, "Document Update Process-Modifications." AI-19 has also been revised since September 1983 to provide more explicit requirements for proposed plant modifications. CAQR SQQ 880109 was initiated on January 28, 1988 and addresses potential problems due to ICFs not being incorporated on a timely bases. The licensee has also initiated an ICF tracking system.

The inspector has reviewed the LER, CAQR and the outline for the ICF tracking system. The LER is not properly titled, the title implies that an inadequate review of a plant modification caused the event; however, the allowance of a temporary change notice to lapse instead of incorporating it was the real cause. The CAQR identifies the real problem as ICFs not incorporated in a timely manner. The inspector reviewed AI-4, "Preparation, Review, Approval and Use of Site Procedures/Instructions," which identifies ICFs and their use with no restrictions on how long an ICF may be implemented without being incorporated. This is a situation that needs to be addressed. Resolution of CAQR SQQ 880109 is being tracked on the TVA TROI system. NRC follow-up of this item will be tracked by IFI 327,328/88-19-02.

This item is closed.

(Closed) LER 327/88-03, Inadvertent ABI Caused by an Unknown Source.

The licensee experienced an ABI while performing work request (WR) B240718 which involved checking the calibration of radiation monitor (RM) particulate channel I-RM-90-101A, computer log point R0019A. This was being performed with the high radiation block switch HS-90-136A3 in the 101A position, pulled out to block 101A high radiation signal. The licensee reviewed all the logs, interviewed operators and instrument mechanics and tried unsuccessfully to reproduce the event.

The inspector has reviewed the event and the licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 328/88-04, Inadvertent Start of all Emergency Diesel Generators During Surveillance Testing Due to Damaged Lockout Relay.

The licensee investigated the occurrence and determined probable cause to be rolling scaffold in the area required for work being done on the ERCW system. This scaffold was removed. Further use of scaffolding in this area will require scaffolding to have bumpers. This will be controlled by revision to hazard control instruction (HCI)-M2, "Scaffolds" by March 22, 1988. The damaged relay was replaced by work request (WR) B29429. The

eleven other HEA relays on the 6900 volt shutdown boards will undergo visual inspection via WR B296416 through B296426 by 3/11/88.

The inspector has reviewed the LER and determined that WR B296429 had been completed. The licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 327/88-04, 50 AMP Circuit Breakers Did Not Preclude Auto-ignition of Associated Cables Contrary to 10 CFR 50 Appendix R Due to a Misapplication of Breaker Curves

The licensee initiated an assessment to determine the consequences of cables contained (EIIS Code ED) in a common enclosure with circuits required to meet 10 CFR 50, Appendix R requirements. Twenty-four cables were identified that were not protected from auto-ignition for high resistance faults. The licensee contacted the manufacturer of these circuit breakers and determined that two different curves were used with this breaker. The selection of the proper curve was dependent upon when the breaker was manufactured. The licensee has replaced the 24 breakers that had the slower response times with those manufactured after mid-1977. The licensee has determined the root cause to be a programmatic failure to verify that the proper breaker characteristic curve is used when the feeder is in service and when developing test criteria for the breaker. The licensee has revised the following surveillance instructions (SI) and Technical Instruction (TI) to ensure proper breaker curves are used:

SI-258. "Testing of Molded Case and Lower Voltage Containment Penetration Circuit Breakers" (Unit 1)

SI-258.2 "Testing of Molded Case and Lower Voltage Containment Penetration Circuit Breakers" (Unit 2)

SI-275.1 "Testing of nonclass 1E load circuit breakers fed from class 1E buses" (Unit 1)

SI-275.2 "Testing of nonclass 1E load circuit breakers fed from class 1E buses" (Unit 2)

TI-79 "Determination of trip time ranges for 480 volt breakers"

Conditions adverse to Quality Report (CAQR) SQP 880005 was generated to document the 24 breakers identified as not being adequate to protect cables from auto-ignition. The licensee is reviewing the process that provides vendor supplied technical information to the implementing engineer for programmatic breakdowns. This should be completed by 3/15/88 and administrative controls will be implemented to correct findings.

After review of the LER, SIs and TI-79, and the CAQR, the licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 327/88-05, Personnel Not Properly Implementing Administrative Procedures Resulting in Inappropriate Exiting TS Action Statement on Radiation Monitor.

The licensee declared radiation monitor (RM) (O-RM-90-212) operable while Hold Order (HO) O-88-037 was still in effect, thus exiting Limiting Condition for Operation (LCO) 3.3.3.9. The licensee reentered LCO 3.3.3.9 upon discovery that RM O-RM-90-212 was inoperable. This resulted in a period of 25.5 hours between samples when the TS require as a minimum a sample every 12 hours. The licensee counseled the operators involved and made Administrative Instruction AI-58 "Maintaining Cognizance of Operation Status - Configuration Status Control" a training topic for week one of the 1988 operator requalification training.

The inspector has reviewed the LER and the training package for week one of 1988 operator requalification training which has been completed. The licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 328/87-06, Inaccurate Determination of the Heat Flux Hot Channel Factor by the Incore Computer Program Due to a Personnel Error.

The licensee developed a core cycle exposure and height dependent power factor ( $W(z)$ ) for Unit 2 cycle 3 from data supplied by Westinghouse that required a quadratic interpolation, that gave erroneous  $W(z)$  values. This was caused by a misutilization of vendor supplied data by the licensee's personnel. Corrected quadratic interpolation applied to SI-126 "Hot Channel Factor Determination" for Unit 2 has verified that TS Surveillance requirements 4.2.2.2.c and 4.2.2.2.e for verification of the heat flux channel factor  $F_q(z)$  limits are acceptable. The licensee has QA qualified the Incore computer program using Methods Group Instruction (MGI)-02, "Development, Validation, Maintenance, Documentation, and Release of Nuclear Fuel Engineering Branch Computer Programs", and has established requirements for double verification of changes to core monitoring computer programs.

The inspector has reviewed the LER, the licensee's response to the issue and it appears that the licensee's actions are adequate.

This item is closed.

(Closed) LER 327/88-09, An Inadequate Procedure Caused Inaccurate Primary to Secondary Leak Rates to be Measured Resulting in a Potential Noncompliance With an LCO.

The licensee issued ICF-880210 to SI-137.2 to correct for steam generator water volume. This correction also allows for leak rate testing at modes 2, 3, 4 and at mode 1 operating at less than 100% power. The licensee has

issued Nuclear Engineering Procedures (NEP) 6.3 "Operating Plant Modifications," NEP 6.4, "Plant Modifications Packages," NEP 6.5, "Plant Modification Studies," and NEP 6.7, "Document Update Process-Modifications" to help prevent recurrence of this type of event. The licensee will revise FSAR section 5.2.7 to correct this inaccurate reference to the steam generator water volume at the next scheduled FSAR revision.

The inspector has reviewed the revisions to SI-137.2 and verified the issued NEPs. The licensee's actions appear to be adequate.

This item is closed.

(Closed) LER 327/88-06, Maintenance Technician Inadvertently Removed Incorrect Radiation Monitor (RM) Module Which Caused a Containment Ventilation Isolation (CVI).

The licensee, while performing WR B240733, removed Unit 1 containment building lower containment ventilation RM (RM-90-106) module instead of the Unit 2 module as required by the WR. This caused an inadvertent CVI, the operations personnel verified no high levels of radiation existed and then recovered from the CVI in accordance with SOI-88.1, "Containment Isolation System." The licensee has counseled the instrument maintenance (IM) technician on the need for attention to detail.

The inspector has reviewed the LER, and the human engineering discrepancy (HED) report that listed various control room deficiencies. The deficiencies are being tracked by CCTS numbers NCO 86-0410-007, 86-0410-008, 86-0410-009, 86-0410-310, 86-0410-311, 86-0410-312, 86-0410-638, 86-0410-639, 86-0410-640, 86-0410-070, 86-0410-202, 86-0410-408, and 86-0410-530. The completion of the work described by the HED report will help to eliminate confusion as to which unit's (1 or 2) equipment is being serviced or reviewed. The licensee's actions appear to be adequate. TVA's long term corrective actions will be tracked through NRC IFI 327,328/88-19-02.

## 8. Inspector Follow-up Items

Inspector follow-up Items (IFI) are matters of concern to the inspector which are documented and tracked in inspection reports to allow further review and evaluation by the inspector. The following IFIs have been reviewed and evaluated by the inspector. The inspector has either resolved the concern identified, determined that the licensee has performed adequately in the area, and/or determined that actions taken by the licensee have resolved the concern.

(Closed) IFI 327/328/85-32-02, Plant Housekeeping and Licensee Implementation of SQA-66, "Plant Housekeeping," and Operations Section Letter (OSLA)-99.

This issue involves general housekeeping practices of the licensee, as pertains to the findings on the engineered safety features walkdown (71710).

This item has been addressed in inspection report 87-73 and the results indicate that the licensee has increased the awareness of requirements to maintain a clean plant. The licensee's actions appear to be adequate.

This item is closed.

(Closed) IFI 327,328/86-37-04, Emergency Diesel Generators May Overload thirty Seconds After a Loss of Off-site Power Concurrent With a Phase B Isolation and a Safety Injection.

The licensee initiated calculations to determine if containment spray pumps could be actuated at three minutes instead of thirty seconds without affecting containment overpressure constraints. The licensee initiated WP 12227, engineering change notice L6715 and technical specification 87-76 to effect the results of the calculations. During performance of PMT-95 it was discovered that incorrect relays (AC coils vs DC coils) had been installed. These were corrected under WP 12227 and CAQR SQP 870152 was written to document the wrong relays.

The inspector has reviewed completed SI-26.1A, -26.1B, -26.2A, and -26.2B, the licensee's calculations, the TS 87-76 changes, the CAQR SQP 870152, the licensee's root cause determination and measures taken to correct the problem. The licensee's actions appear to be adequate.

This item is closed.

(Closed) IFI 327,328/86-57-01, Electrical Coordination Between Feeder and Branch Fuses.

This issue evolves the cascading of fuses in 1E electrical circuits where the branch fuses are not coordinated with the feeder fuses. The purpose of the branch fuse is to protect the feeder circuit while uncoordinated fuses do not offer this protection. This apparent violation of 10 CFR 50, Appendix B, criterion 3 (Design control) was reported by the licensee. The licensee has committed to evaluation of all cascaded fuse circuits, identifying all uncoordinated fuses, and correcting the 1E electrical circuits identified. The licensee has issued and completed Work Plan 12653 and ECNs L7268 and L7269.

The inspector has reviewed WP 12653, ECN L 7269 and operations controlled drawing 45N767-5. A discussion with the licensee, revealed that the following three 1E electrical circuits had uncoordinated fuses: 1) 125 V DC emergency start (vital battery circuit C-42) circuit, 2) EDG Day tank fuel oil transfer pump control circuit and 3) D.G. Corridor space heaters control circuit. The licensee corrected the 125 V DC emergency start (EDG) circuit with ECN L7268 and L7269. The other two circuits were not considered for correction at this time as the evaluation shows that the

day tank fuel oil transfer pump control circuits were themselves redundant and a failure in one branch circuit would only affect one of the two transfer pumps. The EDG corridor space heaters are separate from the EDG room space heaters and their loss would not affect the operation of the EDG. The licensee's actions appear to be acceptable.

This item is closed.

(Closed) IFI 327,328/86-60-06, Evaluation of Preventive and Corrective Measures to Combat the Identified Microbiological Induced Corrosion (MIC) in the ERCW Systems.

On December 15, 1987, TVA and NRC held a meeting for the purpose of discussing TVA's program to address MIC. NRC requested a formal submittal of the Sequoyah MIC program including the technical basis for the structural integrity of the piping. TVA letter dated January 20, 1988, forwards the requested information. Additional TVA commitments regarding the MIC program included in the letter are as follows:

- a. For Modes 5 and 6, revise PMs 2220, 2221, 2222, and 2223 before the next monitoring period begins (March 1988) to state that, when a leak is discovered, a work request will be written to repair the damaged area and that repair work will be a restart requirement. CCTS No NCO 88009001. Due date March 1, 1988.
- b. For Modes 1, 2, 3, and 4, revise TI-09 before the next monitoring period begins (March 1988) to specify that RT will be completed in seven days after leak discovery, compared against preestablished screening criteria; and, if weld exceeds that criteria, a detailed seismic analysis will be performed in an additional seven days and that leaking welds if not repaired will be monitored under PMs 2240 and 2241. CCTS No NCO 88009 002. Due date March 1, 1988.
- c. Select 6-10 welds to monitor growth of existing MIC indications, development of new colonies, and water treatment effectiveness and implement under PMs 2241 and 2242 to begin in March 1988. Track No NCO 88009 003. Due Date March 1, 1988.
- d. Establish a full structural fixture for repairs of damaged welds before Unit 2 restart. CCTS No. NCO 88009 004.

As of April 1, 1988, all commitments were considered completed with the exception of item d. which has to be revised because the sleeving analysis did not require the structural integrity of the pipe.

The inspector observed the licensee's walkdown of the stainless steel piping welds for the ERCW for both Units 1 and 2 during March 14 - 18, 1988. This inspection was performed under preventative maintenance document numbers 2020, 2221, 2222, and 2223. This visual inspection involved approximately 405 welds. This inspection resulted in the

identification of 6 leaking welds on Unit 1 and 8 leaking welds on Unit 2. The following table identifies the weld, pipe size and ERCW train:

<u>Weld No.</u>	<u>Pipe Diameter</u>	<u>ERCW Train</u>
<u>Unit 1</u>		
14313	6"	A
14333	6"	B
14300	6"	B
14365	6"	B
12270	6"	A
12252	6"	A
<u>Unit 2</u>		
14511	3"	B
14515	6"	B
14468A	6"	A
14421	6"	B
14441	6"	A
14434	6"	A
<u>Unit 2</u> (cont'd)		
9789P	3"	A
9750	3"	A

These leaking welds were evaluated for the amount of MIC damage per Sequoyah Technical Instruction No. TI-109. One weld, number 14511 required a detailed seismic analysis since extent of MIC attack exceeded the prescreening criteria.

The results of the visual inspection were discussed in a teleconference between NRC Office of Special Projects personnel G. Zech, R. Hermann, B. Liaw, F. McCoy and J. York. It was concluded that the identified conditions did not affect Sequoyah ERCW system operability.

Based on a review of the licensee's proposed program of inspection, evaluation and repair of potential MIC leakage in the ERCW system and the implementation of the above commitments as scheduled, the program appears adequate. Final determination shall be provided in the NRC safety evaluation. The licensee's continuing long term program to resolve the MIC issue will be reviewed by the NRC during future inspections.

This item is closed.

(Closed) IFI 328/86-62-02, Closure Of Engineering Change Notices (ECN) Prior to Restart.

This item was identified and discussed in inspection report 327,328/86-62 and involves TVA's ECN closeout schedule. Specifically, the inspectors

reviewed the ECN closure process and determined that as of November 1986, the licensee had closed only approximately 100 of the then approximately 1000 field completed ECNs. The licensee was requested in a letter from G. Zech to S. White (dated December 18, 1986) to address their justification for not requiring the complete closure of all open ECNs prior to restart. In their February 3, 1987, response, TVA addressed the fact that although a large number of ECNs were not completely closed out, the physical work authorized by these ECNs was accomplished through the modification process (i.e., work plan). The work plans, if identified as restart issues, have been or will be verified as field complete prior to restart. Additionally, the licensee pointed out that the problems that were identified during the closure of the 100 randomly selected ECNs were mostly minor drawing errors and would not impact system operability. The licensee also stated that in addition to the 100 ECNs reviewed, the closure group reviewed the primary drawings associated with approximately 450 additional safety related ECNs and initiated corrections as required to ensure control room drawings reflected the as installed system.

After reviewing the above submittal, the NRC met with TVA and requested a supplemental response to address the following: (1) how representative the 100 closed ECNs were to the general population of ECNs as they pertain to discipline and complexity; (2) had TVA identified any common problem with drawing update (i.e., type of drawings involved); and (3) TVA's manpower allocations required to support the closure of the ECN backlog at Sequoyah by October 1988 as committed to in TVA's original response. The licensee provided the requested information in their May 22, 1987, supplemental response. The information provided satisfied the above request and was reviewed by the NRC and approval of the licensee's position was the subject of a letter from S. Richardson (NRC) to S. White (TVA) dated March 17, 1988.

In addition to the above, on March 3 and 4, 1988, the NRC was provided with current status of the program. This commitment is being tracked by the licensee on CCTS as NCO-87-0041-001.

This item is closed.

(Closed) IFI 328/86-62-13, Validation of the Sequoyah FSAR Prior to Restart.

During inspection 50-327, 328/86-62 the inspectors became aware of a deficiency associated with the quality of the Sequoyah FSAR. The licensee had identified through the corrective action program that a Significant Adverse Condition existed regarding the current updated FSAR. This condition was documented by CAR SQ-86-04-021 which was written on April 15, 1986. The CAR indicated that there is no assurance that Sequoyah is meeting the requirements of 10 CFR 50.71 which requires the FSAR to accurately reflect the actual plant and be current within 6 months of any modification which affects the FSAR.



The conclusion stated on SQ-CAR-86-021 was that there is no assurance that the SQN FSAR is up to date. The root cause was determined to be inadequate procedures to ensure review of changes and documentation of these reviews. Stated corrective action will consist of the establishment of an interdisciplinary task force to review past material which could have affected the FSAR such as procedures, correspondence, modifications, safety evaluations, analyses, design documents, etc. This work has not been scheduled or fully scoped as yet and has not been linked to unit restart. TVA's schedule and reasoning for not resolving the conditions described in SQ-CAR-86-04-021 was the subject of a separate letter from the NRC to TVA dated December 18, 1986.

During follow-up inspection documented in IR 327,328/87-42 and 327,328/87-73, the NRC conducted reviews of the licensee responses to the above letter (RIMS L44 87 0203 805 and RIMS L44 870522 814) dated February 2, 1987 and May 22, 1987, respectively. The last review of the issue documented in IR 327,328/87-73 resulted in a violation being issued due to the ineffectiveness of the licensee's corrective action described in CAR SQ-86-04-021.

The licensee response to the above violation was reviewed during a recent inspection 327,328/88-02 and found acceptable. The licensee described in their response that revision to applicable procedures require that the FSAR update, required by 10 CFR 50.71, be driven by the field completion of the modification and not the final closeout of the ECN. This new program was only to apply to newly created ECNs and would do nothing to help the FSAR problems that resulted from the old ECN backlog.

During a recent meeting with TVA, the NRC was made aware of the fact that TVA has recently decided to divorce the FSAR update and validation from the ECN closure project for the backlogged ECN. The licensee also reemphasized their commitment that the FSAR Validation would be completed October 1988, in order to support the April 1989 update. This commitment is currently being tracked by the licensee on the CCTS as item NCC-87-0041-003. The March 1988 letter from S. Richardson (NRC) to S. White (TVA) accepted this schedule for the long term corrective action.

Based on the above this item is closed.

9. NRC Bulletins (92701)

Bulletins are documents issued by the NRC which require certain specific actions of the addressee. The inspector has reviewed the actions taken by the licensee as a response to the below listed bulletins. The inspector verified that: corrective actions appeared appropriate; generic applicability had been considered; the licensee had reviewed the event and that appropriate plant personnel were knowledgeable; no unreviewed safety questions were involved; and that violations of regulations or Technical Specification conditions did not appear to occur.

(Open) IEB 85-03; Motor Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings.

The purpose of this bulletin is for the licensee to develop and implement a program to ensure that switch settings for High Pressure Coolant Injection and Emergency Feedwater Systems motor operated valves subject to testing for operationed readiness in accordance with 10 CFR 50.55 a(g) are properly selected, set, tested, and maintained. The inspector has reviewed the status of the licensee actions taken to date and concludes that the following actions need to be completed by the licensee prior to closure of this bulletin.

- Differential pressure testing of two turbin-driven auxiliary feedwater pump turbine steam supply valves. The testing is currently scheduled to be performed during Unit 2 restart.
- Revise plant procedures to specify and administratively control switch settings. These procedures are currently scheduled to be revised by March 31, 1988.
- Respond to NRC letter to TVA dated February 22, 1988, "Request for Additional Information Concerning Sequoyah's Responses to IEB 85-03", which requested additional information regarding TVA's initial response to IEB 85-03. In this letter NRC requested TVA to respond by March 24, 1988.
- Issue a final report to NRC within sixty days after completion of IEB 85-03.

The inspector considers it acceptable that the licensee start-up Unit 2 prior to completion of IEB 85-03. This is based on no significant delay in IEB 85-03 completion.

This item remains open.

(Open) IEB 86-02, Static "0" Ring Differential Pressure Switches

The purpose of this bulletin is for the licensee to determine if Series 102 or 103 differential pressure switches supplied by SOR Incorporated are installed as electrical equipment important-to-safety and then take the appropriate action to ensure that the systems that contain these switches operate reliably. The licensee has identified that the UHI level switches, RHR flow switches, and CCS surge tank level switches are series 103 differential pressure switches supplied by SOR Incorporated.

As IEB 86-02 corrective action, the licensee has installed modified SOR 103 switches in the UHI and RHR systems which are supposed to be more reliable. The licensee will calibrate these switches utilizing a pressure delta-P calibrator from SOR that will allow different pressure switch calibrations at static pressures. The licensee is performing calibrations on UHI level switches and RHR flow switches until the reliability of the

switches is proven. This corrective action is not required for the CCS surge tank level switches because they operate at atmospheric pressure in lieu of elevated pressures addressed in IEB 86-02. In addition, the licensee reports that seven months of data showing no abnormal setpoint drift has been obtained from those switches. The UHI and RHR switch corrective action has not been applied to Unit 1 at this time, as soon as the improved switches are installed in Unit 1 the licensee will commence monthly switch calibration utilizing the SOR high pressure delta-P calibrator.

The inspector has reviewed the results of the monthly calibration checks of the UHI level and RHR flow switches. These results have not proven the reliability of the switches and must continue. There have been neither switch failures nor switches grossly out of calibration discovered during the monthly calibration checks. However, the monthly checks do reveal some setpoint drift, and some switches require adjustment every month. In one case a Technical Specification UHI level setpoint was exceeded by .65 of an inch. The normal calibration period for these switches is 18 months. The results of the monthly checks have not proven the switches reliable thus the monthly checks are continuing. The inspector considers restart of Unit 2 acceptable provided that the UHI level switches and RHR flow switches are calibrated monthly.

IEB 86-02 requires licensee's provide, via a written report, specific information relative to SOR 103 pressure switches. The inspector reviewed the licensee response to IEB 86-02. This response did not provide all the information required by IEB 86-02. This was discussed with the licensee and the licensee committed to provide the additional information.

(Open) IEB 87-02, Fastener Testing to Determine Conformance with Applicable Material Specifications

The purpose of this bulletin was to request licensee's to (1) review their receipt inspection requirements and internal controls for fasteners and (2) independently determine, through testing, whether fasteners in stores at their facilities meet required mechanical and chemical specification requirements.

TVA has completed the above actions and provided a written response on March 16, 1988. TVA concluded that no system operability concerns resulted from their program review and fastener testing. The NRC has reviewed TVA's response and concludes that the results support startup of Sequoyah Unit 2.

This item remains open pending final review of TVA's response by NRC headquarters staff.

#### 10. Operational Readiness

The NRC conducted a review of operational readiness at Sequoyah to support the release of hold point number three in accordance with Office of

Special Projects, Notice No. 2. As part of this hold point review the inspector reviewed the following TVA documents.

Operational Readiness Review, dated April 13 - May 8, 1987  
 Institute of Nuclear Power Operations Report, Dated November 1987  
 Operational Readiness Review, dated January 5, 1988  
 Memo Abercrombie/White, dated February 10, 1988  
 Letter Pate/White, dated February 29, 1988

The February 27, 1988 letter determined that all previously identified INPO items related to startup of Unit 2 had been satisfactorily addressed by the licensee.

Open Nuclear Safety Review Staff Recommendations, dated March 2, 1988  
 Nuclear Manager's Review Group Report R-88-01-SQN, dated March 1988  
 Memo Abercrombie/White, Restart Readiness Final Report Dated March 3, 1988.

As a result of the above reviews only one item remains to be implemented by the licensee. This item resulted from a performance of Technical Instruction (TI)-60, Incore Thermocouple and RTD Cross Calibration. This TI was observed by the NRC and INPO, resulted in a restart recommendation by INPO, and was the subject of an NRC violation. The generic issue of conduct of control room and plant operation was also the subject of an NRC enforcement conference with TVA on March 17, 1988.

The licensee has completed corrective action for the one remaining item by including the placement of experienced operational advisors into the control room to help the Shift Supervisors maintain a better control of plant operations. The audit of the licensee's operational readiness review is complete.

This item is closed

#### 11. Long Term Corrective Actions

Certain issues reviewed during these inspection activities require long term auditing to ensure that committed to or planned actions are completed by the licensee. These long term corrective actions may have been associated with other activities that needed to be reviewed and closed prior to the startup of Unit 2. The following issues will be tracked as Inspector Follow-up Item 327,328/88-19-02:

- a. Long term audit of seismic mounting of class 1E components. This item includes a recent licensee finding that certain bolts were missing in the Unit 2 reactor trip breakers. (Reference 327,328/87-54-02).
- b. Follow-up of CVI Task Force recommendations for long term corrective actions related to LERs 328/86-05, 328/86-011, 328/87-08 Revision. 1, 328/87-09 and 328/87-10.

- c. Long term performance of CAQR program (Reference VIO 327,328/86-53-01 and 327,328/86-73-03).
- d. Unit 1 cables to be addressed by long term cable management program (Reference VIO 327,328/87-52-01, example B).
- e. Reactor Coolant System sight glass modifications (Reference URI 327,328/87-30-03 which was previously closed in IR 87-65).
- f. Post-Restart activities regarding the effects of medium energy line breaks on IE electrical equipment (Reference LER 327/87-044 which was previously closed in IR 87-71).
- g. Long term corrective actions for the following LERs and corresponding CCTS and TROI items:
  - 327/86-47 (NCO-86-0416-001)
  - 327/86-48 (NCO-86-0421-001)
  - 327/87-25 (NCO-87-0183-001 and 003)
  - 327/87-34 (NCO-87-0254-001 and 003, NCO-88-034-002)
  - 327/87-40 (NCO-87-0259-004, 005, and 006)
  - 327/87-47 (NCO-87-0257-001)
  - 327/87-49 (NCO-87-0283-001)
  - 327/87-55 (TROI Item SCRSQNEEB8743)
  - 327/87-71 (NCO-87-0370-001)
  - 327/87-73 (NCO-87-0354-003, TROI Item 1887410)
  - 327/87-75 (NCO-87-0363-001)
  - 327/87-77 (NCO-87-0364-001, 003, 005 and 007)
  - 327/88-01 (NCO-88-0014-003, 004, 005 and 006)
  - 328/88-01 (NCO-88-0028-001)
  - 327/88-02 (NCO-88-0017-001, NCT-88-0017-002)
  - 328/88-02 (TROI Item CAQR SQQ 880109)
  - 328/88-06 (NCO-86-0410-007, 008, 009, 310, 311, 312, 638, 639, 640, 070, 202, 408 and 530)

## 12. Temporary Instructions (TI)

### TI 2515/75 Inspection of the Sequoyah Employee Concern Program

This TI was utilized during inspections 327/328/86-52 and 327,328/87-24 conducted by K. Hooks, K. Jenison and others. The conclusion of these reports was that the Sequoyah Employee Concern Program was effective and met the intent of its charter. An audit was conducted of the Sequoyah Employee Concerns Program (ECP) during this inspection period. In addition, discussions were held with certain ECP managers. The Sequoyah ECP continues to be adequately implemented. The inspection requirements of this module have been fulfilled by this inspection and in conjunction other inspections.

### TI 2515/79 Emergency Operating Procedures

This TI was utilized during inspections 327,328/87-61; 327,328/88-14 and 327,328/88-16 conducted by L. Lawyer, M. Lewis, S. Elrod and others. The conclusions of these reports was that with the exceptions cited, the Sequoyah Emergency Operating Procedures were adequate. The inspection requirements of this module have been fulfilled by the referenced inspections.

#### TI 2500/26 Fastener Testing

This TI was utilized during this inspection to take the initial samples for IEB 87-02, Fastener Testing to Determine Conformance with Material Specifications. This IEB required inspection is in progress. However, the TI has been completed sufficiently to support the startup of either unit. This TI will remain open until completion of the IEB.

#### TI 2515/73 Motor Operated Valves

This TI was utilized during this inspection to review the licensee's compliance with the requirements of IEB 85-03, Motor Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings. The IEB required inspection is in progress. However, the TI has been completed sufficiently to support the startup of either unit. This TI will remain open until completion of the IEB.

### 13. (Closed) Restart Open NSRS Recommendations

The Nuclear Safety Review Staff (NSRS) of the Tennessee Valley Authority (TVA) issued safety reports between October 1979 and February 1986 when it was disbanded. These reports described the results of internal TVA evaluations of the performance of TVA organizations in the TVA nuclear program. These NSRS reports contained recommendations to the TVA line organizations for actions to be taken to address NSRS identified safety problems. Those NSRS recommendations which were not addressed by TVA and closed out by NSRS before it was disbanded were addressed by TVA through its Nuclear Management Review Group (NMRG) or its Employee Concern Task Group (ECTG). These are the open NSRS recommendations of which TVA has concluded that 27 need to be addressed before the restart of Sequoyah Unit 2.

The NRC staff has evaluated TVA's corrective actions to close out the 27 open NSRS recommendations which are restart items for Sequoyah. TVA submitted the corrective actions in its letter dated October 5, 1987. The staff's Safety Evaluation Report (SER) was issued in its letter dated March 2, 1988. The staff concluded that TVA's corrective actions (1) acceptably addressed the 27 restart open NSRS recommendations and (2) were verified except for 7 recommendations. This inspection, conducted on March 18 to 21, 1988, addressed the verification of TVA's corrective actions to address these 7 recommendations.

#### a. Recommendation R-84-19-WBN-01

The NSRS identified that controlled documents are not clearly identified for all plants and the purposes and uses for each document have not been delineated.

Standard Practice SQA-125, Controlled Manuals, defines the controlled manuals program for Sequoyah. Its purpose is to assure that proper actions are taken in handling and updating these controlled documents and it covers all manuals, instructions and procedures at Sequoyah that are "controlled". SQA-125 Revision 10 dated February 16, 1988, was reviewed. It refers to Administrative Instruction AI-23 for control vendor manuals and AI-25 (Part I) for drawings after Unit licensing. These were also reviewed. It states that the originating organization shall define the distribution for its controlled documents and the document control organization shall designate the control status and shall distribute and maintain the controlled documents. A listing of controlled documents was provided in SQA125.

The licensee's Standard Practice SQA-125 acceptably addresses this open NSRS recommendation. This item is closed.

b. Recommendation R-85-2-SQN/WBN-2

The NSRS identified the following specific actions as remaining to be done to close this issue:

- (1) Issuance of the proposed Maintenance Instruction MI-1.11, "Thimble Tube Installation" which will replace SMI-1-94-5.
- (2) Issuance of the proposed revision to SMI-0-94-3 that requires the use of an appropriate thread lubricant and cautions against allowing fitting bodies to turn.
- (3) Further revision of SMI-0-94-3 to include a precaution against working on the high pressure seals when the primary system is pressurized above atmospheric pressure.
- (4) Revision of appropriate instructions to preclude pressurizing the primary system with the thimble tubes disconnected from the overhead path transfer system or preclude any work on the seals with the primary system pressurized above atmospheric pressure and the thimble tubes disconnected from the overhead path transfer system.

Sequoyah Instructions MI-1.11, Thimble Tube Installation, Revision 0, dated July 10, 1986; SMI-0-94-3, Seal Table High Pressure Seal Repair, Revision 2, dated June 27, 1986; MI-1.9.1 (Unit 1) and MI-1.9.2 (Unit 2), Bottom Mounted Instrument Thimble Tube Retraction and Reinsertion, Revision 1, dated March 1, 1988; and MI-1.10, Incore Flux Thimble Cleaning and Lubrication, Revision 4, dated September 11, 1986, were reviewed. Instructions MI-1.9.1 and MI-1.9.2 were formerly MI-1.9 of the same title which was last

revised on June 2, 1987. Instructions MI-1.9 and MI-1.10 were specifically revised to address this NSRS recommendation.

Instruction MI-1.11 has been issued. Instruction SMI-0-94-3 requires the use of an appropriate thread lubricant, cautions against allowing fitting bodies to turn and requires the reactor coolant system (RCS) to be depressurized. Instructions MI-1.9.1 and MI-1.9.2 have the requirements on the use of a thread lubricant, on not overtightening fittings and on the RCS being depressurized. These instructions state that the RCS will not be above one atmosphere head pressure unless a unique procedure reviewed by the PORC and approved by the plant manager is used. Instruction MI-1.10 has the same requirements on a thread lubricant and on RCS pressure.

The indexes for the Maintenance Instructions and the Special Maintenance Instructions were reviewed to determine that no other MI or SMI for the thimble tubes were needed to be revised.

The licensee's instructions discussed above acceptably address this open NSRS recommendations. This item is closed.

c. Recommendation I-85-06-WBN-05

The NSRS recommended that the TVA Division of Quality Assurance identify the required controls applicable to systems identified with limited quality assurance in the TVA Nuclear Quality Assurance Manual (NQAM). TVA stated that the NQAM contains a revised description of the limited QA program and specified the requirements that are imposed on the 13 features and programs to which a limited QA program applied. At Sequoyah, TVA stated that these requirements are implemented in procedure Standard Practice SQA-189.

The requirements of a limited QA program are in Part I, Section 1.3, Limited Quality Assurance Program Requirements. Revision 1 dated December 12, 1986, of Section 1.3 was reviewed. The 8 special programs and the 5 special features which require a limited QA program are listed in the document.

The Quality Notice dated December 1, 1987, from the Director of Nuclear Quality Assurance, was issued to clarify the interim programmatic coverage and implementation timetable for Revision 1 of NQAM Section 1.3 above. The notice applied to Sequoyah.

Sequoyah was directed to implement Revision 1 within 120 days after restart of the first unit. Until then, Sequoyah was to implement Revision 0 of the limited QA program requirements which are to stay in force until Revision 1 is implemented. The Sequoyah Standard Practice SQA 189, Limited QA Program, is the procedure describing the requirements and assigning the responsibilities for implementing the limited QA program at Sequoyah. Standard Practice SQA-189, Revision 1, dated March 1, 1988, was reviewed. It was revised to be



in agreement with NQAM, Part I, Section 1.3, Revision 0 in accordance with the Quality Notice.

Standard Practice SQA-138, Implementation of Corporate Level Procedures, describes the program at Sequoyah to assure full and timely implementation of new or revised Office of Nuclear Power procedures such as in the NQAM. SQA-138 implements the temporary procedures system for the startup of Sequoyah which was approved by the NRC staff in its SER on the Corporate and Sequoyah Nuclear Performance Plans. The implementation of new or revised source documents is tracked through the Sequoyah Procedures Tracking System. TVA has made a restart determination that this may be completed after the restart of Unit 2. TVA documented this determination in a memorandum to L. E. Martin, Site Quality Manager, dated March 21, 1988.

The licensee's documents discussed above acceptably address this open NSRS recommendation. This item is closed.

d. Recommendation R-80-05-SQN-10

The NSRS recommended that the design of the Sequoyah containment and other areas be reviewed to determine if they are adequate to withstand the effects of tornados. The additional analyses by TVA to verify the adequacy of the structures at Sequoyah to withstand tornados were reviewed and approved by NSRS except for vertical missile strikes down the exhaust vent of the containment. TVA stated that a missile plate had been installed beneath the opening of the exhaust vent to provide protection for equipment installed directly under the vent opening.

The following TVA documents were reviewed: CEB Report 82-10 dated May 12, 1980; Engineering Change Notice (ECN) L5674, dated July 8, 1982; Memo CEB 800808007 dated August 8, 1980; Drawings 48N1228R10, 48W1705-1R4, 48W1705-2R3 and 48W1258-2R9; SCG Report RIMS B25 870819 452 dated August 19, 1987; and CEB Report RIMS B41 870223006 dated February 23, 1987. These documents are not listed in their proper sequence from the resolution of the issue of tornado protection with the NRC staff through the design of the modifications needed, the completion of the modifications, and then the revision of drawings.

CEB Report 82-10 is a TVA assessment of the tornado missile protection for the 480-volt transformer rooms and 125-volt battery for Sequoyah Unit 1 and 2. NRC letter dated November 10, 1981, concluded that the 480-volt transformers were not adequately protected from a 1-inch diameter steel rod entering the intake on the exhaust vents. This was expanded to the exhaust vents of the 125-volt battery rooms by NRC in a telcom dated December 15, 1981. TVA decided to provide positive protection for the 1-inch diameter missile for these openings.

CEB Report B41 870223 006 and SCG Report B25 870819 452 are the calculations for the 1-inch steel rod at 210 feet/sec into the intake/exhaust vents for the 480-volt transformer rooms and into the exhaust vents for the 125-volt battery room, respectively. The thickness required for tornado missile protection for the intake vents of the 480 volt transformer rooms is a plate 0.54 inches. The required thickness was to be provided by welding an additional plate (3/8 inch) onto the existing 1/4 inch plate. The grating required for the exhaust vents for the 480-volt transformer rooms and the 125-volt battery rooms was 2-1/2" x 3/8" grating, 1/2" round crossbars on 2" centers, and 1-3/16" center-to-center main bars.

ECN L5674 was the engineering change notice to provide the tornado protection for the ventilation openings in the roof of the Auxiliary Building into the 480-volt transformer rooms and the 125-volt battery rooms. The ECN contained the drawings 48W1705-1 R4, 48W1795-2 R3, 48N1228 R10 and 48W1258-2 R9. All of these drawings show revisions based on ECN L5674.

Drawing 48W1705-1R4 shows the Auxiliary Building roof plan. It shows the 7 exhaust vents and 4 intake vents for each of the two 480-volt transformer rooms and the 4 exhaust vents for each of the two 125-volt battery rooms. Drawing 48N1228, R10 shows the top of each of the 8 air intake frames for the 480-volt transformer rooms is a 3/8" plate welded on top of a 1/4" plate. This is Section A-A and B-B. This was also seen in a tour of the intake frames on top of the auxiliary building. This meets the design requirements for the tornado missile protection for these vents.

Drawing 48W1705-1 R4 shows the grating for the exhaust vents for both the 480-volt transformer rooms and the 125-volt battery rooms. The grating is the same for the exhaust vents for all these rooms. The drawings did not give sufficient detail to determine if the grating installed met the design requirements. The gratings were observed in a tour of the room containing these exhaust vents and were measured for the 125-volt battery rooms. The gratings for the 480-volt transformer rooms are located at the ceiling of these rooms. The only difference from the design requirements for the grating is that the crossbars are actually on a 4" center instead of a 2" center. TVA provided calculations SQEP/CEB B15 88 0321 304 dated March 21, 1988, which showed that the 4" center-to-center spacing for the crossbars is acceptable for the grating to provide the required tornado missile protection.

The TVA documents reviewed in the inspection acceptably address this open NSRS recommendation. This item is closed.

e. Recommendation R-82-08-NPS-10C

Inadvertently, this recommendation was incorrectly listed in the SER dated March 2, 1988 as R-82-08-NPS-01 instead of R-82-08-NPS 10C.

The NSRS determined that water quality analytical procedures were inadequately controlled and documented, and inconsistencies were found between the Nuclear Steam Supply System vendor procedures and ASTM standards. The NSRS report stated that there were no procedural controls established for the central office preparation, qualification and issuance of analytical procedures. TVA stated that procedural controls for qualifying and issuing analytical procedures are required by the NQAM and implemented for Sequoyah through procedure SQE-22.

Sequoyah Standard Practice SQE-22, Sequoyah Nuclear Plant Chemistry Program, Revision 9, dated March 4, 1988 was reviewed. This practice was first approved May 9, 1985. Its purpose is to define the chemistry program at Sequoyah. It requires that adequate plant procedures and practices are implemented to ensure chemistry activities meet regulatory requirements, fuel warranty requirements, and minimize corrosion damage. SQE-22 lists source documents including Westinghouse steam side water specifications and criteria but does not list Westinghouse steam side procedures or ASTM standards. SQE-22 requires experienced analysts and that each analysis is performed using approved instructions. Administrative Instruction AI-4 controls the preparation, review, approval, revision and use of chemistry instructions. AI-4 refers to source documents and references for preparing instructions such as "vendor manuals or other documents" but does not specifically require the use of NQSS vendor procedures and ASTM standards to develop chemistry instructions.

A review of the Sequoyah chemical analytical and radiochemical analytical methods instructions shows that vendor procedures and ASTM standards are being used to develop chemistry technical instructions. An Office of Nuclear Power Directive, ONP-DIR-58 Revision 0-C, Chemistry, states laboratory methods will, to the extent practical, be based on accepted industry standards such as ASTM standards. This follows the Employee Concern Special Program or ECTG Tracking System item CATD No. 30711-NPS-20 which addresses all the recommendations in NSRS Report R-82-08-NPS. TVA in addressing this item has established a chemistry program manager at the corporate level with the responsibility and authority to develop a chemistry program at TVA that it states will exceed industry standards. The CATD No. 30711-NPS-20 is not a restart item for Sequoyah Unit 2.

TVA has acceptably addressed this open NSRS recommendation for the restart of Sequoyah Unit 2. This item is closed.

f. Recommendation R-84-17-NPS-12

The NSRS determined that the receipt inspection between Field Quality Engineering and Power Stores for QA levels I and II material and commercial grade items was inadequate. It recommended that such items be receipt inspected by individuals qualified to ANSI N45.2.6.

TVA stated that receipt inspection of these items are done by individuals qualified to the ANSI standard.

The following TVA documents were reviewed: Sequoyah AI-20, QC Inspection Program, Revision 14, dated July 16, 1987; NQAM Part II Section 5.3A, Training and Certification Program for Quality Control Inspectors, Revision 4, dated November 23, 1987; and Sequoyah AI-11, Receipt Inspection, Nonconforming Items, QA Level/Description Changes and Substitutions, Revision 45, dated March 4, 1988.

Section 5.3A of the NQAM Part II states that the training and certification program satisfies the requirements of USNRC Regulatory Guide 1.58, Revision 1, September 1980 and ANSI/ASME N45.2.6-1978 with exceptions as defined in TVA-TR75-1. The NRC staff approved the TVA QA Topical Report No. TVA-TR75-1A Revision 9 in its letter to TVA dated January 10, 1987. AI-20 states that the Sequoyah material receipt inspection is defined in AI-11 and the QC inspectors performing receipt inspections are certified in accordance with the requirements of NQAM Part II Section 5.3A. AI-11 states that the Site Quality Manager's organization is responsible for receipt inspection of QA level I, II and III items and the QC inspectors responsible for performing receipt inspections shall have training in QA and be certified in accordance with NQAM Part II Section 5.3A.

The licensee's documents discussed above acceptably address this open NSRS recommendation. This item is closed.

g. Recommendation I-86-101-SQN

The NSRS determined that the Conax connectors in the containment did not always meet vendor wire bend radius requirements and that deficient connector installations were accepted by Sequoyah quality control. TVA stated that work requests were initiated in 1986 to correct problems found during its verification activities. These work requests have been completed.

Sequoyah Modifications and Additions Instruction, M&AI-19, Installation of Conax Connectors, Revision 4, dated January 29, 1987, provides the guidelines for initial field installation of electrical conax connectors at Sequoyah. The instruction references the Conax Installation Manual IPS-725 Revision G and lists the minimum bend radius for the conductor size in Table D of Step 5.1. These values were compared to the values in the Conax installation manual and found to be the same.

The corrective action report (CAR) on the fact that not all Conax connectors were installed with wire bend radii within allowable limits of the Conax Manual IPS-725 is SQ-CAR-86-02-005. The verification of the corrective actions was signed by the QA supervisor on August 8, 1986.

A sample of five work packages of the corrective actions was reviewed. The work packages referred to Special Maintenance Instructions SMI-2-363-2, Rework of Bend Radii for Outboard-Side Conax Connection Cables for Unit 2, Revision 0, dated May 8, 1986; and SMI-2-363-1, Inspection of Bend Radii Of Outboard-Side Conax Connector Cables for Unit 2, Revision 0, dated April 8, 1986. Both of these instructions have the same table of minimum bend radius and conductor size as does M&AI-19, Revision 4 and the Conax installation Manual IPS-725, Revision G.

The licensee's response acceptably addresses this open NSRS recommendation. This item is closed.

Based on the discussion above, the 7 open NSRS recommendation items are closed.

For open NSRS Recommendation R-80-05-SQN-10 discussed in section d. above, the licensee did not have calculations available to show that the gratings installed for exhaust vents for the 480-volt transformer rooms and the 125-volt battery rooms could be different from the design requirements of calculation SCG Report Number B25 870819 452 dated August 19, 1987. Such calculations were generated by TVA on March 21, 1988 during this inspection.

10 CFR Part 50, Appendix B, Section III, Design Control, states that design changes, including field changes shall be subject to design control measures commensurate to those applied to the original design and be approved by the organization that performed the original design unless the applicant designates another responsible organization. Contrary to this, the gratings for exhaust venting for 480-volt transformer rooms and the 125-volt battery rooms were installed differently from the design requirements without design control measures commensurate to those applied to the original design. The calculations to justify the installed gratings were generated on March 21, 1988 during this inspection. Workplan number 9934 for the installation of the gratings shows the work was completed by September 2, 1982.

In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Action." 10 CFR Part 2, Discretionary Enforcement, the event described above meets the following criteria:

- The Licensee was forced into an extended shutdown related to poor performance over a long period following their August 1985 shutdown.
- The Licensee has developed and is aggressively implementing their Nuclear Performance Program for problem identification and correction.
- NRC concurrence is needed by the Licensee prior to restart.
- Enforcement action is not necessary to achieve remedial action.

- The violation occurred prior to the August 1985 shutdown.
- The violation was non-willfull and would not have been categorized as higher than Severity Level III under the NRC's enforcement policy.

This item is closed.

## 14. List of Abbreviations

AARP	-	Alternate Analysis Review Program
ABI	-	Auxiliary Building Isolation
AI	-	Administrative Instruction
AFW	-	Auxiliary Feedwater
ANSI	-	American National Standards Institute
AUO	-	Auxiliary Unit Operator
AOI	-	Abnormal Operating Instruction
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing of Materials
BIT	-	Boron Injection Tank
BPLCV	-	Bypass Level Control Valve
C&A	-	Control and Auxiliary Buildings
CAR	-	Corrective Action Report
CAQ	-	Condition Adverse to Quality
CAQR	-	Conditions Adverse to Quality Report
CCP	-	Centrifugal Charging Pump
CCS	-	Component Cooling System
CCTS	-	Corporate Commitment Tracking System
CDWE	-	Condensate Demineralizer Waste Evaporator
COPS	-	Cold Overpressure Protection System
CRDM	-	Control Rod Drive Mechanism
CS	-	Containment Spray
CSSC	-	Critical Structures, Systems, and Components
CST	-	Condensate Storage Tank
CVI	-	Containment Ventilation Isolation
DBVP	-	Design Baseline and Verification Program
DC	-	Direct Current
DCN	-	Design Change Notice
DCR	-	Design Change Request
DNE	-	Division of Nuclear Engineering
ECCS	-	Emergency Core Cooling System
ECN	-	Engineering Change Notice
EDG	-	Emergency Diesel Generator
EEB	-	Electrical Engineering Branch
EGTS	-	Emergency Gas Treatment System
EM	-	Electrical Maintenance
EQ	-	Environmental Qualification
ERCW	-	Essential Raw Cooling Water
ESF	-	Engineered Safety Feature
FCR	-	Field Change Request
FSAR	-	Final Safety Analysis Report
HO	-	Hold Order
HP	-	Health Physics
HQ	-	Headquarters
HVAC	-	Heating, Ventilation, and Air Conditioning
ICF	-	Instruction Change Form
IDI	-	Integrated Design Inspection
IE	-	Inspection and Enforcement

IEB	-	Inspection and Enforcement Bulletin
IMI	-	Instrument Maintenance Instruction
IR	-	Inspection Report
KV	-	Kilovolt
LER	-	Licensee Event Report
LCO	-	Limiting Condition for Operation
LOCA	-	Loss of Coolant Accident
MI	-	Maintenance Instruction
MOVATS	-	Motor Operated Valve Testing
MSIV	-	Main Steam Isolation Valve
NEP	-	Nuclear Engineering Procedures
NPSH	-	NLT Positive Suction Head
NRC	-	Nuclear Regulatory Commission
NQAM	-	Nuclear Quality Assurance Manual
ODCM	-	Offsite Dose Calculation Model
OSP	-	Office of Special Projects
PD	-	Positive Displacement
PM	-	Preventive Maintenance
PMT	-	Post Modification Test
PORV	-	Power Operated Relief Valve
PORC	-	Plant Operations Review Committee
PORS	-	Plant Operation Review Staff
PRO	-	Potentially Reportable Occurrence
QA	-	Quality Assurance
QC	-	Quality Control
RARC	-	Radiological Assessment Review Committee
RCS	-	Reactor Coolant System
RCP	-	Reactor Coolant Pump
RHR	-	Residual Heat Removal
RO	-	Reactor Operator
RTD	-	Resistance Thermal Devices
RTI	-	Restart Test Instruction
RWP	-	Radiation Work Permit
RWST	-	Reactor Water Storage Tank
SCR	-	Significant Condition Report
SER	-	Safety Evaluation Report
SG	-	Steam Generator
SI	-	Surveillance Instruction
SIS	-	Safety Injection System
SMI	-	Special Maintenance Instruction
SOI	-	System Operating Instructions
SRO	-	Senior Reactor Operator
STA	-	Shift Technical Advisor
STI	-	Special Test Instruction
TACF	-	Temporary Alteration Control Room
TAVE	-	Average Reactor Coolant
TDAFP	-	Turbine Driven Auxiliary Feedwater Pump
TER	-	Technical Evaluation Report
TS	-	Technical Specifications
TSC	-	Technical Support Center



TVA	-	Tennessee Valley Authority
UHI	-	Upper Head Injection
USQD	-	Unresolved Safety Question Determination
VCT	-	Volume Control Tank
WCC	-	Work Control Center
WP	-	Work Plan
WR	-	Work Request