NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY

Tennessee Valley Authority
Sequoyah Units 1 & 2

Docket Nos. 50-327 and 50-328
License Nos. DPR-77 and DPR-79
EA 97-409

During an NRC inspection conducted from July 25 through September 4, 1997, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the NRC proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalty are set forth below:

A. Technical Specification 3.8.2.3. requires four direct current (DC) vital battery channels to be energized and operable with each channel consisting of a 125 volt DC board, a 125 volt DC battery bank, and a full capacity charger.

Contrary to the above, on July 24, 1997, at approximately 6:13 a.m., 125 volt DC battery bank No. IV was disconnected from 125 volt DC board No. IV causing the No. IV DC vital battery channel to be inoperable. The channel remained inoperable until 11:32 a.m. on July 25, a period of approximately 30 hours. (01013)

B. Technical Specification 6.8.1.a requires, in part, that procedures shall be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, "Quality Assurance Program Requirements (Operation)." Appendix A of Regulatory Guide 1.33, Section 3, includes procedures for onsite emergency power sources (DC System).

System Operating Instruction (SOI) 0-SO-250-1, "125 Volt DC Vital Power System," Revision 9, Section 8.4, provides instructions for placing vital battery V in service for battery boards I, II, III, or IV. Step 8.4.8 of SOI 0-SO-250-1 required the operator to "Place Distribution Panel...B-S breaker (107) in "ON" position to align feed to desired Vital Battery Board."

Contrary to the above, on July 24, 1997, an SRO failed to implement step 8.4.8 of SOI 0-SO-250-1, in that, while aligning vital battery V to feed vital battery board No. IV, he did not place distribution panel B-S breaker (107) in the "ON" position to align feed to vital battery board No. IV. (01023)

Enclosure 1

C. 10 CFR 50, Appendix B, Criterion V requires, in part, 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.

Site Standard Practice SSP-12.6, Equipment Status Verification and Checking Program, Revision, Section 3.3, Verification Instructions, Step 3.3.1, Independent Verification Requirements, states, "Independent verification is required for the following situations on breakers, valves, and components in those systems listed in Appendix A...." One situation listed stated, "Any activity that, if done improperly, could remain undetected until that structure, system or component was called on to mitigate an accident or transient as described in the FSAR,..." Appendix A, List of Systems and Components Requiring Independent Verification, includes the "125V Vital DC Distribution System Components that supply control power essential for the Shutdown Boards to function properly."

Contrary to the above, on July 24, 1997, the licensee failed to include requirements for independent verification, as specified by SSP-12.6, in Systems Operating Procedure 0-SO-250-1, 125 Volt DC Vital Power System, Revision 9, Section 8.4, Placing Vital Battery No. V in Service for Battery Board I, II, III, or IV. Placing vital battery No. V in service, if done improperly, could remain undetected until that structure, system or component was called on to mitigate an accident or transient as described in the FSAR. Vital battery board No. V, while in service for battery boards I, II, III, or IV, would supply control power essential for the shutdown boards to function properly. (01033)

These violations represent a Severity Level III problem (Supplement I).

Pursuant to the provisions of 10 CFR 2.201, Tennessee Valley Authority (Licensee) is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each alleged violation: (1) admission or denial of the alleged violation, (2) the reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, the Licensee may pay the civil penalty by letter addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a check, draft, money order, or electronic transfer payable to the Treasurer of the United States in the amount of the civil penalty proposed above, or may protest imposition of the civil penalty in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the Licensee fail to answer within the time specified, an order imposing the civil penalty will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violations listed in this Notice, in whole or in part, (2) demonstrate extenuating circumstances, (3) show error in this Notice, or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty in whole or in part, such answer may request remission or mitigation of the penalty.

Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the Licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty due which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The response noted above (Reply to Notice of Violation, letter with payment of civil penalty, and Answer to a Notice of Violation) should be addressed to: Mr. James Lieberman, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region II and a copy to the NRC Resident Inspector at the Sequoyah Nuclear Plant.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the

information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated at Atlanta, Georgia
this 8th day of December 1997

PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA

SEQUOYAH

NOVEMBER 19, 1997, AT 10:30 A.M.

NRC REGION II OFFICE, ATLANTA, GEORGIA

I. OPENING REMARKS AND INTRODUCTIONS
L. Reyes, Regional Administrator

II. NRC ENFORCEMENT POLICY
A. Boland, Director
Enforcement and Investigation Coordination Staff

III. SUMMARY OF THE ISSUES
L. Reyes, Regional Administrator

IV. STATEMENT OF CONCERNS / APPARENT VIOLATION
J. Johnson, Director, Division of Reactor Projects

V. LICENSEE PRESENTATION

VI. BREAK / NRC CAUCUS

VII. NRC FOLLOWUP QUESTIONS

VIII. CLOSING REMARKS
L. Reyes, Regional Administrator

STATEMENT OF APPARENT VIOLATIONS
(J. Johnson)

A. Technical Specification 3.8.2.3. requires four DC vital battery channels be energized and operable, with each channel consisting of a 125 volt (V) DC board, a 125 V DC battery bank, and a full capacity charger. Technical Specification Action Statement 3.8.2.3.b states, "With one 125-volt D.C. battery bank and/or its charger inoperable, restore the inoperable battery bank and/or charger to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."

On July 24, 1997, at approximately 6:13 a.m., the #4 vital battery bank was made inoperable and remained inoperable until 11:32 a.m. on July 25, an approximate 30-hour time frame. The #4 vital battery bank was not restored to OPERABLE status within 2 hours and Units 1 and 2 were not in HOT STANDBY within 6 hours.

NOTE: THE APPARENT VIOLATIONS DISCUSSED IN THIS PREDECISIONAL ENFORCEMENT CONFERENCE ARE SUBJECT TO FURTHER REVIEW AND ARE SUBJECT TO CHANGE PRIOR TO ANY RESULTING ENFORCEMENT DECISION.

B. Technical Specification 6.8.1.a requires, in part, that procedures shall be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, "Quality Assurance Program Requirements (Operation)." Appendix A of Regulatory Guide 1.33, Section 1, Administrative Procedures, includes procedures for "Procedure Adherence and Temporary Change Method and Section 3, includes procedures for onsite emergency power sources (DC System)."

Site Standard Practice (SSP)-2.51, Rules of Procedure Use, Revision 6, Section 3.3, Performance Sections, Part G, states, "STOP the procedure if any of the following occur: 1. A procedure or work document step cannot be completed as written. 2. In the performer's judgement it would be unsafe to perform a step. 3. An unexpected response is obtained." Part H states, "NOTIFY the SOS/ASOS or Cognizant Supervisor. 1. The SOS/ASOS or Cognizant Supervisor will evaluate the situation and document the review and approval to continue the procedure or work document, if applicable, in a note."

System Operating Instruction 0-SO-250-1, 125 Volt DC Vital Power System, step (8.4.8), required the operator to "Place Distribution Panel...B-S breaker (107) in ON position to align feed to desired Vital Battery Board."

On July 24, 1997,

A senior reactor operator (SRO) performing System Operating Instruction 0-SO-250-1, 125 Volt DC Vital Power System, could not complete Procedure Step 8.4.8 (Place Distribution Panel A-S or B-S breaker in ON position...) as written because the breaker he observed was already in the ON position, and the SRO did not stop performance of the procedure and did not notify the SOS/ASOS or cognizant supervisor.

A senior reactor operator failed to follow System Operating Instruction 0-SO-250-1, and did not align feed to the desired Vital Battery Board (IV) in that he did not place distribution panel B-S breaker (107) in the ON position, but instead erroneously verified Vital Board IV/Panel 1/breaker 107 in the ON position.

NOTE: THE APPARENT VIOLATIONS DISCUSSED IN THIS PREDECISIONAL ENFORCEMENT CONFERENCE ARE SUBJECT TO FURTHER REVIEW AND ARE SUBJECT TO CHANGE PRIOR TO ANY RESULTING ENFORCEMENT DECISION.

C. 10 CFR 50, Appendix B, Criterion V requires, in part, 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 drawing.

Site Standard Practice SSP-12.6, Equipment Status Verification and Checking Program, Revision , Section 3.3, Verification Instructions, Step 3.3.1, Independent Verification Requirements, states, "Independent verification is required for the following situations on breakers, valves, and components in those systems listed in Appendix A...." One situation listed stated, "Any activity that, if done improperly, could remain undetected until that structure, system or component was called on to mitigate an accident or transient as described in the FSAR,..." Appendix A, List of Systems and Components Requiring Independent Verification, includes the "125V Vital DC Distribution System Components that supply control power essential for the ShutDown Boards to function properly."

General Operating Procedure 0-GO-14, Attachment 5, Revision 4, Main Control Room Auxiliary Unit Operator (AUO), requires the AUO to monitor plant equipment and to take specific readings. Special instructions are included as part of 0-GO-14 and are attached to the AUO rounds sheets to provide specific guidance. The Main Control Room AUO Special Instructions, Sequence 5, 10, 16, and 22, require that "If temperature cannot be maintained within the nominal range (70-80 degrees F), THEN NOTIFY unit supervisor and INITIATE corrective action as appropriate."

Main Control Room AUO Special Instructions of 0-GO-14, Sequence 41.3, documents an acceptable operating range for the battery, "Check battery volts between 132 and 149 volts." System Operating Instruction 0-SO-250-1, 125 Volt DC Vital Power System, Section 3.0, Precautions and Limitations, Step 1, requires that "The design operating limits for the 125v dc Vital Power System are greater than 129V dc and less than 140V dc."

NOTE: THE APPARENT VIOLATIONS DISCUSSED IN THIS PREDECISIONAL ENFORCEMENT CONFERENCE ARE SUBJECT TO FURTHER REVIEW AND ARE SUBJECT TO CHANGE PRIOR TO ANY RESULTING ENFORCEMENT DECISION.

On July 24, 1997,

1. Systems Operating Procedure 0-SO-250-1, 125 Volt DC Vital Power System, Revision 9, Section 8.4, Placing Vital Battery V in Service for Battery Board I, II, III, or IV, did not include requirements for independent verification. Placing Vital Battery V in service, if done improperly, could remain undetected until that structure, system or component was called on to mitigate an accident or transient as described in the FSAR. Vital Battery Board V, while in service for Battery Boards I, II, III, or IV, would supply control power essential for the Shutdown Boards to function properly.

2. Three of the four battery room temperatures, logged for Sequence 5, 16 and 22, were not being maintained within the nominal range of 70-80 degrees F, and the unit supervisor was not notified and corrective actions were not initiated as required by procedure 0-GO-14. Battery room temperatures were logged at 86 degrees F, 82 degrees F and 84 degrees F.

3. The Main Control Room AUO Special Instructions of 0-GO-14, Sequence 41.3, was inadequate in that it provided an acceptable operating range to the operator that was outside the design operating limits for the Vital Power System.

NOTE: THE APPARENT VIOLATIONS DISCUSSED IN THIS PREDECISIONAL ENFORCEMENT CONFERENCE ARE SUBJECT TO FURTHER REVIEW AND ARE SUBJECT TO CHANGE PRIOR TO ANY RESULTING ENFORCEMENT DECISION.

D. 10 CFR 50, Appendix B, Criterion XVI, requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected.

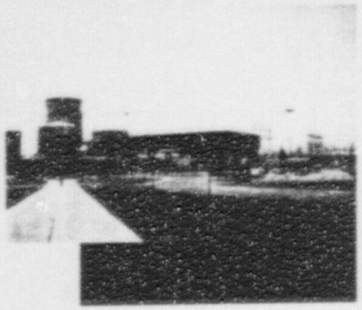
A condition adverse to quality was not promptly identified and corrected in that an assistant unit operator failed to identify an out-of-tolerance reading for the #5 vital battery. Recognition of the out-of-tolerance reading would have identified the #5 vital battery misalignment approximately 12 hours before it was ultimately discovered.

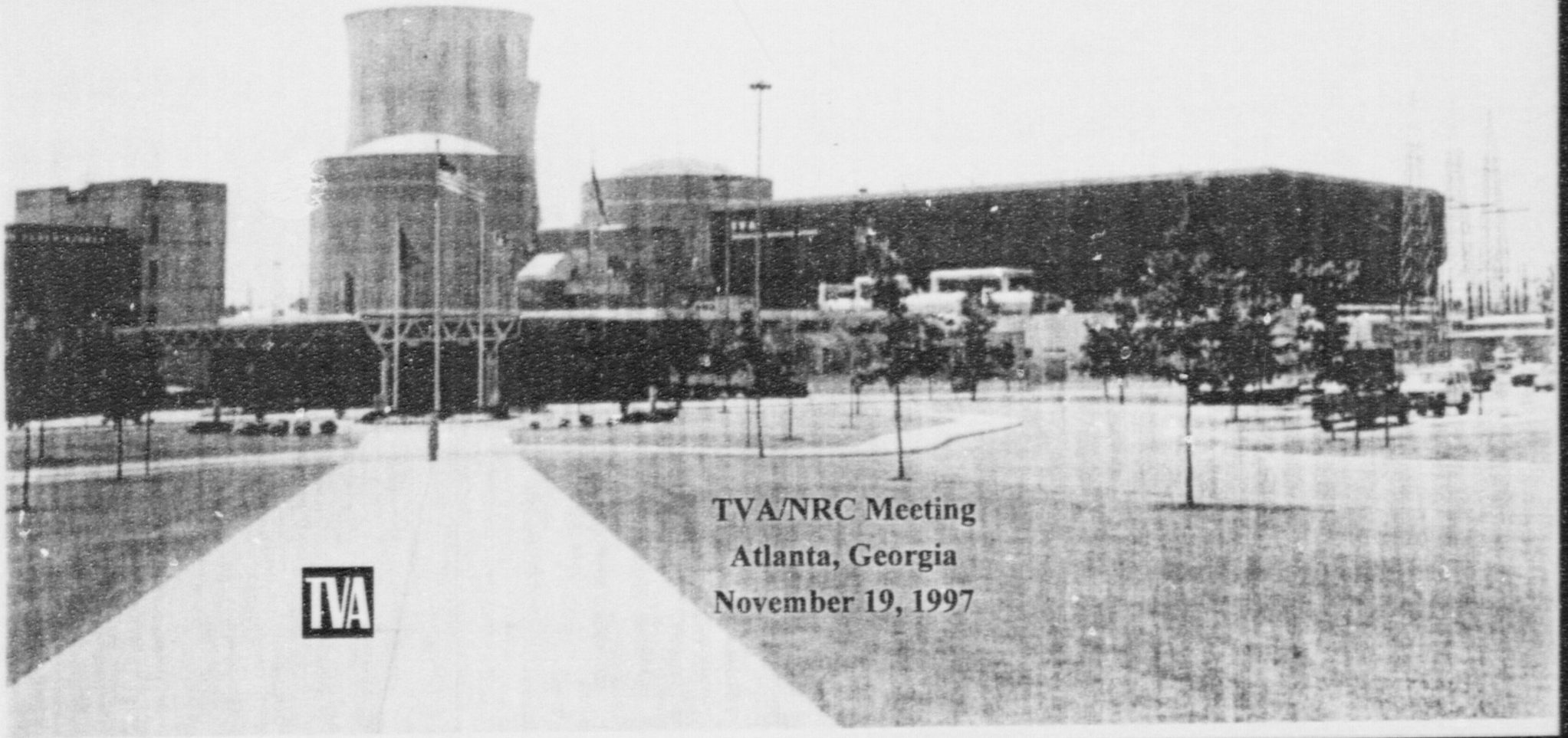
NOTE: THE APPARENT VIOLATIONS DISCUSSED IN THIS PREDECISIONAL ENFORCEMENT CONFERENCE ARE SUBJECT TO FURTHER REVIEW AND ARE SUBJECT TO CHANGE PRIOR TO ANY RESULTING ENFORCEMENT DECISION.

Sequoyah Nuclear Plant

Predecisional Enforcement Conference

Vital Battery Board Alignment





TVA/NRC Meeting
Atlanta, Georgia
November 19, 1997

TVA

Predecisional Enforcement Conference
Vital Battery Board Alignment
Agenda

Opening Remarks	M. Bajestani
Vital Power Overview	M. J. Lorek
Chronology	H. H. Butterworth
Root Cause/Other Contributors	H. H. Butterworth
Operator Performance	H. H. Butterworth
Corrective Actions	H. H. Butterworth
Safety Significance	M. J. Lorek
Closing Remarks	M. Bajestani

Opening Remarks

- Examination of Event
- Measures Taken to Strengthen Operator Performance
- Measures Taken to Increase Management Oversight of Plant Activities
- Safety Significance

Vital Power Overview

- System Description
  - Safety-related Vital Battery system with four redundant vital instrument and control power channels
  - The design basis of the Vital Battery system provides for a single failure such that three of the four channels can safely mitigate design basis events
  - Four channels are required by technical specifications (TS) to be operable for operation of either unit
  - Each of the four channels consists of a battery, battery board, charger, and inverter
  - A fifth Vital Battery is designed to replace any one of the four normal Vital Batteries
  - The fifth Vital Battery is manually aligned through transfer breakers

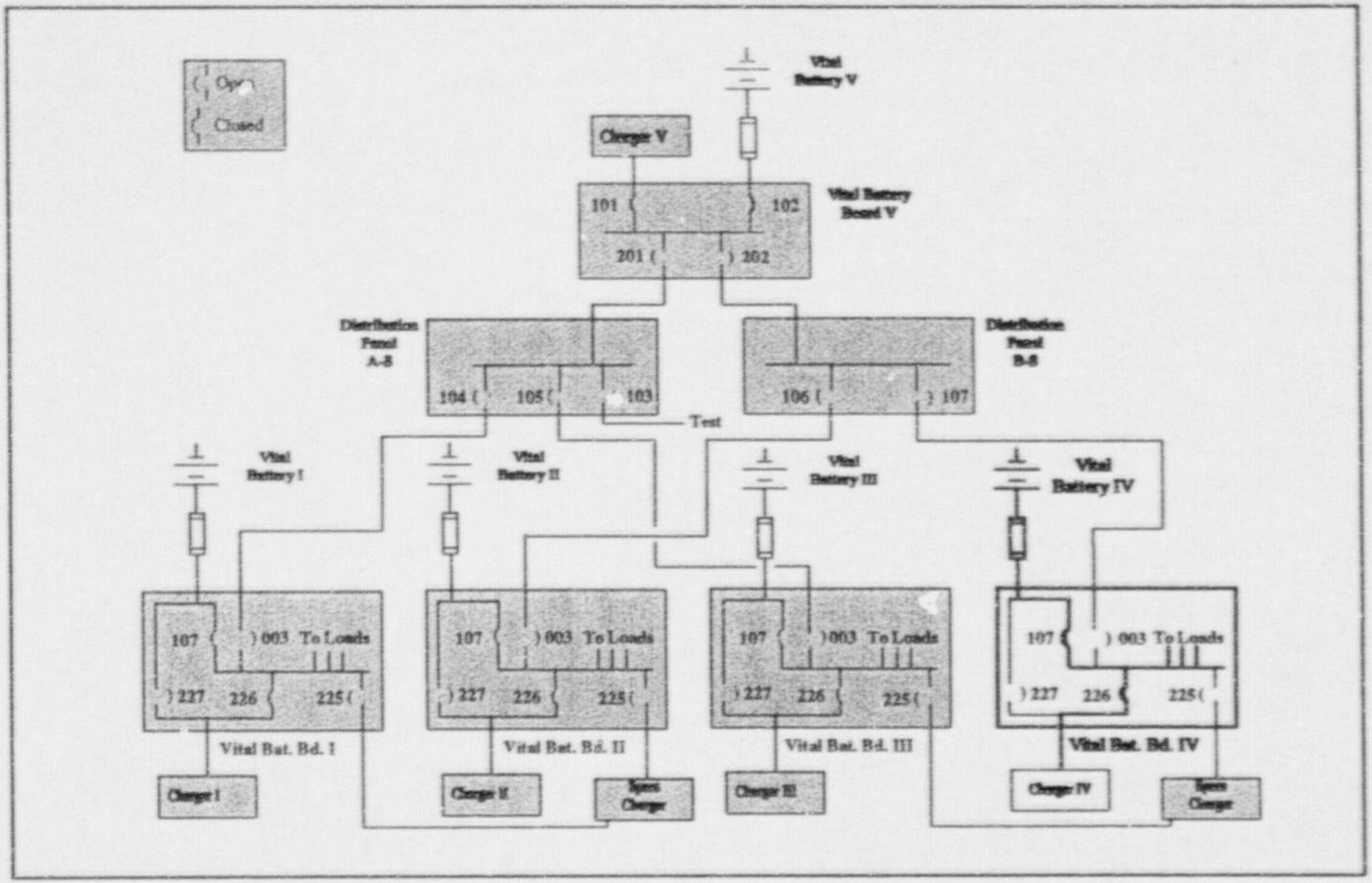
Vital Power Overview
(Continued)

- Reason for Realignment
  - Testing Channel IV Vital Battery
  - Testing being performed to satisfy TS Surveillance Requirement 4.8.2.3.2. (Demonstrate Operability of each battery bank)
  - Inspection and testing required once every 18 months for each battery channel including Vital Battery V
  - The activity was to spare out Vital Battery IV and place Vital Battery V in service for performance of the battery discharge test on Vital Battery IV

Chronology

July 24, 1997 Plant Configuration

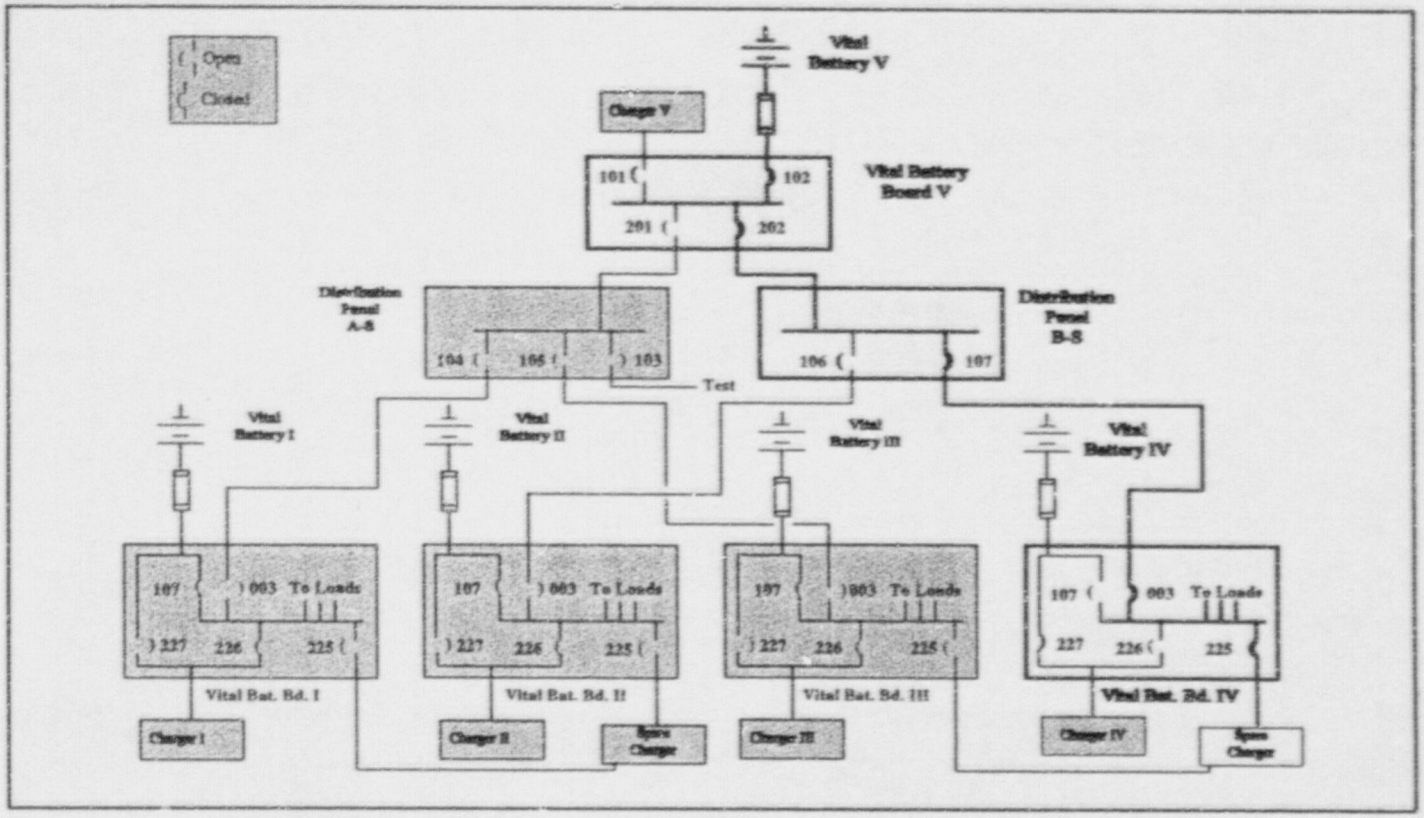
- Breaker positions before the start of the evolution



Chronology
(Continued)

July 24, 1997 Expected Plant Configuration After Procedure Implementation

- Breaker positions expected after evolution



Butterworth

Chronology
(Continued)

July 24, 1997 at Approximately 0545 EDT

- Prejob Briefing For Procedure 0-SO-250-1 Performance (Section 8.4 - Placing Vital Battery V in Service for Battery Board IV)
  - Floor SRO and Unit Supervisor (Unit 2) provided briefing
  - The briefing was thorough
    - Procedure review
    - Review of drawings
    - Review of clearance
  - Qualification of performers
    - Floor SRO and AUO were both trained on Electrical systems
    - Floor SRO has previous experience performing this type evolution

Chronology
(Continued)

July 24, 1997 at 0556 EDT

- Unit Supervisor Approves Work Start
  - Previously decided to enter TS LCO 3.8.2.1 when Battery Board IV is disconnected from DC battery

ONSITE POWER DISTRIBUTION SYSTEM / AC DISTRIBUTION - OPERATING

"The following AC electrical boards and inverters shall be OPERABLE"

"- 120 volt AC Vital Instrument Power Board Channels 1-IV and 2-IV energized from inverter 1-IV and 2-IV connected to DC Channel IV."

Chronology
(Continued)

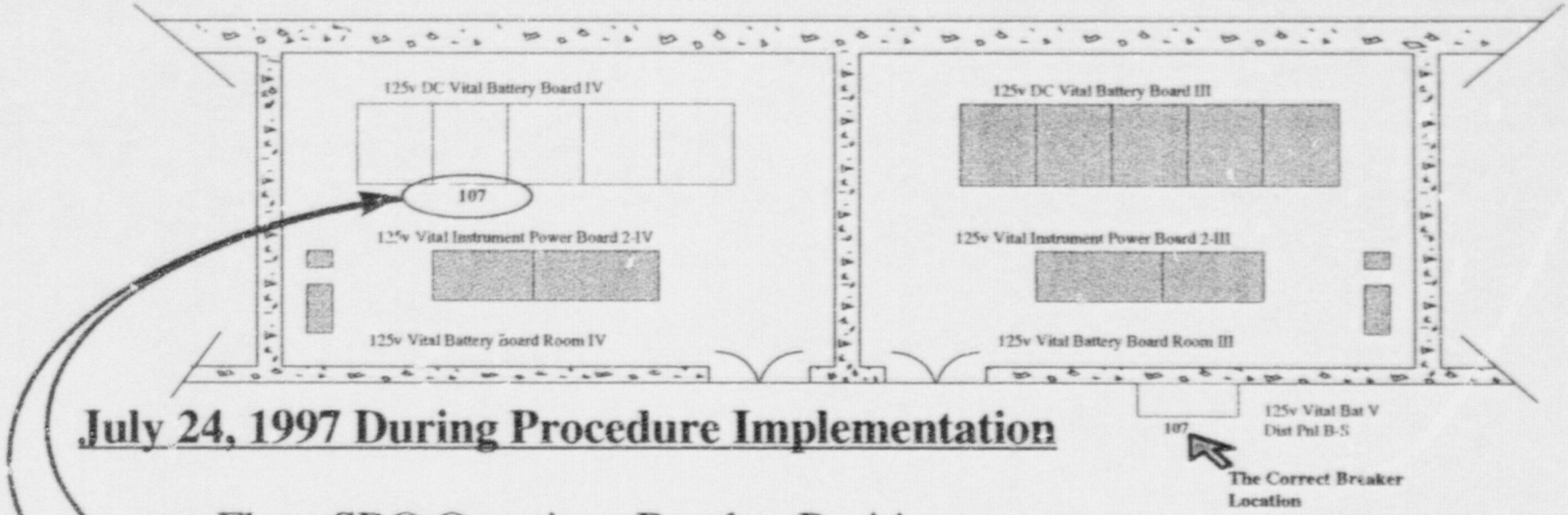
Procedure Step #8

[8] **PLACE** Distribution Panel A-S or B-S breaker in **ON** position to align feed to desired Vital Battery Board. (N/A others) (Located on wall outside Vital Battery Board Rooms, AB el 734')

Desired Battery Bd Feeder From Distr Panel	Initials
125V dc Vital Battery Board I, Feeder - **Bkr 104**	
125V dc Vital Battery Board II, Feeder - **Bkr 106**	
125V dc Vital Battery Board III, Feeder - **Bkr 105**	
125V dc Vital Battery Board IV, Feeder - **Bkr 107**	

Chronology
(Continued)

Plant Layout of Breaker Boards



July 24, 1997 During Procedure Implementation

- Floor SRO Questions Breaker Position
  - Both operators go inside Vital Battery Board Room IV thinking that the breaker to be manipulated is in the room
  - Standing inside Vital Battery Board Room IV, the Floor SRO realized the 107 breaker on Vital Battery Board IV panel was already in the closed position

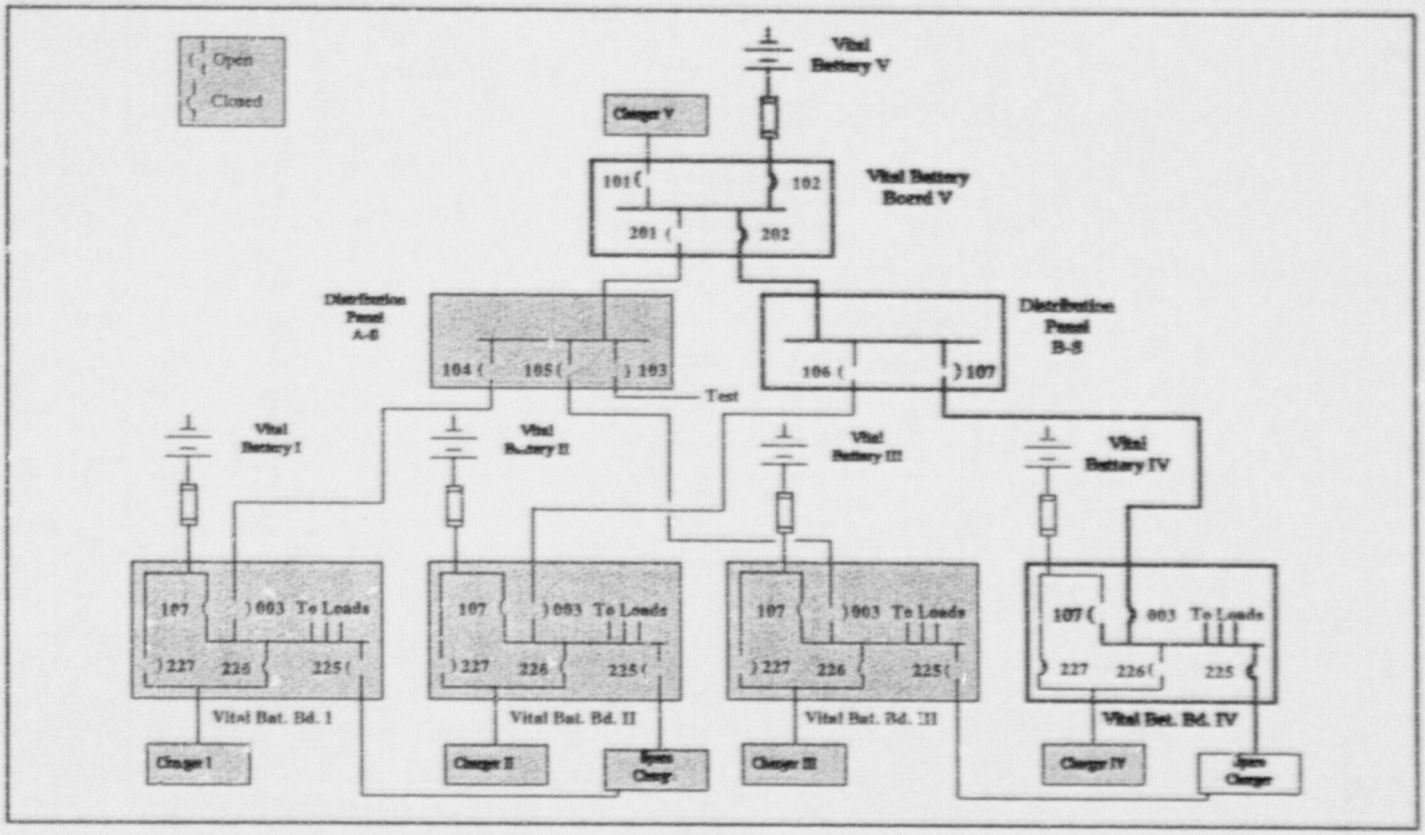
Chronology
(Continued)

- Floor SRO Questions Breaker Position (continued)
  - The operators **stopped** and **questioned** the condition
  - The Floor SRO, being unsure about the breaker already being in the closed position, went inside Vital Battery Board Room III to verify the position by using the location and position of a similar breaker also numbered 107 on Vital Battery Board Room III
  - The Floor SRO incorrectly concluded, by the breaker being closed on another Vital Battery Board, that the as-found position of the 107 breaker on the Vital Board IV was correct and proceeded sparing out Vital Battery IV

Chronology
(Continued)

July 24, 1997 at 0613 EDT

- LCO entered and exited for Sparing Out Vital Battery IV
- As-Left Condition



Chronology
(Continued)

July 25, 1997 at 0102 EDT

- AUO Rounds
  - Operator performs round and finds Vital Battery V voltage within acceptance criteria (132 to 149 Vdc)

July 25, 1997 at 1100 EDT

- Operator Training Instructor Identifies Condition
  - Operator instructor questions breaker alignment during inplant training
  - Main Control Room operators notified that Vital Battery Board IV was incorrectly aligned for emergency power

Chronology
(Continued)

July 25, 1997 at 1108 EDT

- Recovery Activities
  - Shift crew verifies drawings and procedures to actual configuration
  - Enter TS LCO action 3.8.2.3.a. and b. at 1108
    DC DISTRIBUTION - OPERATING (2-hour action)
  - Shift crew coordinates with Engineering for evaluation of the condition of Battery IV
  - Operations personnel connect Vital Battery V to Vital Battery Board IV

July 25, 1997 at 1226 EDT

- Operations Personnel Declare Vital Battery Board IV Operable
  - Exit TS LCO 3.8.2.3, actions a. and b. following completion of breaker alignment verifications

Chronology
(Continued)

- Summary of Significant Events

July 24, 1997, Thursday

- 0545* EDT - Prejob briefing - Procedure and drawing review
- 0556 EDT - Unit Supervisor approves work start
- 0605* EDT - SRO questions breaker position
- 0610* EDT - SRO stops activity and reviews Vital Battery Board Room III breaker position
- 0613 EDT - Evolution to spare out Vital Battery IV completed

July 25, Friday

- 0102 EDT - AUO performs rounds and finds Vital Battery V voltage within acceptance criteria
- 1100 EDT - Operator training instructor identifies incorrect alignment
- 1108 EDT - Recovery activities begin
- 1226 EDT - Vital Battery Board IV declared operable

*Approximate times based on duration of task and interviews

Root Cause

- Procedure Noncompliance
  - Operators failed to properly execute 0-SO-250-1 (Section 8.4 - Placing Vital Battery V in Service for Battery Board IV), Step No. 8
  - Failure to properly execute procedure is a result of inadequate disposition of operator uncertainty (shallow questioning attitude)
    - SRO Operator expects to find breaker in the open position, but finds it closed
    - SRO Operator **stops**, **questions** the condition, and **investigates** by checking breaker position in an adjacent room
    - SRO Operator incorrectly concludes the unexpected breaker position as acceptable through examination of other board rooms
    - SRO Operator does not recognize need for additional investigation

Other Contributors

- Inadequate Procedure
  - Procedure did not have verification requirements as contained in site procedure SSP-12.6, "Equipment Status Verification and Checking Program"
  - Entry into the appropriate Technical Specification was not identified
- Use of Common Identifier for Similar Breakers on Each Vital Battery Channel
  - Limited unique identification for breakers on the 125 Vdc Vital Battery Boards
- Procedure Did Not Fully Use System Capability
  - When Vital Battery V is placed in service for Vital Battery IV, Main Control Room alarm illuminates

Operator Performance

- AUO Round Performance
  - Round points including DC Boards typically take 16 to 18 minutes
  - Round data collected in less than 7 minutes
- Main Control Room Evaluation of LCO Applicability
  - Initial LCO entry into 3.8.2.1 (8-hour action)
  - Later LCO entry into 3.8.2.3 (2-hour action)
  - Both applicable
- Condition Discovered by Alert Empioyee
  - Condition identified by training instructor during electrical system walkdown training
  - Observed breaker in wrong position
  - Exhibited proper questioning attitude and attention to detail

Corrective Actions

- Immediate Corrective Actions
  - Upon identification of the condition, training instructor immediately notified the Main Control Room operators
  - Operations personnel connected Vital Battery V to Vital Battery Board IV
  - PER initiated, Event Team formed, condition discussed with Site Management, and immediate corrective actions developed/reviewed
  - Operations personnel issued a Caution Order warning of multiple breakers with 107 label
  - Standing Order issued on expectations for use of verification methods

Corrective Actions
(Continued)

- Immediate Corrective Actions (Continued)
  - Lessons Learned issued describing the event, root cause, and corrective actions
  - SRO involved discussed lessons learned with each operating crew
  - Personnel accountability enforced by the following actions
    - Discussion of crew performance and expectations between Senior Management and shift crew
    - Individual positive disciplinary actions
  - System Operating Procedure revised to add cautions concerning manipulation of breakers with the same numbers, independent verification requirements, and alarm function verification

Corrective Actions
(Continued)

- Immediate Corrective Actions (Continued)
  - Independent verification requirement changes

Old Procedure Step #8 (Revision 9)

[8] PLACE Distribution Panel A-S or B-S breaker in ON position to align feed to desired Vital Battery Board. (N/A others) (Located on wall outside Vital Battery Board Rooms, AB el 734')

Desired Battery Bd Feeder From Distr Panel	Initials
125V dc Vital Battery Board I, Feeder - [illegible]	_____
125V dc Vital Battery Board II, Feeder - [illegible]	_____
125V dc Vital Battery Board III, Feeder - [illegible]	_____
125V dc Vital Battery Board IV, Feeder - [illegible]	_____

New Procedure Step #8 (Revision 10)

[8] PLACE Distribution Panel A-S or B-S breaker in ON position to align feed to desired Vital Battery Board. (N/A others) (Located on wall outside Vital Battery Board Rooms, AB el 734')

Desired Battery Bd Feeder From Distr Panel	1st	IV
125V dc Vital Battery Board I, Feeder - [illegible]	_____	_____
125V dc Vital Battery Board II, Feeder - [illegible]	_____	_____
125V dc Vital Battery Board III, Feeder - [illegible]	_____	_____
125V dc Vital Battery Board IV, Feeder - [illegible]	_____	_____

  - System monitoring feature changes (alarm functions)

[9] **IF** placing Vital Battery V in service to Vital Battery Bd. I or III, **THEN**

VERIFY window B-1 on 1-XA-55-1C and 2-XA-55-1C annunciates. _____

[10] **IF** placing Vital Battery V in service to Vital Battery Bd. I or III, **THEN**

VERIFY window C-1 on 1-XA-55-1C and 2-XA-55-1C annunciates. _____

  - Identification of Tech Specs to Enter

CAUTION

Tech Spec LCO 3.8.2.1 & 3.8.2.3 will be applicable during performance due to the vital battery board being temporarily disconnected from a vital battery.

Corrective Actions
(Continued)

- Additional Corrective Actions
  - TVA will improve breaker identification by providing unique identification for the breakers on the 125 Vdc Vital Battery Boards, 250 Vdc Battery Boards, and 120 Vac Vital Instrument Boards
  - Requal training will be enhanced by development and implementation of "Job Performance Measures" for sparing out the 125 Vdc Vital Batteries with Vital Battery V
  - TVA will review applicable plant procedures to ensure verification requirements are correct and standardized
    - Operation and Chemistry procedure reviews are completed and revisions are in progress
    - Maintenance procedures were previously evaluated, second sampling to be performed to verify previous review quality

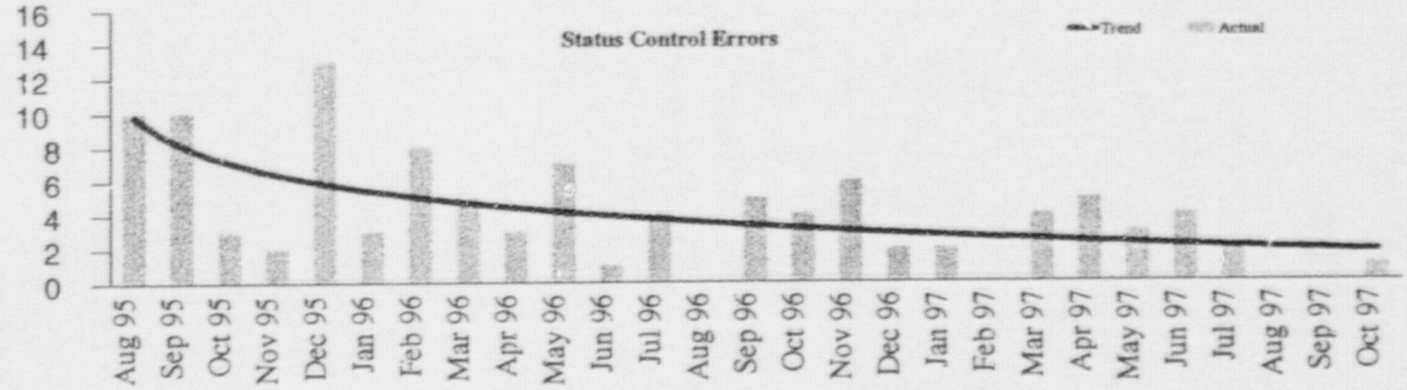
Corrective Actions
(Continued)

- Additional Corrective Actions (Continued)
  - Specific expectations have been developed and communicated to all Operations personnel. These expectations continue to be reinforced
  - Management reinforcement of problem/issue escalation and resolution prior to continuing with a task continues to be communicated
  - An Operations team is assessing the impacts of impinging work activities and schedule pressure on conduct of AUO rounds and is identifying opportunities to reduce those impacts

Corrective Actions
(Continued)

- Additional Corrective Actions (Continued)
  - Operations crew interaction and performance has been improved by:*
    - Evaluating individual performance attributes
    - Strengthening and balancing crew composition
    - Returned onshift personnel to a common crew rotation schedule
    - Developed and using crew-specific performance indicators to monitor performance

* This corrective action was developed before the Vital Battery event and implemented subsequent to that event. Action emphasis was on overall improvement of human performance.



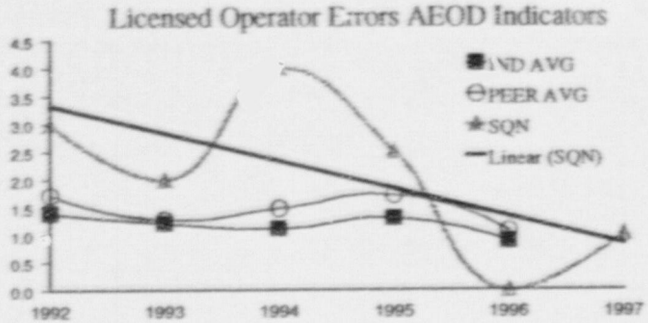
Corrective Actions
(Continued)

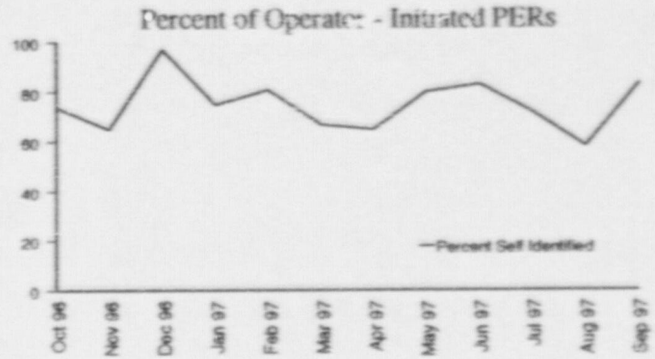
- Additional Corrective Actions (Continued)
  - Management involvement in field activities*
    - Observations of AUO, UO, and Control Room performance
    - Observations of daily work activities
  - Improve Human Performance*
    - Human Performance Subcommittee
    - Developing questioning attitude scenario training

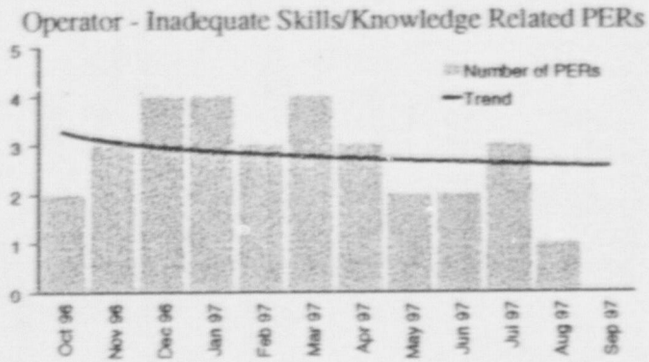
* This corrective action was developed before the Vital Battery event and implemented subsequent to that event. Action emphasis was on overall improvement of human performance.

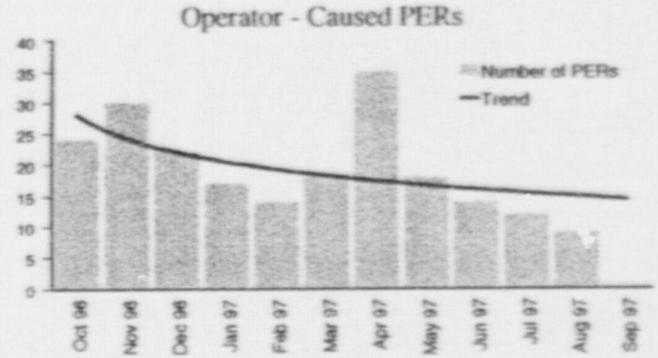
Corrective Actions
(Continued)

- Additional Corrective Actions (Continued)
  - Corrective Actions Are Effective









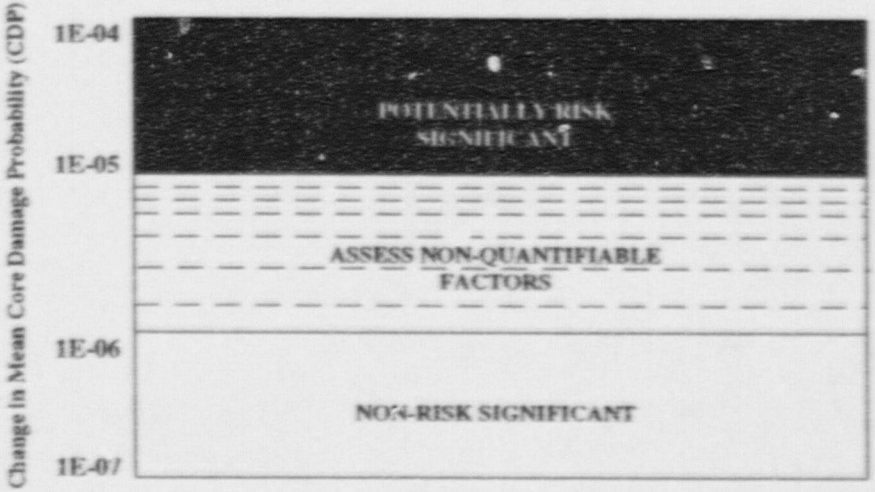
Butterworth

Safety Significance

- Safety Significance Evaluation Methodology
  - Safety significance was evaluated using the current plant specific Probabilistic Safety Assessment (PSA) Model
  - The assessment of risk was performed utilizing the evaluation methodology described in Section 4.2.3, "Temporary Risk Increases" of EPRI Report TR-105396, "PSA Applications Guide"
  - This methodology assesses risk by determining the change in Mean Core Damage Probability (ΔCDP)
  - ΔCDP = Core Damage Frequency x Risk Achievement Worth (RAW) x Event Duration
  - Risk Achievement Worth is defined as the increase in Core Damage Frequency (CDF) if the feature were guaranteed to fail at all times

Safety Significance
(Continued)

- Safety Significance Evaluation Methodology (Continued)
  - A ΔCDP of 1E-05 or greater is considered potentially risk significant
  - A ΔCDP between 1E-06 and 1E-05 should result in assessing non-quantifiable factors to determine risk significance
  - A ΔCDP below 1E-06 is considered non risk significant



Quantitative Screening Criteria for Temporary Changes

Safety Significance
(Continued)

- Initial Safety Significance Evaluation
  - The initial safety significance evaluation performed on August 1, 1997 utilized the current approved Sequoyah PSA model
  - The initial evaluation was based on the RAW for the loss of the entire Train B 125V Vital DC Power System (Battery, Charger, Spare Charger, Bus, and Fuses)
  - This resulted in a ΔCDP increase of 1.07E-05 which falls into the potentially risk significant category
  - The initial safety significance determination reported in LER 50-327/97011 was based on this calculation
  - This conclusion initiated a detailed evaluation of the model for this event

Safety Significance
(Continued)

- Subsequent Safety Significance Evaluation

  - The evaluation discovered that the fault tree for the 125V Vital DC Power System results in a direct failure path if the battery fails (Battery, Charger, Spare Charger, Bus, and Fuses)

  - The potential for taking credit for the spare charger led to an evaluation of the capability of the spare charger

  - The normal and spare battery chargers have the capability to deliver full-rated load plus 25% without voltage dropping below the nominal value

  - The spare charger would have supplied the required DC load to operate all required safety-related equipment for non Loss of Offsite Power (LOOP) events
    - 125% of battery charger full-rated load is 187.5 amps
    - The normal load for this battery charger is approximately 30 amps
    - The additional load placed on this charger due to the simultaneous starting of safety-related equipment during an analyzed accident is approximately 75 amps

Safety Significance
(Continued)

- Subsequent Safety Significance Evaluation (Continued)
  - A sensitivity study was performed that modeled the spare charger success path and other safety-related equipment that was out of service at the time (B Train Auxiliary Air Compressor, ERCW Pumps M-B and N-B)
  - This resulted in a ΔCDP increase of 6.27E-07 which falls into the non risk significant category
  - LER 50-327/97011 was revised to reflect this subsequent evaluation
- Conclusion
  - This event is **not safety significant**

Closing Remarks

- Condition Discovered by Alert Employee
- Comprehensive Corrective Actions
- Confident Broader Actions are Right and TVA is Staying the Course on Broader Corrective Action to Improve Personnel Performance
- Minimal Safety Significance
  - Initial evaluation suggested the event was significant
  - Follow-up analysis using actual plant configuration results in the condition being **not safety significant**

LIST OF PREDECISIONAL ENFORCEMENT CONFERENCE ATTENDEES
November 19, 1997

Tennessee Valley Authority

O. Zeringue, Chief Nuclear Officer and Executive Vice President
M. Bajestani, Site Vice President, Sequoyah
J. Herron, Plant Manager, Sequoyah
E. Vigluicci, TVA Senior Attorney
M. Lorek, System Engineering Manager, Sequoyah
P. Salas, Licensing Manager, Sequoyah
M. Roeer, Assistant Unit Operator, Sequoyah
G. Sanders, Unit Supervisor, Senior Reactor Operator, Sequoyah

NRC

L. Reyes, Regional Administrator, Region II (RII)
J. Johnson, Director, Division of Reactor Projects (DRP), RII
A. Boland, Director, Enforcement and Investigations Coordination Staff (EICS)
C. Evans, Regional Counsel, RII
M. Lesser, Chief, Reactor Projects Branch 6, DRP, RII
F. Hebdon, Director, Directorate II-3, Office of Nuclear Reactor Regulation (NRR)
R. Hernan, Senior Project Manager, NRR
M. Shannon, Senior Resident Inspector, Sequoyah, DRP, RII
L. Watson, Enforcement Specialist, EICS
W. Rogers, Senior Reactor Analyst, RII

Enclosure 4