NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTIES

Tennessee Valley Authority
Sequoyah Nuclear Plant
Units 1 and 2

Docket Nos. 50-327 and 50-328
License Nos. DPR-77 and DPR-79
EA 96-414

During an NRC inspection conducted between September 19 and November 2, 1996, 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 civil penalties 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 penalties are set forth below:

A. (1) 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, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, the licensee identified a significant condition adverse to quality, i.e., rust in the brake assembly of main feedwater isolation valve (MFIV) 2-MVOP-003-0100-B, but failed to adequately determine the root cause of the rust (water intrusion) and failed to take corrective action to preclude repetition of this significant condition adverse to quality. Specifically, the licensee failed to perform adequate evaluations or take adequate corrective actions for MFIV failures in January 1989, September 1990, September 1994, and April 1995. The failure to preclude repetition of this adverse condition resulted in the failure of MFIV 2-MVOP-003-0100-B to close on October 11, 1996, upon a valid feedwater isolation signal. (01013)

(2) 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, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, the licensee identified a significant condition adverse to quality, i.e., degradation of the elastomer material Buna-N when exposed to temperatures greater than 125 degrees Fahrenheit (°F), which resulted in repetitive failures of solenoid valves, but failed to take corrective action to

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preclude repetition of this significant condition adverse to quality. Specifically, the licensee failed to implement a corrective action plan developed in late 1993 to address issues identified in NRC IE Bulletin 78-14, Deterioration of Buna-N Components in ASCO Solenoids and Generic Letter 91-15, Operating Experience Feedback Report, Solenoid-Operated Valve Problems at United States Reactors, and failed to implement effective corrective actions for Problem Evaluation Report (PER) SQPER930001, which identified previous deficiencies in the operation of ASCO solenoid valves due to degradation of the Buna-N material. On October 11, 1996, a quality-related solenoid operated valve, on a reactor coolant system (RCS) pump seal leak-off isolation valve, failed due to temperature aging of Buna-N material in the valve, which caused initiation of a plant shutdown resulting in a reactor trip. A subsequent licensee investigation identified that a number of safety-related and quality-related valves exposed to temperatures of greater than 125 degrees °F and containing Buna-N were not evaluated for Buna-N degradation. (01023)

(3) 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 (Operations)." Appendix A of Regulatory Guide 1.33, Section 1, includes administrative procedures.

Site Standard Practice 3.4, Sections 3.3 and 3.4, require, in part, that the Responsible Organization (1) develop the corrective action plan, and (2) implement and/or monitor implementation of the approved corrective action, for conditions documented in Problem Evaluation Reports.

Contrary to the above, the licensee failed to develop an adequate corrective action plan and failed to implement corrective action to ensure that equipment affected by a July 1996 inadvertent fire system deluge actuation, documented in PER SQ961977PER, was surveyed for degradation and refurbished as necessary. As a result, turbine impulse pressure switches PS 47-13B and PS 47-13E were subsequently identified as failed, due to water intrusion. The failed switches caused a spurious turbine runback on October 11, 1996, and complicated recovery from a subsequent reactor trip by inhibiting manual control of the Auxiliary Feedwater System. Subsequent licensee investigation identified 18 other junction boxes affected by water intrusion. (01033)

These violations represent a Severity Level III problem (Supplement I). Civil Penalty - $50,000.

B. (1) 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 (Operations)." Appendix A of Regulatory Guide 1.33, Section 9, includes procedures for performing maintenance.

Maintenance Instruction (MI)-10.9.1, REACTOR TRIP BREAKER TYPE DB50 INSPECTION ASSOCIATED WITH SYSTEM 99, Revision 16, describes, in part, the steps for lubrication and testing of the reactor trip breaker (RTB) inertia latch.

Contrary to the above, the licensee failed to properly implement procedure MI-10.9.1 and failed to establish adequate procedural steps to ensure complete reassembly of the RTB inertia latch during latch lubrication and appropriate testing of the RTB contacts after it was reassembled. Specifically:

1. On September 14, 1996, personnel performed two sections of MI-10.9.1 out of sequence. Section 7, Post Performance Activities, was performed prior to the completion of Section 6, Performance, which resulted in completion of the RTB post-maintenance test prior to a step requiring that the auxiliary contact linkage assembly be disconnected from the inertia latch.

2. Since July 29, 1994, MI-10.9.1, was inadequate in that Step 6.2.6 functionally tested operability of the auxiliary contacts when a subsequent step, Step 6.4.1, required disassembly of the auxiliary contact linkage assembly to allow lubrication of the inertia latch. The procedure did not contain precautions or adequate instructions regarding the disassembly/reassembly of the RTB inertia latch during latch lubrication. The failure to provide adequate instructions for reassembly of the inertia latch resulted in an inoperable P-4 channel. (02013)

(2) Unit 2 Technical Specification 3.3.1, Table 3.3-1, Item 22.G, Reactor Trip, P-4, Action 14, requires that, while in Mode 1, with the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours.

Contrary to the above, on September 19, 1996 while operating in Mode 1, the number of P-4 channels OPERABLE was one less than required by the Minimum Channels OPERABLE requirement and the licensee failed to place Unit 2 in HOT STANDBY within 6 hours. (02023)

(3) 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 (Operations)."

Site Standard Practice, SSP-3.4, CORRECTIVE ACTION, Revision 17, Appendix E, Step 2.0.D, requires, in part, that if a condition described in a PER potentially affects operability or is potentially reportable, that prompt verbal notification of the condition to the Shift Operations Supervisor (SOS) shall be provided and that the SOS shall promptly receive a copy of the PER.

Contrary to the above, as of September 20, 1996, prompt verbal notification of the condition described in PER SQ962451PER was not provided to the SOS nor did the SOS promptly receive a copy of the PER. As a result, the licensee failed to perform an immediate operability/reportability determination on an inoperable RTB, as required by SSP-3.4, Appendix E, Step 5.0, until October 7, 1996, after being prompted by the NRC. (02033)

These violations represent a Severity Level III problem (Supplement I). Civil Penalty - $50,000.

Pursuant to the provisions of 10 CFR 2.201, the 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 Penalties (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 penalties 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 penalties proposed above, or may protest imposition of the civil penalties 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 penalties will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, 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 penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties.

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 penalties 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 penalties, 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 penalties, 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 day of December 1996

LIST OF PREDECISIONAL ENFORCEMENT CONFERENCE ATTENDEES
DECEMBER 16, 1996

Tennessee Valley Authority

O. Zeringue, Senior Vice President, Nuclear Operations
R. Adney, Site Vice President
R. Baron, General Manager, Nuclear Assurance and Licensing
J. Herron, Plant Manager, Sequoyah
W. Lagergren, Operations Manager
L. Bryant, Acting Assistant Plant Manager
R. Rausch, Maintenance and Modifications Manager
M. Fecht, Nuclear Assessment and Licensing Manager
M. Burzynski, Engineering and Materials Manager
D. Clift, Planning Manager
R. Shell, Licensing and Industry Affairs Manager
J. Smith, Site Licensing Supervisor
T. Van Huis, Shift Manager
F. Cuzzort, Technical Support Supervisor
K. Whittenburg, Tennessee Valley Authority (TVA) Communications
E. Vigluicci, TVA Senior Attorney

NRC

E. Merschoff, Director, Division of Reactor Projects (DRP), Region II (RII)
M. Lesser, Chief, Reactor Projects Branch 6 (RPB6), DRP, RII
F. Hebdon, Director, Directorate II-3, Office of Nuclear Reactor Regulation (NRR)
R. Hernan, Project Manager, NRR*
L. Watson, Enforcement Specialist, Enforcement and Investigations Coordination Staff, RII
M. Shannon, Senior Resident Inspector, Sequoyah, DRP, RII
R. Starkey, Resident Inspector, Sequoyah, DRP, RII
S. Sparks, Project Engineer, DRP, RII
R. Bernhard, Senior Reactor Analyst, RII
C. Evans, Regional Counsel, RII
J. Kauffman, Office of Enforcement*

* Participated by Telephone

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PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA

SEQUOYAH

DECEMBER 16, 1996, AT 10:00 A.M.

NRC REGION II OFFICE, ATLANTA, GEORGIA

I. OPENING REMARKS AND INTRODUCTIONS
E. Merschoff, Director, Division of Reactor Projects

II. NRC ENFORCEMENT POLICY
B. Uryc, Director
Enforcement and Investigation Coordination Staff

III. SUMMARY OF THE ISSUES
E. Merschoff, Director, Division of Reactor Projects

IV. STATEMENT OF CONCERNS / APPARENT VIOLATIONS
M. Lesser, Chief, Branch 6
Division of Reactor Projects

V. LICENSEE PRESENTATION

VI. BREAK / NRC CAUCUS

VII. NRC FOLLOWUP QUESTIONS

VIII. CLOSING REMARKS
E. Merschoff, Director, Division of Reactor Projects

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

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APPARENT VIOLATIONS

APPARENT VIOLATIONS A, B, and C

10 CFR 50, Appendix B, Criterion XVI requires implementation of a corrective action program to assure that conditions adverse to quality are promptly identified and corrected.

A. The licensee failed to adequately evaluate the previous as found conditions (rusted) of the main feed water isolation valve (2-MVOP-003-0100-B) brake assembly, which led to the failure to identify and correct the root cause of the brake failure (water intrusion). The main feed water isolation valve experienced failures in 1989, 1990, 1994, and 1995, prior to the failure on October 11, 1996.

B. The licensee failed to take adequate corrective actions to prevent additional flexible conduit damage. The work request history indicated that the flexible conduits, on the Unit 2 main feed water isolation valves, were damaged approximately 20 times since 1989, with 8 occurrences of damage on the flexible conduits for 2-MVOP-003-0100-B alone.

C. The licensee failed to implement a corrective action plan for previously identified deficiencies regarding temperature aging of solenoid operated valves. Subsequently, on October 11, 1996, a solenoid operated valve, on a reactor coolant system (RCS) pump seal leak off isolation valve, failed due to temperature aging.

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

APPARENT VIOLATION D

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 (Operations)."

Site Standard Practice 3.1, Quality Assurance Program, requires corrective action to be taken for conditions documented on Problem Evaluation Reports.

In July 1996, an inadvertent fire system deluge actuation occurred as documented on Problem Evaluation Report SQ961977PER, and the licensee failed to identify and correct affected equipment. As a result, turbine impulse pressure switches were subsequently identified as failed, due to water intrusion. This caused a spurious runback on October 11, 1996, and complicated recovery from the subsequent reactor trip by inhibiting manual control of the Auxiliary Feedwater System.

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

APPARENT VIOLATION E

Technical Specification 3.3.1.22.G, Reactor Trip, P-4, Action 14, requires that with the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours.

On September 19, 1996, the number of P-4 channels OPERABLE was one less than required by the Minimum Channels OPERABLE requirement and the plant was not placed in HOT STANDBY within 6 hours.

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

APPARENT VIOLATION F

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 (Operations)." Appendix A of Regulatory Guide 1.33, Section 9, includes procedures for performing maintenance.

Maintenance Instruction (MI)-10.9.1, REACTOR TRIP BREAKER TYPE DB50 INSPECTION ASSOCIATED WITH SYSTEM 99, Revision 16, does not authorize personnel to perform procedure sections out of sequence. MI-10.9.1, in part, describes the steps for lubrication of the reactor trip breaker inertia latch.

MI-10.9.1 was not followed and was inadequate. Each of the following examples contributed to the subsequent failure of a reactor trip breaker.

1. On September 14, 1996, personnel performed two sections of MI-10.9.1 out of sequence. Section 7, Post Performance Activities was performed prior to the completion of Section 6, Performance.

2. Since July 29, 1994, MI-10.9.1, has not contained precautions or adequate instructions regarding the disassembly/reassembly of the reactor trip breaker inertia latch during latch lubrication.

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

APPARENT VIOLATION G

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 (Operations)."

Site Standard Practice, SSP-3.4, CORRECTIVE ACTION, Revision 17, requires that Operability/Reportability determinations be performed per Appendix E, if the condition potentially affects operability or reportability.

An operability/reportability determination was not performed on a potentially inoperable reactor trip breaker until approximately October 4, 1996 (when prompted by the NRC, two weeks after the issue was identified).

NOTE: The apparent violations discussed in this enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

Tennessee Valley Authority

Sequoyah Nuclear Plant

Predecisional Enforcement Conference

October 11 Unit 2 Shutdown Equipment Problems and Unit 2 Reactor Trip Breaker Issues

December 16, 1996

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NRC/TVA Meeting
Predecisional Enforcement Conference
December 16, 1996
Agenda

Opening Remarks	R. J. Adney
Material Condition Improvement Initiatives	J. T. Herron
October 11 Unit 2 Shutdown Equipment Failures	L. S. Bryant
Reactor Trip Breaker Maintenance Issues	R. R. Rausch/J. T. Herron
Regulatory Perspective	R. H. Shell
Closing	R. J. Adney

Sequoyah Nuclear Plant

Opening Remarks

Sequoyah Nuclear Plant
Opening Remarks

- TVA understands the significance of the equipment failures and reactor trip breaker maintenance issues
- We have been working our problems - issues have been identified and fixes have been initiated
- October 11 events reinforced need to give continued attention to material condition and to continue the emphasis on personnel performance
- Still evidence of past problems recurring
  - Problems are implementation based - not programmatic
  - Quality of past corrective actions still impacting current performance
  - Site continues to focus on effective resolution of problems
- SQN demonstrating dedication to problem resolution by the additional time taken for Unit 2 restart and the planned Unit 1 outage
- Ongoing initiatives for improving maintenance effectiveness
- Key is vigorous action - we are improving implementation and holding our people accountable

Sequoyah Nuclear Plant

Material Condition Improvement Initiatives

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives
Introduction

- SQN shares concern about material condition
  - Equipment reliability expectations still not met
  - Still have too many recurring problems
    - Inspection Report 96-13 contains examples of known problems
- Improvement initiatives underway
  - Corrective action implementation
  - Employee commitment/ownership
  - Maintenance effectiveness

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives
Corrective Action Implementation

- Improving quality of information to management
  - Management has lowered the reporting threshold
  - The number of PERs is increasing (approximately 3000 this year)
  - Issues being identified are valid and important
  - System health program changed to include repeat problems
  - Nuclear Assurance and Licensing trends PERs
  - Repeat trends identified during planning process
  - Equipment history trending program
- Improving department manager involvement
  - MRC now meets daily
  - Plant Manager chairs MRC
  - Department managers present PERs to MRC
  - Managers responsible for identifying PER level, responsible organization, and need for interim action on each PER

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Corrective Action Implementation (cont.)

- Improving effectiveness of corrective actions
  - Plant Manager or Engineering & Support Services Manager reviews and approves root causes and corrective actions for level A and B PERs
  - Department managers review and approve level C apparent causes
  - Corrective actions are scheduled
  - Schedule performance is reviewed weekly
  - Nuclear Assurance and Licensing reviews corrective actions
  - Nuclear Assurance and Licensing trends PERs and corrective action timeliness
  - Corrective action health reports
  - System health reports
  - Program health reports

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Employee Commitment and Ownership

- Still focused on increased Operations ownership of the plant
  - Positive results are being exhibited
  - Operators are demanding better equipment reliability
- Plant Manager has personally met with AUOs to discuss expectations and need for improvement in identifying issues
- Leadership Development Program is being used to promote ownership and commitment
  - Targeted at first-line supervisors
  - Site senior managers developed and are teaching the course
  - Courses include personnel policies, observation skills, human error reduction, and coaching skills

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Employee Commitment and Ownership (cont.)

- Restructured the Engineering organization to better define and consolidate engineering, technical support, and component engineer functions

- Still focused on system engineer being held responsible for system reliability and alerting management to reliability concerns

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Maintenance Effectiveness

- Twenty of twenty eight first-line supervisors completed the Leadership Development Program supervisory training course
- The Plant Manager has personally met with maintenance general foremen (first-line supervision) to reinforce expectations
- Increased specialized training to improve identification and prevention of problems
  - Westinghouse reactor coolant pump seal training
  - EPRI leak reduction training
  - Vibration training
  - Maintenance Manager and shop manager in SRO training
  - Bringing vibration expert for site training
  - Root cause analysis training

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Maintenance Effectiveness (cont.)

- Maintenance data (three-month average)
  - Non-outage corrective maintenance (approximately 400)
  - 3% rejection on Quality Control inspections
  - Approximately 230 activities worked weekly, WO/SI/PM with >80% adherence
  - Repeat maintenance <2%
- Individual expectations written and communicated one-on-one with first-line supervisors by Maintenance and Modifications Manager

Sequoyah Nuclear Plant
Material Condition Improvement Initiatives

Maintenance Effectiveness (cont.)

- Around-the-clock maintenance support to improve efficiency
  - Technical specialists
  - Planners
  - Procedure writers
- Equipment problems are being fixed
  - Vital inverter overhauls
  - AFW pump
  - CCW trip circuit
  - Steam dump system
  - Throttle valve/governor valve transfer

Sequoyah Nuclear Plant

October 11 Unit 2 Shutdown

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Feedwater Isolation Valve

- FWIV lockup due to corrosion in motor brake
- Problem was self-revealing
- Improved Corrective Action Program used to develop root cause and corrective actions
- Root cause is ineffectiveness of prior corrective actions
  - JAN '89 - Replaced motor and brake, noted not waterproof design
  - SEP '90 - Replaced motor and brake, fixed leak, fixed conduit, initiated PM on conduit
  - SEP '94 - No failure - water noted in brake, replaced brake, fixed conduit
  - APR '95 - Failed to stroke - grounded brake leads prevented brake release - no brake corrosion noted

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Feedwater Isolation Valve (cont.)

- Corrective actions taken
  - Motor/brake replaced
  - Modified design to include gasket on brake housing
  - Drain hoses and fitting gaskets replaced
  - Spray shields added above motor/brake
  - Increased emphasis on housekeeping inspections including water, oil, and steam leaks
  - Reviewed equipment history trending program

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Feedwater Isolation Valve (cont.)

- Corrective actions planned
  - Replace motor brakes with corrosion-resistant brakes if it meets safety-related requirements
  - Install permanent drains for steam generator wet layup tell-tale drains during upcoming outages
  - Reinspect during U2C8 in the Fall of '97

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Feedwater Isolation Valve (cont.)

- No actual safety significance
  - Feedwater system isolated
    - All four feedwater regulation valves closed
    - Remaining three feedwater isolation valves closed
    - Operating feedwater pump tripped
- TVA agrees with the apparent violation

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

ASCO Solenoid Valve

- Solenoid failure due to internal Buna-N O-ring age hardening
- Failure was self-revealing
  - Failure mode (valve closure) due to O-ring degradation not obvious or previously known
- Root cause was that the use of industry and previous plant operating experience was not fully effective

Sequoyah Nuclear Plant
October 1 1 Unit 2 Shutdown
Equipment Failures

ASCO Solenoid Valve (cont.)

- Solenoid valve corrective actions
  - Developed screening criteria for solenoid valves
  - Screened approximately 1000 SOVs and walked down approximately 100 SOVs per unit
  - Identified and replaced 28 Unit 2 SOVs and 25 Unit 1 SOVs
  - Noted the failed SOV was the only seal return SOV with Buna-N material
  - Placed hold on issue of Buna-N from warehouse
  - Will update design specification by February 1997 to eliminate Buna-N option
  - Maintenance activities for other Buna-N solenoid valves will be defined and implemented by the cycle 8 outages

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

ASCO Solenoid Valve (cont.)

- Industry and Operating Experience corrective actions
  - Performed assessment of both industry and operating experience - no other similar issues were identified
  - GL 91-15 was reassigned for review and action
  - Implementation of previously addressed Corrective Action Program improvements

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

ASCO Solenoid Valve (cont.)

- No actual safety significance
  - No. 2 RCP seal is designed to handle full RCS pressure for approximately 100 hours
  - Plant was shutdown in accordance with Abnormal Operating Procedures within 8 hours
- TVA agrees with the apparent violation

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Fire System Actuation

- Pressure switch failure due to water intrusion from a single-zone fire deluge header activation
- Failure was self-revealing
- Root cause was failure to conduct an in-depth post-deluge walkdown

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Fire System Actuation (cont.)

- Corrective actions taken
  - Pressure switches were replaced and Unit 2 fire detectors replaced with sealed type
  - Extent of condition identified
    - 66 potential locations inspected on Unit 2 - approximately 18 junction boxes showed signs of water intrusion
    - Approximately 70 potential locations inspected on Unit 1
    - Other plant areas inspected for similar conditions
    - Unit 1 pressure switches were inspected - no problems found
    - Approximately 130 turbine building junction boxes sealed

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Fire System Actuation (cont.)

- Corrective actions planned
  - Maintenance procedure revisions to address sealing instrument panels by February 1997
  - Other turbine building single-zone actuation detectors to be replaced by U2C8
  - Improved inspection methodology to be developed for water intrusion by January 1997

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Fire System Actuation (cont.)

- No actual safety significance
  - Automatic auxiliary feedwater functions of controlling steam generator level not defeated by pressure switch failure

- TVA agrees with the apparent violation

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

Flex Conduit

- Instances of broken flex conduit in the steam valve vaults
- Breaks licensee-identified through PM program
- Attainment of zero break goal is limited by physical congestion in the work area

Sequoyah Nuclear Plant
October 11 Unit 2 Shutdown
Equipment Failures

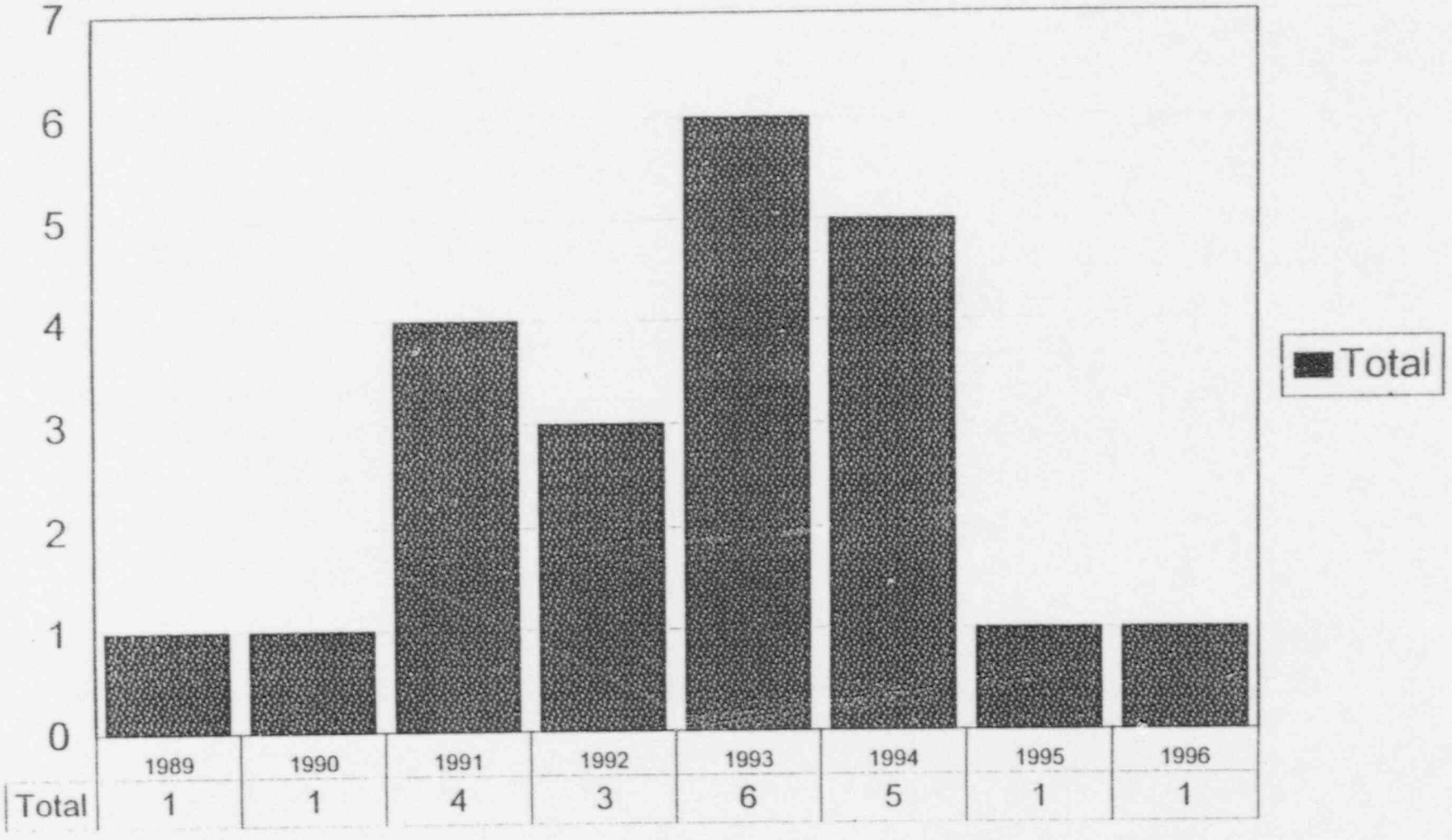
Flex Conduit (cont.)

- As part of September 1990 FWIV failure corrective actions,
  - Evaluated and determined 26 valves are susceptible to this damage
  - Initiated two PMs to check these valves for conduit damage after outages before plant returns to service
  - Number of breaks successfully reduced by employee training (1 in '95, 1 in '96)
  - PM successfully repairs remaining breaks

- TVA does not agree with the apparent violation
  - Failure rate has been reduced
  - PM repairs effective

CONDUIT WORK ORDERS FOR MFIV's

From 1989 till 1996



	1989	1990	1991	1992	1993	1994	1995	1996
Total	1	1	4	3	6	5	1	1

TOTAL Work orders = 22

Sequoyah Nuclear Plant

Reactor Trip Breaker Maintenance Issues

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

Sequence of Events

- 07/29/94 - MI revised to incorporate previous SQN corrective actions
- 09/06/96 - 09/19/96 - Shop performance of MI
- 09/19/96 - LCO entered at 0929
  - Reactor trip breaker changeout completed at 1048
  - Concurrently LCO exited and rod deviation alarm received; Shift Manager questions source of alarm and requests troubleshooting begin
  - Shift Manager, Operations Manager, and Maintenance Manager decide to implement contingency plan to reinstall original breaker

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

Sequence of Events (cont.)

- LCO entered at 1745
- Reinstalled original breaker at 1835
- LCO exited at 1835
- PER written, breaker investigation begins
- PER supervisor marks 'potentially affects operability YES, potentially affects reportability NO', Shift Manager concurred

- 09/20/96 - MRC changes PER to 'potentially reportable'
- 10/09/96 - Reportability determination completed
- 10/23/96 - LER submitted

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

Inadequate Procedure/Procedure Adherence

- Procedure contained inadequate instructions for linkage disassembly
- Sections of the procedure were performed out of sequence
- Both procedural failures were identified by SQN
- Root causes were:
  (1) Failure to follow procedure, and
  (2) The procedure was revised without specific instructions or details as to how to disassemble and replace the inertia latch

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

Inadequate Procedure/Procedure Adherence (cont.)

- Corrective actions
  - Revised maintenance instruction
  - Reinforced expectations for revising procedures
  - Disciplinary actions have been taken
  - Reinforced the necessity of adhering to procedural guidance
- Safety significance was low
  - Capability to trip the reactor not affected
  - P4 trip function (turbine trip/FWI) limited to loss of redundancy
  - Would have complicated safety injection recovery actions because of blocked safety injection reset function
- TVA agrees with this apparent violation

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

LCO Compliance Issues

- Tech spec allowed outage time was exceeded
- Root cause was the failure to identify that the P4 contacts were inoperable
- Corrective actions
  - Disciplinary actions have been taken
- Safety significance was low
  - Capability to trip the reactor not affected
  - P4 trip function (turbine trip/FWI) limited to loss of redundancy
  - Would have complicated safety injection recovery actions because of blocked safety injection reset function
- TVA agrees with the apparent violation

Sequoyah Nuclear Plant
Reactor Trip Breaker Maintenance Issues

Untimely Operability/Reportability

- Reportability determination was not performed as required by SSP-3.4
- Root cause of the lack of a reportability determination was an untimely determination of operability
- Corrective actions
  - Personnel have been disciplined
  - MRC has been counseled
- There was no safety significance because the reactor trip breaker had been replaced and reporting is an administrative function
- TVA agrees with the apparent violation

Sequoyah Nuclear Plant

Regulatory Perspective

Sequoyah Nuclear Plant
Regulatory Perspective

- October 11 shutdown-related violations
  - Ineffective corrective actions associated with the feedwater isolation valve
  - Ineffective corrective actions associated with ASCO solenoid valve
  - Ineffective corrective actions associated with fire system actuation
  - Ineffective corrective actions associated with flex conduit
- Each of these violations was self-revealing but, with the exception of the feedwater isolation valve, was not readily apparent
- Root causes were identified promptly
- Corrective actions taken for each violation were prompt and comprehensive
- No actual safety significance to any of these violations

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Regulatory Perspective

- Reactor trip breaker violations
  - Procedure adherence and inadequate procedure
  - LCO compliance
  - Untimely operability/reportability.determination
- Procedure adherence and inadequate procedure were self-identified
  LCO noncompliance was self-revealing
  Untimely operability/reportability was NRC-identified
- Root causes were identified promptly
- Corrective actions taken for each violation were prompt and comprehensive
- Safety significance for these violations was low

Sequoyah Nuclear Plant
Regulatory Perspective

- Regulatory significance
  - TVA understands the regulatory significance of these issues
    - Material condition of plant needs to continue to improve
    - Maintenance and support activities for reactor trip breaker are important
  - Extensive corrective actions taken and planned
    - As discussed at November 15 meeting, site-wide initiatives have been in progress for several months
    - Additional actions are being taken to improve Corrective Action Program implementation

Sequoyah Nuclear Plant
Regulatory Perspective

- Conclusions
  - No regulatory purpose for escalated enforcement
  - One Level IV with three examples of not taking adequate corrective actions
  - Two Level IVs for reactor trip breaker
    - Procedures (two examples adherence/inadequate)
    - Exceeded technical specification LCO (two examples untimely operability/reportability)

Sequoyah Nuclear Plant

Closing Remarks