



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

Report Nos.: 50-327/85-27, 50-328/85-28

Licensee: Tennessee Valley Authority
500A Chestnut Street
Chattanooga, TN 37401

Docket Nos.: 50-327 and 50-328

License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah Units 1 and 2

Inspection Conducted: August 6 - September 5, 1985

Inspectors: A. J. Ignatonis
for K. M. Jenison, Senior Resident Inspector

9/27/85
Date Signed

A. J. Ignatonis
for L. J. Watson, Resident Inspector

9/27/85
Date Signed

A. J. Ignatonis
for A. Ignatonis, Project Inspector

9/27/85
Date Signed

Approved by: S. P. Weise
S. P. Weise, Section Chief
Division of Reactor Projects

9/27/85
Date Signed

SUMMARY

Scope: This routine, announced inspection involved 286 resident inspector-hours onsite in the areas of operational safety verification including operations performance, system lineups, radiation protection, security and housekeeping inspections; surveillance and maintenance observations; review of previous inspection findings; followup of reportable events; review of inspector followup items and licensee identified items; and followup of licensee's response to NRC Order EA 85-49.

Results: In the areas inspected, three violations were identified:

- 1) Failure to follow procedure during surveillance testing of an Emergency Diesel Generator (EDG). This applies to both units. (paragraph 6a).
- 2) Failure to adequately perform a non-destructive examination. This applies to Unit 1 only. (paragraph 10a).
- 3) Failure to comply with Technical Specification Limiting Condition for Operation (LCO) 3.5.1.1. This applies to Unit 2 only. (paragraph 10c)

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REPORT DETAILS

1. Licensee Employees

Persons Contacted

H. L. Abercrombie, Site Director
*P. R. Wallace, Plant Manager
*L. M. Nobles, Operations and Engineering Superintendent
*B. M. Patterson, Maintenance Superintendent
J. A. Domer, Chief, Nuclear Licensing Branch
G. Brantley, Nuclear Safety Review Staff
*M. A. Skarzynski, Electrical Maintenance Supervisor
*M. R. Harding, Engineering Group Supervisor
*J. M. Anthony, Operations Group Supervisor
*D. C. Craven, Quality Assurance Supervisor
D. E. Crawley, Health Physics Supervisor
J. L. Hamilton, Quality Engineering Supervisor
*G. B. Kirk, Compliance Supervisor
*W. L. Williams, Chemical Unit Supervisor
*D. F. Goetches, Codes and Standards Supervisor
*R. C. Burchell, Compliance Engineer
*R. L. Moore, SQN Plant Evaluation Group Manager, Division of QA
*C. Wilson, Nuclear Engineer, NSS

Other licensee employees contacted included technicians, operators, shift engineers, security force members, engineers and maintenance personnel.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized with the Plant Manager and members of his staff on September 6, 1985. Violations described in paragraphs 6 and 10 were discussed. The licensee acknowledged the inspection findings. The licensee did not identify as proprietary any material reviewed by the inspectors during this inspection. During the reporting period, frequent discussions were held with the Site Director, Plant Manager and his assistants concerning inspection findings. The licensee committed to require technicians to place their initials in signoff spaces in Maintenance Instruction MI-10.1, Diesel Generator Inspection, rather than allow the use of checks or other marks. At no time during the inspection was written material provided to the licensee by the inspector.

3. Licensee Action on Previous Inspection Findings (92702, 61726, 62703)

(Closed) Violation (327/83-31-02). The licensee's response of March 15, 1984 was reviewed, and the indicated corrective actions were audited. The corrective actions stipulated were to remove the licensed operator from licensed duties and evaluate his performance, and to retrain all Operations

personnel in administrative controls associated with system alignment and operation. These licensee actions are considered complete and adequate.

(Closed) Violation (327,328/84-27-01). The licensee's response of December 13, 1984 was reviewed, and the indicated corrective actions were audited. The corrective actions stipulated were to repair the damaged conduit associated with the Upper Head Injection system, to cancel all drilling permits that were outstanding and to revise Administrative Instruction AI-17, Drilling, Cutting, Chipping and Excavation. In addition, three conductance type power interruption devices were purchased and prescribed for use when applicable drawings are not clear about the location of embedded electrical conduit. The licensee's actions are considered complete in this instance; however, the inspector noted that AI-17 does not require the use of the power interruption devices in all cases.

(Closed) Violation (327/84-24-01). This violation concerned several examples of failure to establish or implement adequate procedures. The licensee responded to the violation in letters dated June 6 and July 22, 1985. The inspector reviewed the responses and the following procedures and held discussions with cognizant licensee personnel:

Maintenance Instruction MI-1.9, Revision 6, Bottom Mounted Instrument
Thimble Tube Retraction and Reinsertion.
Administrative Instruction AI-8, Revision 14, Access to Containment
Quality Assurance Section Instruction Letter 5.3, Revision 11 Radiation
Work Permit 02-1-85-110

The licensee has cancelled the original maintenance procedures, MI-0-94-1 and -2. A review of MI-1.9 identified several deficiencies with respect to unincorporated vendor recommendations for inspection and measurement of components during high pressure seal reassembly. Licensee personnel provided a draft revision which was awaiting approval. This revision incorporated the vendor recommendations. These revisions are to be in place prior to thimble cleaning activities during the Unit 1 refueling outage. Other revisions to procedures appeared adequate. The inspector reviewed the list of quality assurance reviewers authorized to review maintenance requests and the documented training held. No discrepancies were identified. A sample of active hold orders was also reviewed to determine if hold orders were being issued to personnel responsible for maintenance activities. No discrepancies were identified, and licensee corrective actions were complete with the exception of the revisions to MI 1.9. These are being tracked under IFI 327/84-24-04.

(Closed) Violation (327/84-24-02). This violation concerned onsite review committee reviews. The inspector reviewed licensee responses dated June 6 and July 22, 1985 and onsite review committee meeting minutes 3415-3429. Licensee management reviewed the requirements for onsite reviews as delineated in Technical Specifications and procedure SQA-21. No discrepancies were identified, and licensee corrective actions appeared complete.

(Closed) Violation (327/84-24-03). This violation concerned use of a modified cleaning tool and lack of appropriate controls. The inspector reviewed licensee responses dated June 6 and July 22, 1985. The licensee has implemented a new cleaning method which is to be used only in Modes 5 or 6. The inspector reviewed procedure SQM-63, Special or Modified Tooling, Revision 0 and two in-progress tool evaluations. Licensee corrective actions appeared adequate.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Operational Safety Verification (71707)

a. Plant Tours

The inspectors observed control room operations, reviewed applicable logs, conducted discussions with control room operators, observed shift turnovers, and confirmed operability of instrumentation. The inspectors verified the operability of selected emergency systems, reviewed tagout records, verified compliance with Technical Specification (TS) Limiting Conditions for Operation (LCO) and verified return to service of affected components. The inspector verified that maintenance work orders had been submitted as required and that followup 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, and excessive vibrations and plant housekeeping/cleanliness conditions.

The inspectors walked down accessible portions of the following safety-related systems on Units 1 and 2 to verify operability and proper valve alignment:

Control Room Ventilation (Units 1 and 2)
 Diesel Generators (Units 1 and 2)
 Auxiliary Air Compressors (Units 1 and 2)
 Safety Injection (Units 1 and 2)

No violations or deviations were identified.

b. Security

During the course of the inspection, observations relative to protected and vital area security were made, including access controls, boundary integrity, search, escort, and badging. No violations or deviations were identified.

c. Radiation Protection

The inspectors observed Health Physics (HP) practices and verified implementation of radiation protection control. On a regular basis, radiation work permits (RWPs) were reviewed and specific work activities were monitored to assure the activities were being conducted in accordance with applicable RWPs. Selected radiation protection instruments were verified operable and calibration frequencies were reviewed.

On September 5, 1985, the Sequoyah Nuclear Plant Health Physics Supervisor notified the Resident Inspectors that an employee, who was a member of the security force, had reported that he had radiation sickness. The employee had previously been admitted to a local hospital for an undisclosed illness and had reported back to work with a doctor's release for full duty. The employee was interviewed by the licensee and returned to work. The inspectors reviewed his exposure records and determined that his quarterly dose was 190 millirem based on pocket chamber readings. The most recent reading of his assigned TLD indicated that his exposure during the quarter had been zero. The TLD reading, which is more accurate, is utilized as the official exposure record. The individual's lifetime dose was also zero. NRC Health Physics personnel were notified of this issue.

6. Monthly Surveillance Observation (61726)

The inspectors observed Technical Specification (TS) required surveillance testing and verified that testing was performed in accordance with adequate procedures; that test instrumentation was calibrated; that Limiting Conditions for Operation (LCO) were met; that test results met acceptance criteria requirements and were reviewed by personnel other than the individual directing the test; that any deficiencies were identified, properly reviewed, and resolved by management personnel; and that system restoration was adequate. For completed tests, the inspector verified that testing frequencies were met and tests were performed by qualified individuals.

The inspector witnessed/reviewed portions of the following surveillance test activities:

- a. Portions of the five year surveillance of the 2A-A Diesel Generator (DG) were observed on August 14, 1985. In order to ensure that the remaining three DGs were operable, the licensee conducted Surveillance Instruction SI-7, Electrical Power System Diesel Generators, on August 13, 1985 for DGs 1A-A, 1B-B, and 2B-B. The following Maintenance Instructions (MI), Maintenance Requests (MR), Surveillance

Instructions (SI), and Instrument Maintenance Instructions (IMI) were reviewed/observed in conjunction with this periodic surveillance activity:

- MI-10.1 Diesel Generator Inspection
- MI-11.4 Maintenance of CSSC Valves
- MI-6.20 Configuration Control During Maintenance Activities
- SI-1 Surveillance Program Units 1 and 2
- SI-7 Electrical Power System: Diesel Generators
- SI-102 Inspection of Diesel Generators
- SI-170.3 Periodic Calibration of the Standby Diesel Generator
- IMI-82 Standby Diesel Generator System, Appendix C
- MR A525959
- MR A284291
- Hold Order 1529
- Drawing 47W839-1
- Temporary Change 85-0828

During the performance of MI-10.1, three instances of failure to follow procedures were identified:

- (1) In order to clean and visually inspect the generator, Electrical Maintenance technicians are directed in Step 5.4.1.1 of MI-10.1 to use low pressure air to remove dust from collector rings and stator. There is a corresponding space on Inspection Sheet 5.4 of Appendix A to MI-10.1 that is used to indicate completion of this step. The inspector observed a technician, who was performing MI-10.1, mark step 5.4.1.1 as complete without using low pressure air to remove dust from the generator collector rings and stator. When questioned the technician stated that in his opinion there was not sufficient dust on the collector rings and stator to require the use of the air; therefore, he checked the step as complete.
- (2) Step 5.4.1.2 directs the technician to remove oil, grease, or accumulation of dirt from the collector with clean, bound end, lintless wiping cloths. The cloths that were used to complete this step were of a knit material rather than bound end, lintless wiping cloths.
- (3) Step 5.4.1.8 states that frame hold down and foundation bolts are to be checked to see that they are tight. This step also requires the technician to record results and any unusual findings on Inspection Sheet 5.4. This action was not completed by the Electrical Maintenance technician because he stated that he felt that the activity was a Mechanical Maintenance Section function. Mechanical Maintenance technicians did not perform this section of MI-10.1 and were unaware of the requirements of this step. As a result Step 5.4.1.8 was not implemented.

The above examples constitute a violation for failure to follow procedure (327/85-27-01, 328/85-28-01). While the safety significance is low, these activities indicate a disregard for procedural compliance during the performance of a safety related surveillance.

- b. Two steps in MI-10.1 direct the technician to perform tasks and do not give sufficient guidance to the technician in order to ensure quality.
 - (1) Step 5.4.1.7 requires the technician to verify that the generator space heaters were functioning properly by raising the heater's setpoint and checking heater operation. Additionally, Step 5.4.1.7 directs the technician to return the setpoint to its original value upon completion. What was actually performed by the technician was a full scale rotation of the control knob from a starting point to zero and then to a point where the rheostatic relay energized. After the relay energized, the knob was returned to what was thought to be its initial starting point. The original starting point was not prescribed in the procedure, recorded on Inspection Sheet 5.4 as an "as found condition", or indicated on the control knob dial face.
 - (2) Step 5.4.1.8 directs the technician to check frame hold down and foundation bolts to see that they are tight and to record results and any unusual findings on Inspection Sheet 5.4. The procedure did not provide acceptance criteria with reference to bolt tightness and did not provide a space in Inspection Sheet 5.4 on which to note the results of the inspection conducted by the technician.

During the performance of the above surveillance, assigned technicians were independently conducting separate portions of SI-102 and MI-10.1. After the completion of each step, indications were placed on the appropriate check sheets to validate the completion of that step. The indications used included check marks and the statement "ok". Initials were not used in this case and the cover sheet had not been signed because at the time of inspection, the procedure was not fully completed. The licensee's policy is to have the individuals who performed the procedure to initial only the cover sheet rather than initial each procedural step. These documents are designated as quality records by the licensee's quality assurance program and as such require traceability with respect to the technician that performed the quality function. Since the procedure is performed over some time by several technicians, there may be a problem in determining who performed the steps. As a result, the licensee has committed to incorporate the requirement that technicians initial steps performed in MI-10.1 rather than use a check or some other indication. This will be reviewed as Inspector Followup Item (327/85-27-02, 328/85-28-02). The licensee did not commit to require the use of initials on all MI's.

- c. The calibration of the Unit 1 reactor coolant system (RCS) loop resistance temperature detectors (RTD) by Instrument Maintenance was observed by the inspector. The following Surveillance Instructions were observed/reviewed:

SI-478, Response Time Testing Reactor Coolant System Narrow Range RTD's Units 1 and 2

SI-483, Procedures for Removing a Reactor Protection Channel from Service

The calibration of Measuring and Test Equipment (M&TE) used to perform the calibration of RCS RTD was reviewed. Current bridges TEC LCSR numbers USTVA 393132 and 432675 were found to be uncalibrated. These pieces of M&TE equipment are used to generate a step function into a second piece of calibrated M&TE which disregards the actual amplitude of the input signal and requires only input of a step function. The TEC LCSR equipment is functionally tested in step 5.1.2 of SI-478 against a standard decade resistance box which itself is calibrated to National Bureau of Standards criteria. The current rating of the RTD is well below that generated by the current bridges, and the current output of the bridges were checked with a multimeter prior to commencing the RTD calibration.

7. Monthly Maintenance Observations (62703)

Station maintenance activities on safety-related systems and components were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and in conformance with TS.

The following items were considered during this review: LCOs met while components or systems were removed from service; redundant components operable; approvals obtained prior to initiating the work; activities accomplished using approved procedures and inspected as applicable; procedures used adequate to control the activity; troubleshooting activities controlled and the repair record accurately reflected activities functional testing and/or calibrations performed prior to returning components or systems to service; quality control records maintained; activities accomplished by qualified personnel; parts and materials used properly certified; radiological controls implemented; QC hold points established where required and observed; fire prevention controls implemented; outside contractor force activities controlled in accordance with the approved Quality Assurance (QA) program; and housekeeping actively pursued.

- a. Maintenance on the 2B-B Centrifugal Charging Pump was reviewed and partially observed. This maintenance involved the addition of STO-2 oil (serial number 2-MTRA-62-108A) to the pump. Maintenance Request (MR) A526894 was reviewed and the participating Mechanical Maintenance Section (MM) technicians were interviewed. The MR stated only that oil was needed and gave no further guidance.

The two technicians involved in the maintenance stated that they had never added oil to this pump and were not familiar with the process. As a result of the MM technicians lack of familiarity with the process, a Radiation Work Permit (RWP) (RWP 02-2-85734) was written which prescribed the use of lab coats and did not authorize disassembly of the pump. The two assigned technicians consulted a maintenance foreman and determined that a second MR was needed for partial disassembly of the pump in order to add oil. This action resulted in rewriting the RWP and performance of a radiological survey of the area.

A technician, accompanied by a Quality Assurance technician, went to an oil storage room in the turbine building to draw the oil. When the technician attempted to transfer oil from the drum to a can, he did not inspect the internal condition of the can for debris or other oil. The QA inspector stated that his only function was to ensure that the MM technician drew the correct oil. Both the technician and the QA inspector stated that the can should be rinsed with STO-2 oil prior to filling it.

The licensee considered these MM technicians to be qualified and the MR process to be adequate despite the demonstrated difficulty with this relatively simple process. The technicians later determined that there was not any of the correct oil in the storage room. The inspector will continue to evaluate the appropriateness of the licensee's position on skill of the craft credit.

- b. On August 11, 1985, the Unit 1 letdown orifices 1-62-72, 73 and 74 were determined to be leaking. The leakage was discovered when relief valve 62-662 lifted after the letdown orifices were isolated. Manual isolation valves 62-723 and 62-714 were closed and containment isolation valve 62-77 was closed, tagged and the power removed.

The letdown orifice valves are Masoneillan valves with removable seats. It was discovered that all three valves had flow induced cuts on the seats and required repair. The following material was reviewed:

Maintenance Request (MR) A297129, A297130, A297130
 Drawing 47W809
 Drawing A8424, Revision 901, Contract 68C60-91934
 Maintenance Instruction MI-10.1, Diesel Generator Inspection,
 Units 1 and 2

In order to ensure proper valve seating, the surface of the corresponding disc had to be angle cut. The technicians stated that they matched the previous angle on the disc and shaved its surface. The angle used was thirty degrees. MI 10.1 was amended to include the authorization for milling these valves. No technical manual was available to the technicians, and the angle used to mill the disk had

not been verified to be correct. This is an Inspector Followup Item (327/85-27-03, 328/85-28-03) to evaluate the acceptability of the milled disk.

9. Review of Licensee Event Reports (LERs), Deficiency Reports, and Special Reports (92700)

- a. 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, violations of regulations or Technical Specification conditions had been identified.

LER's Unit 1

82024

Inoperability of the Turbine Building Sump Monitor and Condensate Demineralizer Effluent Monitor

Subsequent LER 83058 identified the same problem which was blocking of flow switches due to buildup of crud and debris. Flow switches were replaced per Work Plan No. 11068 with a new design, having a sight glass for inspection of crud buildup and a low flow alarm.

83018

Containment Internal Differential Pressure Exceeded 0.3 psig Relative to Annulus Pressure

Although similar events occurred afterwards, the causes were different. In this case the EGTS suction damper failed to open due to a failed latching relay. The relay was replaced per MR No. A-106214.

83038

Potential Inoperability of Diesel Generators Due to High Environmental (Outside) Temperature.

83045

Steam Generator Wide Range Level Channel Inoperable.

83094

Steam Generator No. 4 Steam Flow Indicated Zero; Redundant Loop Indicated 106 Lbs/hr.

This was reoccurrence of a previous event described in LER 83037. Air entrainment in sensing line was suspected. The sensing line

was backfilled and output verified per MR No. A-082218. No recurrence was identified.

- 83164 Turbine Building Liquid Effluent Line Radiation Monitor Not Able to Clear a False Hi-Rad Alarm Due to Arcing Contacts in Power Relay.
- 83168 1A-A D/G Failed to Start.
- 83183 Steam Supply Valve Failed to Meet Surveillance Requirements; Limitorque Switch Failure
- 84030 and Revision 1 Incore Detector Thimble Tube. Failure at High Pressure Connection.

LER's Unit 2

- 83060 Inoperable Auxiliary Feedwater (AFW) Automatic Control Valve

Control Valve 2-LCV-3-156 failed to fully open due to incorrectly sized metering orifice in the pneumatic relay. There were previous similar occurrences. A subsequent occurrence was reported in LER 328/03133. For corrective action, valves on both units were inspected and another control valve, 1-LCV-3-164, was found to have an incorrectly sized orifice. A safety evaluation was made by EN DES, USQD-83-8, Rev. 0, which reported that the valve would stroke properly with input air pressure reduced to as low as 48 psig. The 35 psig metering orifices were replaced with the correct 60 psig orifices ones. Also, permanent tags were mounted on the actuators stating that a 60 psig metering orifice should be used for replacement, and Surveillance Instruction SI-75 was revised to verify proper metering orifice replacement and ensure a 60 psig supply pressure. The inspector verified implementation of the above corrective actions.

- 83061 Steam Generator (SG) No. 2 Pressure Indicator Failed Low
- 83064 AFW Automatic Valve Failed to Close on Demand

Cause was due to a faulty circuit board in Beckman Controller; it was replaced per MR A-105946.

83072 SG No. 1 Remote Shutdown Pressure Indicator Failed High

83133 AFW Automatic Control Valve Failed to Open on Demand

Cause was due to an incorrect air pressure supply regulator setting. Per MR A-110425 the air supply was adjusted to 59 psig and proper valve operation was verified.

83003 Failure to Seal Electrical Conduit Penetrating a Fire Barrier.

85004 Two Reactor Trips Due to Low-Low Steam Generator Water Level

- b. The following items (18 months and older) were reviewed by the inspector and are considered closed. The corrective actions were reviewed and appeared to be appropriate. These items were:

Unit 1

Special Report 83-03 which pertained to breached penetration fire barriers in the auxiliary building.

Unit 2

CDR 81-05, Retrievable Information from Valve Tag Numbers

The subject deficiency involved lack of manufacturers valve data in the licensee's documentation systems, thereby impeding the retrieval of pertinent engineering data used in piping analyses and other design calculations. For corrective action the licensee revised all drawings in series 47A365, 57A366, and 47B601 to cross reference the manufacturer's valve information. This was a long-term corrective action to be completed by June 30, 1984. The inspector reviewed the licensee's corrective action under Work Plan Number 10809. The inspector reviewed a sample of revised drawings and verified implementation of the corrective action.

CDR 81-24, Waiving Source Inspection Without Proper Authority

The subject deficiencies was in the control of procurement activities program and was generically applicable to other TVA facilities. This item was inspected and closed for the Bellefonte and Watts Bar facilities;

The corrective action also applies to Sequoyah facility and the item is closed.

10. Event Followup (93702, 62703, 61726)

- a. On August 11, 1985, a leak in a Chemical and Volume Control System (CVCS) sample line was identified by an Auxiliary Unit Operator (AUO) during a routine walk through. A crack was discovered in the weld area of the 3/4-inch sample line which runs off the Unit 1 reactor coolant system letdown line. The unit was operating at 100% power at the time of the discovery and continued to operate at this power level. The AUO reported the situation to the Assistant Shift Engineer (ASE) who directed the operators to isolate normal letdown. The leakage rate was approximately 0.4 gallons per minute (gpm) and there was no detectable airborne radioactivity. This event was similar to an event which occurred on July 29, 1985 on Unit 2. The Unit 2 occurrence resulted in a declaration of an Unusual Event by the licensee as a result of exceeding RCS leakage limits. The Unit 2 event is discussed in Inspection Report 327,328/85-26.

The licensee completed weld repairs on the affected sample lines on both units, and pipe supports were designed and installed to prevent recurrence of the cracking. Neither line had been originally supported by a pipe brace or support. As partial corrective action, the licensee performed a structural walkdown in the accessible areas of the CVCS on each unit to determine if there were additional unsupported lines. Welds on these smaller lines were not examined during this walkdown. The licensee also used low frequency accelerometers to test the main CVCS lines for vibrations. No vibrations were identified, and no root cause for either line's failure has been identified by the licensee. The licensee intends to monitor this system during system operation configuration changes in an attempt to identify a source of the vibrations. This is Inspector Followup Item (327/85-27-05, 328/85-28-04).

The licensee shipped both failed sample lines to a vendor for metallurgical analysis. The analysis included, in part, an examination with a standard electron microscope. The Unit 1 failure was similar to the previous failure on Unit 2. Both failures were generated by high-cycle, low stress fatigue originating on the outer diameter of the schedule 40 stainless steel line in the heat affected zone of the weld.

The following material was reviewed by the inspector for Units 1 and 2. In addition, this material was reviewed by an NRC metallurgical inspector as documented in NRC Inspection Report 327/85-29, 328/85-29.

Drawing 47B001 series
Drawing 47W609
Drawing 47W809

Drawing 47W625
Support Variance Sheet 84080Z0111
Support Variance Sheet 84090Z0057

Prior to the crack on Unit 1 and immediately following the crack on Unit 2, the licensee wrote a Maintenance Request (MR 123140) to conduct a liquid penetrant test of the Unit 1 weld area in accordance with Technical Instruction TI-51, Liquid Penetrant Examination Using the Color-Contrast Solvent-Removable Method for Elevated Temperature Examinations. This procedure was completed for the entire surface area on the Unit 1 CVCS letdown sample line between the main three inch line and valve 62-674. The technicians who performed the examination, reported that a full outside diameter test was conducted with no discrepancies noted.

When the second failure was evaluated by the vendor, liquid penetrant and developer were identified inside the crack. The depth of penetration attained by the dye penetrant and developer were approximately one third and two thirds of the distance from the exterior wall towards the inner diameter wall, respectively. This indicated that the crack was present when the dye penetrant and developer were applied to the pipe section being tested. The presence of the dye and developer was verified through both X-ray isotopic analysis and electron microscope examination.

Failure to adequately implement TI-51 dye penetrant testing on July 31, 1985 is a violation (327/85-27-04). Proper performance of the TI should have identified the crack in the CVCS letdown sample line prior to leakage.

The licensee action plan to determine the root cause of the letdown sample line cracks and corrective actions were specified in the August 28, 1985 letter from Mr. H. G. Parris of TVA to Dr. J. N. Grace of NRC Region II. The resolution of the failed branch line joints consisted of two parallel efforts: 1) to determine the root cause of the two cracked lines and 2) to ensure that other similar lines are not cracked or going to crack. For the root cause evaluation, the licensee had metallurgical examinations performed by Combustion - Engineering, Inc., on the failed pipes and committed to obtain vibration data for various system flow rates and alignments and to investigate the maintenance history of the branch line, including preoperational history and history at other Westinghouse plants having similar configuration. For the second parallel effort, the licensee committed to inspect the remaining positions of the letdown system and review the maintenance history of snubbers/hangers on other selected systems for indication of vibration problems. The licensee submitted a status report of findings on September 15, 1985.

- b. On August 16, 1985, the licensee declared pressure transmitters in the Emergency Gas Treatment System (EGTS) inoperable due to environmental qualification issues. The qualification was questioned when it was determined that a Containment Spray (CS) line which would carry potentially highly radioactive water during an accident was located in close proximity to the transmitters. This line had not previously been considered in the environmental map of area. The transmitters were declared operable after setpoint readjustments were evaluated and made.

During an unrelated independent contractor audit of 10CFR50.49 compliance at Sequoyah Nuclear Plant, a review of a sample of the documentation packages and supporting technical material for the environmental qualification of safety-related equipment at the plant was conducted. This review identified the following documentation deficiencies:

1. Documentation was not available to support the determination that certain equipment was environmentally qualified.
2. Technical criterion were not available to support certain engineering evaluations.
3. Manufacturer's recommended maintenance/surveillance actions were not taken or were not validated on all Qualified Maintenance Data Sheets.

After examination of the audit findings the licensee identified three main areas of concern:

1. Inadequacy of the justifications of environmental qualification of equipment based on similarity to other equipment.
2. Inadequacy of equipment aging analyses.
3. Establishment of qualified equipment life.

Due to these discrepancies and potential for unqualified equipment, the licensee commenced shutdown of Unit 2 on August 21, 1985 and of Unit 1 on August 22. Both units were in cold shutdown on August 23. The licensee is conducting a comprehensive review of the environmental qualification of safety related equipment for both units. This shutdown was confirmed by 50.54(f) letter from the NRC on September 17, 1985.

- c. On August 9, 1985, while operating at 100% power, a routine boric acid sample was taken on Unit 2 loop 3 cold leg injection accumulator.

The events that followed lead to a violation of the TS 3.5.1.1 LCO.
The chronology of the events follows:

August 9

<u>Time</u>	<u>Event</u>	<u>Boric Acid Concentration</u>
1440	Number 3 loop accumulator sampled	1907ppm
1440	Boric Acid Add Recommendation Sheet completed	1907ppm
1740	Number 3 loop accumulator was drained in preparation to add borated water. LCO 3.5.1.1 was entered due to low level in loop 3 accumulator.	
1830	Loop 3 accumulator sampled. TS minimum value is 1900 ppm boric acid.	1891
2115	Stopped draining loop 3 accumulator.	
2120	Started 2BB safety injection pump to fill loop 3 accumulator with borated water.	
2212	Reactor Operator exited LCO 3.5.1.1 based on restoration of level in the loop 3 accumulator. The out-of- specification low boric acid concentration from 1830 sample was not considered.	
2350	Loop 3 accumulator sampled, and second sample ordered.	1839ppm

August 10

0002	LCO 3.5.1.1. is entered by Reactor Operator	
0100	Loop 3 accumulator resampled.	1831
0120	Loop 3 accumulator resampled and within the TS allowed limits.	1961
0200	LCO 3.5.1.1 was exited by the Reactor Operator	

The above sequence of events indicates that LCO 3.5.1.1 was entered as a result of accumulator level at 1740 on August 9, 1985. The licensee met the LCO at 0120 on August 10, 1985. The plant actually remained in the LCO, however, because boric acid concentration was determined to be out of tolerance low prior to the accumulator level being restored to the TS required limit. The total time that elapsed from the initial entry into LCO 3.5.1.1 to its exit at 0120 on August 10, 1985 was seven hours and forty minutes. The licensee did not comply with the LCO 3.5.1.1 action statement which requires the plant to be placed in hot shutdown condition within seven hours after initial entry into the LCO. This is a violation (328/85-28-05). The safety significance of this event was low since there is reasonable assurance that sufficient boron concentration existed in the accumulator after the level was restored, and the boron injection tank and other three cold leg injection accumulators were available to satisfy the safety analyses.

11. Inspector Followup Items (IFI) (92701)

(Closed) IFI (327,328/83-31-05). The licensee was in the process of writing a single, comprehensive statement regarding all aspects of independent verification at the time this IFI was opened. The licensee presently has an Administrative Instruction (AI-37), Independent Verification, Revision 1, which addresses independent verification in all cases, with the exception of temporary alterations. The control of independent verification during the performance of a temporary alteration is addressed in AI-9, Control of Temporary Alterations. This IFI is closed.

(Closed) IFI (327,328/83-31-06). The licensee was reviewing a number of procedures that had been identified by the NRC resident inspectors as procedures that required independent verification when this IFI was opened. The licensee developed AI-37 following this review. The inspectors will, during the course of normal system and procedure inspections, evaluate the adequacy of independent verification in site procedures. This IFI is closed.

(Open) IFI (327/84-24-04). The inspector reviewed the following documents pertinent to seal table fitting maintenance:

MI-1.9, Revision 6

MI-1.10, Revision 2

Crawford Fitting Company letters dated August 13 and November 16, 1984

TVA NSRS Report R-85-02-SQN/WBN dated March 25, 1985

Westinghouse Technical Bulletin 84-09 Revision 1 dated April 24, 1985

Issues identified by Crawford, with respect to the use of their fittings on the thimble and guide tubing, were resolved as not being of safety concern as documented in their November letter. Crawford still does not recommend mixing their fittings with fittings of other vendors. Westinghouse also does not recommend use of fittings of different vendors, although certain mixed fitting combinations have been tested by TVA and Westinghouse and determined to be adequate high pressure seals.

The inspector reviewed the licensee maintenance procedures listed above to determine if vendor recommendations were incorporated. The review of MI 1.9 identified several recommendations which had not been incorporated. When brought to the licensee's attention, licensee maintenance personnel provided a draft revision to the procedure which was awaiting review. These revisions are to be in place prior to thimble tube cleaning activities during the Unit 1 refueling outage. Additionally, Sequoyah maintenance personnel plan to review the Unit 1 seal table fittings to determine the desirability of making all fitting combinations uniform. While no immediate safety concerns have been identified in this area, this followup item will remain open until the licensee has revised MI 1.9 and evaluated current high pressure seal fitting adequacy.

With respect to the thimble tube blockage problem, TVA has established a policy of cleaning and lubricating all thimble tubes during refueling outages. During the Unit 1 ice weighing outage, 8 to 10 blocked tubes were cleaned. Currently, Unit 2 has two plugged tubes. The licensee has also determined that detector cables undergo less corrosion when detectors are kept in their storage position when not in use.

12. NRC Order EA 85-49 Followup

The inspector reviewed the licensee's response dated July 26, 1985, to NRC Order EA 85-49. The inspector reviewed enclosure 2 of the submittal and held discussions with TVA licensing staff personnel. Enclosure 2 provided a summary of the employee survey, and TVA personnel provided position title information for a sampling of employees. The inspector identified eight employees having early knowledge of the issue (A0100, A0102, A0121, A0132, A0136, A0138, A0165, A0168). Based on TVA input, these individuals did not hold positions that would have brought them into the pressure transmitter issue. The inspector concluded their surveys were inaccurate or did not reflect an understanding of the issue. The inspector also questioned a Nuclear Safety Review Staff member involved in TVA's review of this issue. This individual stated that none of the eight were interviewed since their names were not mentioned as associated with the issue during interviews with cognizant TVA personnel.

The inspector identified one management level individual not included in the survey. TVA personnel stated this was an oversight due to the transfer of the individual to Bellfonte. TVA provided the survey information on the individual in a supplemental response dated August 30, 1985.

The inspector identified no violations or deviations.