



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

ELEMENT REPORT NO. 10900-S0N "CABLE INSTALLATION"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-323

1.0 SUBJECT

Category: Construction (10000)
Subcategory: 10900
Element: 10900
Employee Concern: The following cable installation concerns were identified.

Maximum Pull Tension and/or Sidewall Pressure Exceeded

EX-85-076-003	EX-85-086-001	IN-85-213-001	IN-85-255-001
IN-85-285-003	IN-85-325-005	IN-85-433-002	IN-85-436-004
IN-85-581-001	IN-85-733-001	IN-85-856-005	IN-85-935-001
IN-85-978-001	IN-86-028-001	IN-86-199-001	IN-86-201-001
IN-86-259-001	IN-86-262-003	XX-85-008-001	XX-85-094-004

Minimum Bend Radius Exceeded

EX-85-157-002	IN-86-266-006	WI-85-011-013	JLH-86-002
---------------	---------------	---------------	------------

Inadequate Splicing

MAS-85-003	IN-86-268-003
------------	---------------

Insulation Damage

00-85-005-014

Improper Cable Coating

IN-86-259-005

480 Volt Receptacle Wire Size

IN-85-009-001

Nuclear Instrumentation System (NIS) Cable Unsupported

IN-85-120-001

Firebarrier Adequacy

IN-85-018-004 XX-85-094-005

Improper Cable Routing

IN-85-300-002 IN-86-268-003

Termination Inadequate

I-85-101-WBN PH-85-003-N32

Element Report CO 10900-SQN, Revision 7, dated June 18, 1987, is the Sequoyah Nuclear Plant (SQN) specific response to the generic implications of Watts Bar Nuclear Plant (WBN) employee concerns listed above in all areas of the cable program.

2.0 SUMMARY OF ISSUE

The problems as defined by TVA, are as follows:

- ° Cable Installation - Allowable limits for the maximum pull tension (MPT), cable sidewall pressure (SWP), and minimum bend radius (MBR) have been exceeded.
- ° Splicing - Specific instance of an improper splice for CS CCS pump and questions about splices in harsh environments.
- ° Insulation Damage - Insulation was mistakenly cut off of a 440 volt cable which feeds the back flow or discharge gate hoist motor (part of Condenser Circulating Water (CCW) System) and was incorrectly repaired using electrical tape.
- ° Cable Coating - Flamemastic 77 applied thicker than specified in site procedures, therefore, allowing too much heatup in cable trays. Flamemastic was removed from cables with sharp instruments which could have resulted in possible cable damage.
- ° 480 Volt Receptacle - Receptacles have not been properly sized per the Division of Nuclear Engineering (DNE) specified wire size for receptacles found throughout the plant.
- ° Nuclear Instrumentation System Cable - Cables were unsupported for excessive distances between raceways and the NIS detectors.
- ° Firebarriers - Inadequate controls and improper tools were used to breach firebarriers (Room Temperature Vulcanizing (RTV) silicone foam) in wall and floor penetrations.

- ° Cable Routing - Site Division of Nuclear Engineering (DNE), Modification personnel and DNE personnel in Knoxville were not in agreement concerning the routing of cables outside of the raceway system.
- ° Terminations - AMP Diamond Grip Insulated Terminal Lugs (PIDG) which were designed for use with stranded wire were used on solid wire leads.

3.0 EVALUATION

- ° Cable Installation - Maximum Pulling Tension (MPT) and Maximum Sidewall Pressure (SWP)

The licensee evaluated operational, maintenance, and surveillance test data on cables from TVA's operating plants and any readily available equivalent data from other outside sources. These data were used to determine if cable failure could be attributed to past cable pulling practices including exceeding the cable manufactures recommendations concerning maximum allowable sidewall pressure and minimum bending radius. TVA concluded from this evaluation that past Class 1E cable installation could not adversely affect startup, operations, or safe shutdown capabilities of SQN. This conclusion was based upon the use of historical data and ongoing surveillance requirements which have not identified any failures.

The staff did not agree that the above data alone supported this conclusion, because cables which are not installed in accordance with the cable manufactures recommendation may only fail on a random basis over an extended period of time.

The licensee has stated that Class 1E cables which required mechanical assistance for pulling also required the craft foreman to notify the cognizant engineer. The engineer would then calculate the size of the pulling rope. This rope size would preclude exceeding the cable tension because the rope would break at a tension lower than the maximum cable tension. The staff did not find this line of argument persuasive.

TVA Nuclear Safety Review Staff (NSRS) evaluation of cable installation identified the following deficiencies:

- Excessive cable side wall pressure was not considered in the procedures.
- The method used to determine maximum pull tension (MPT) on multi-cable pulls was not acceptable.
- The method used to resolve questions of exceeding manufacturers minimum bend radius (MBR) was not acceptable.

NSRS concluded that TVA's program was inadequate to accomplish the cable pulling activities and in violation to the accepted industry standards and practices. NSRS recommended that procedures be modified to reflect the manufacturer's test data for MPT, SWP and MBR.

The staff has reviewed the revised General Construction Specification No. G-38, "Installing Insulated Cables rated up to 15,000 volts", Revision 2, dated March 17, 1986 and the revised Modification and Addition Instruction SQN-M&AI-04, "Installation of Control, Power, and Signal Cables", Revision 12, dated May 8, 1987. Both G-38 and SQN-M&AI-04 provide guidance for the installation of cables regarding maximum pull tension, maximum cable side wall pressure and minimum bend radius. The staff finds both to be acceptable.

The licensee has analyzed 16 worst-case conduits to determine if cables had been subject to excessive side wall bearing pressures. The calculation concluded that all the calculated sidewall pressure and pulling tension values were within the prescribed guidelines. The NRC staff concluded that the values using the coefficient of friction Yellow-77 lubricant is nonconservative and the calculations are therefore not acceptable. Further, pullby would have had higher friction forces and therefore higher sidewall pressures, which are not reflected in the calculations.

The licensee has conducted a test to determine the maximum SWP which did not cause a dielectric breakdown of the conductor installation. Representative samples of power, control, instrument cables, including coaxial cables, were selected for this SWP test. The cables were subjected to near the maximum tensile strength except for wire size greater than number 2 AWG. TVA concluded from these SWP tests that cables could be installed with higher values than the cable manufacturer had recommended without cable damage.

The NRC staff concludes that cables may have been installed at SQN where values of pull tension and side wall bearing pressure exceeded the cable manufacturer's recommendations. The staff does not find acceptable TVA's evaluation and analysis for determining that cables were not damaged during installation. However, the staff does find acceptable TVA's test results which demonstrate, by dc high voltage tests, the integrity of 1E cables installed in conduits at SQN. These tests have adequately demonstrated the integrity of cables at SQN also for other installation concerns such as, pullby, jamming and vertical drop. A separate safety evaluation report will address the results of TVA's cable test program.

Minimum Bend Radius

The following are concerns about cable bend radius:

- EX-85-157-002: The condulette fittings caused excessive cable bend.
- IN-96-266-006: Many cables were pulled around 90 degree bends without maintaining proper placement in the cable trays.
- JLP-86-002: Conax electrical connectors have been installed with wire radius smaller than allowed by procedure M&AI-19.
- WI-85-100-013: Cable bending radius problems.

The above employee concerns were specific to the Watts Bar Plant. TVA has addressed the generic concern relative to SQN in this element report.

The TVA's Nuclear Safety Review Staff (NSRS) concluded that some cables had been installed at SQN where the cable manufacturer's minimum bend radius had been exceeded. These conclusions were based on personnel interviews and limited field evaluation.

Because the above concern JLH-86-002 impacted the EQ of components TVA conducted a survey at SQN. This survey identified discrepancies which were reported in SQ-CAR-86-02-005. The corrective action was an inspection of all field termination of Conax connectors and rework if required.

TVA's Electrical Engineering Branch (EEB) analyzed the actual bend radius to which each cable type has been or could have been subjected to during installation. The elongation stress due to this bending was then determined. The stress was the critical parameter in determining acceptability. NSRS has indicated that preliminary conclusions of this study indicate that the installed non-shielded cable bends would not cause cable failures. This final report was to be issued in March 1987.

The effects of bending shielded power cable (8kV), instrument coaxial, triaxial and twinaxial cables were to be evaluated separately. A field inspection was to be conducted for the existence of pull boxes or conduits of any type in which the cables are bent as well as individual inspections of a cable's bend radius. The actual bend radius would be determined and the effects on the cable integrity would be established. This activity was tracked by SCR SQNEEB8703 which was to be completed by March 1987.

Overbending shielded power cable (8kV) could cause separation of either the conductor from the insulation or the semiconduction insulation from the insulation or the semiconduction insulation from the drain wire. All of the above could cause long term corona failure of the insulation. The NRC staff's review of the class 1E, 6.9kV electrical system indicated that either three conductor shielded cables sized 2/0 or 4/0 were used in the system design.

The outside diameter of these cables are 1.5 inch and 1.75 inch. The current cable installation procedure M&AI-04, Revision 12, lists the minimum cable bend radius as 12 times the cable outside diameter. This minimum radius for the class 1E 8kV shielded cable is 18 inches for the 2/0 cable and 21 inches for the 4/0 cable. The staff's observations of the raceway system at SQN, would lead to the conclusion that the current minimum bend radius requirement of 18 and 21 inches were met for 8kV shielded cables.

The staff concludes that the test results of the 600 V non-shielded cables which were part of the test program for other concern such as, pullby, jamming and vertical drop have demonstrated the integrity of cables for bend radius concerns.

As of March 1988 TVA has not submitted the two reports which had been committed to in March 1987. The minimum bend radii concern is not considered a restart

issue. The staff will review the two minimum bend radii reports when they are issued.

° Splicing

The specific concern is that the CS CCS pump had split insulation that had been improperly taped during construction. A review of MR A561116 indicated that one cable had been repaired with Raychem sleeves as required and the other cable was found with no damage. TVA has indicated no further action is required for this concern. Two non-conformance reports (NCR) 6208/6224 concerning these cable splices were dispositioned by personnel in the licensee's Experience Review Program. The splices identified in the NCR's were inspected and where required reworked. The documentation for the inspection and/or correction was sent to the Environmental Qualification (EQ) project as part of the EQ binder. The licensee considered these NCR's closed.

The generic applicability of NCR 6623/6774 caused a Significant Condition Report (SCR) SQNEEB8631 to be written. The licensee's DNE and EEB personnel reviewed the following concerns:

- HVS Raychem kits identified for the time frame of concern were not used at SQN.
- The concern that the applicable range of WCSF-N tubing was not used correctly did not apply, because the ranges for usage were broadened.
- Breakout and end caps with no oversleeve in harsh environment was not a problem for cables whose ends were not sealed to keep the shield (or drain) wire separated from ground.

The licensee has closed out SQNEEB8631 on an accept-as-is basis. The staff has reviewed the TVA response and has found the TVA response adequate. The staff's acceptance is based on discussions with the Sequoyah electrical engineering personnel, review of SQN-M&AI-7, Cable Termination, Splicing and Repairing Damaged Cables, Revision 11, dated June 11, 1987 and review of calculation EEB8EC801, "Instrument Cable Shield and Grounds due to Moisture in Harsh Environment," dated August 12, 1986.

° Insulation Damage

The specific concern states that insulation was removed from a 480 volt cable which supplied power to the back flow or discharge gate hoist motor of the condenser Circulation System (CCS) system. Electrical tape was supposedly used to re-attach this insulation. Four motors and conduits were identified with this concern. The concern was verified. However, the components have been removed from service. The removal of the components have been documented and the power cables deenergized with their respective breakers tagged. The licensee does not consider any further action is warranted for this concern.

The staff has reviewed the procedure for identifying and controlling equipment that is removed from service but left in place and finds it acceptable.

o Cable Coating

The concerns about the use of Flamemastic 77 cable coating were as follows:

- The Flamemastic coating had been applied in thickness greater than that recommended by DNE.
- The use of a sharp instrument had been used to remove this coating.

The licensee could not confirm that a sharp instrument had been used to remove the Flamemastic coating from the cable. This potential for cable damage using a sharp instrument exists since no specific procedure precluded the use of a sharp instrument. The licensee will provide a specific procedure for the removal of the Flamemastic coating, should there be a future requirement for this removal. This removal guidance will be either a revised procedure or a new procedure. The licensee has verified that Flamemastic coatings have been applied for depths greater than the limits. The staff during a walkdown of portions of Sequoyah Unit 2 did not observe flamemastic coatings which appeared to exceed one half inch. TVA's ampacity evaluation for the power cables was made based upon one quarter inch thickness. However, this was reevaluated using one half inch flamemastic thickness and found acceptable by TVA.

The staff has reviewed the ampacity concern in employee concern Element Report 24000 "Cable Derating" and found the corrective action taken by TVA acceptable.

The staff reviewed SQN-M&AI-13, "Electrical Pressure Seal, Firestop Barrier, Thero-Lag 330 Fire Barrier System and Flame Restardant Cable Coating," Revision 8, dated July 24, 1987. M&AI-13 included guidance for the application and removal for Flamemastic 77 which the staff finds acceptable.

o 480 Volt Receptacle Wire Size

The concern was that an incorrect wire size was used for the 480 volt receptacles. Two of the receptacles were examined to determine the manufacturer model number and wire size. The specific model required a cable diameter from 0.64 inch to 1.37 inch. The wire size used was three conductor number 2 AWG. A single conductor number 2 AWG was determined to be 0.476 inch in diameter over the insulation. The licensee has determined the three number 2 AWG conductors overall diameter would be a minimum diameter of 1.02 and a maximum of 1.30 inches. The licensee concluded that this diameter is within the range of 0.64 to 1.37 inches specified by the receptacle manufacturer and there is no valid concern.

The staff concurs that the receptacle wire size is not a valid concern based upon the following considerations:

- The National Electric Code NFPA 70 lists 7 strand number 2 AWG rated 90 degree C with 40 degree ambient in free air ampacity as 130 ampere. Derated by 20% for conduit the ampacity is 104 amperes. This appears to be a reasonable value for a receptacle rating.

° NIS Cable Unsupported

The concern was that unsupported excessive distances existed between the raceway and the detectors for the NIS cable. This was a concern for WBN which was evaluated by the SQN Employee Concern Task Force and documented in a report for adequacy. The staff concluded that these large distances did not exist in the SQN design and therefore, there was no problem.

° Firebarrier Adequacy

The concern was that inadequate controls and improper tools have been used to breach firebarriers in wall and floor penetrations. However, the method of breaching the fire stop at WBN was a fish tape not a fish hook as identified by a concerned employee. The procedure permitted the use of a metallic breaching tool provided it was free of burrs and sharp edges. Although no known problems were identified using a fish tape the maintenance and additional instructions, M&AI-14, Revision 2, for WBN was revised to permit the use of either a fiberglass or wooden rod fire stop breaching tool. The NRC staff evaluated the SQN generic concern for the permitted type of fire stop breaching tool. As part of this evaluation the staff reviewed the following documents.

- General Construction Specification G-38, Revision 8, "Installing Insulated Cable Rated Up To 15,000 Volts."
- Maintenance and Additional Instructions M&AI-04, Revision 12, "Installation of Central, Power, and Signal Cables."
- M&AI-13, Revision 8, "Electrical Pressure Seal, Fire Stop Barrier Thermo-Lag 300 Fire Barrier System and Flame Retardant Cable Coating"

From the review of the above documents the staff determined the following:

- The upper tier document G-38 which is used for all facilities does not address the acceptable fire barrier breaching tool.
- SQN-M&AI-04 refers to the use of a fish tape as a fire barrier breaching tool.
- SQN-M&AI-13 permits the use of a metallic fire stop breaching tool for cable tray fire stops. However, the procedure specifies a non-conductive fire stop breaching tool for conduit fire stops.

The TVA conclusion (CATD to 900-NPS-02) of this subject for SQN stated that the same change that was made for WBN should be also made for SQN. The line management response to this conclusion was that the subject would be reviewed and if necessary the procedures would be revised. The NRC staff has contacted TVA for proper closure of this concern which is not a restart issue. The staff has not received a closure response.

° Cable Routing

Procedures prior to December 31, 1985 did not specify that cable must always be inside in raceways. This was the understanding of the site DNE and Modification personnel but not the understanding of DNE in Knoxville. The major number of cables outside of raceways (trays) were temporary security cables at WBN. SQN site personnel stated that they have seen one or two cables running outside of cable trays. Non QA cables have been identified as improperly routed at SQN in the 480 volt Shutdown Board Room 2A2 in cable tray JAN. Since there has been a past misunderstanding concerning cables routed outside of trays, SQN walkdown was made to verify that all permanent cables are in cable trays and to correct those that are not in the proper cable tray system.

A walkdown of Sequoyah Unit 2 was conducted by the staff to ascertain whether there were any cables routed outside of the raceway system. This walkdown was conducted in the following areas:

- 6.9KV switchboards
- 480 volt switchboards
- 125V batteries, charges and inverters
- Auxiliary building (partial)
- Containment (partial)
- Emergency diesel generator

The staff walkdown did not identify any cables which were improperly routed.

° Termination

The concern was that termination lugs designed for stranded wires were used on solid wires and therefore test point resistor failures in the Foxboro racks had occurred due to crimp failures. All PIDG lugs in the security system which were crimped on solid wire were replaced with the appropriate type terminal lugs. Procedures were revised to require that only AMP solid strand lugs be used on solid wire. Inspections to verify the extent of the misapplication have been conducted. Corrective action and a schedule for rework followed. The above activities have been completed except for the rework of lugs on solenoid valve surge suppression networks. The corrective action resolving this specific problem was that all solenoids which energize to perform their safety function would have lugs replaced or soldered over immediately. Ten percent of the other solenoids which deenergize to complete their safety function would be verified operable by field measurement of the arc suppressors circuit

resistance. If any were found open, all Class 1E arc suppressors would be checked. This procedure would be repeated periodically until all arc suppression circuits were permanently fixed.

The staff concurs that improper lugs should be replaced on those components which require energization for their safety function. For those components that deenergize to complete their safety function, a test program and/or long term replacement is adequate.

4.0 CONCLUSION

The NRC staff concludes that the licensee's investigation of the concerns were adequate and their resolution of the concern described in Element Report CO 10900-SQN, Revision 7, is acceptable.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
CO 11103-SQN "METHODS USED DURING INSTALLATION"

I. Subject

Category: Construction (10000)

Subcategory: Hangers/Supports (11100)

Element: Methods Used During Construction (11103)

Employee Concern: IN-85-288-001, IN-86-116-001, and XX-85-070-007

The basis for Element Report CO 11103-SQN, Rev. 5, dated December 19, 1986 is Watts Bar Employee Concerns IN-85-288-001 and IN-86-116-001 and Sequoyah-specific Employee Concern XX-85-070-007, which state (respectively):

"Snubbers are not handled properly and are not adjusted and installed in accordance with the manufacturer's recommended practices of protecting them in waterproof coverings, storing and carrying them compressed, and adjusting their paddles only while they are held vertical. Construction Dept. concern. (CI has no more information) No followup required."

"Not all piping hangers have ends of tube steel closed/capped, but electrical hangers do. When caps have been inadvertently installed on piping hangers, QC has made the craft remove them. Open tube steel collects dirt and water, and could conceal a bomb or other prohibited item. (Unit II construction). No additional information available in file. No follow up required."

"Sequoyah, September 1984 Unit 2: Installed snubbers are not per design drawings (115 drawings involved) and no rework has been scheduled except a request to include this in 1986's budget. Nuclear power concern. C/I has no further information."

Concerns IN-85-288-001 and XX-85-070-007 were evaluated by TVA as potentially nuclear safety-related and safety significant. The two Watts Bar concerns were determined by TVA to be potentially applicable to the Sequoyah Nuclear Plant (generic).

II. Summary of Issue

The issues raised by the three concerns appear unrelated, except that they involve pipe supports (snubbers, auxiliary steel). The issues were separately defined by TVA, and separate corrective actions were defined to resolve the issues. The three issues defined by TVA were: (a) there were no procedures covering handling of snubbers; (b) snubbers were not

installed in accordance with design drawings; and (c) not all vertical tube steel sections were capped to exclude water or other material.

III. Evaluation

TVA personnel reviewed Watts Bar Nuclear Safety Review Staff (NSRS) Investigation Report I-85-713-WBN, Sequoyah Nuclear Plant Standard Practices, Maintenance Instructions, Surveillance Instructions, contract documents and design drawings, interviewed cognizant personnel and conducted a field walk down. The TVA evaluators concluded that (a) although Sequoyah procedures did not generally include vendor (or other) requirements for handling snubbers the periodic surveillance and testing would have detected any damaged snubber due to improper handling; (b) some vertical tube steel sections were uncapped, contained water, and could be damaged by freezing; and (c) deviations had been made from typical snubber support drawings, but that the deviations had been documented on variance forms (although some documentation was subsequently lost).

Corrective Actions have been proposed by TVA to resolve the three areas of concern and prevent recurrence of the problems. These corrective actions are mainly of a documentation nature, including adding handling requirements to instructions and documenting hanger design variances. Those non-standard snubber supports which do not meet design requirements will be modified prior to restart. A limited number of vertical tube steel sections will be capped or be drilled to provide weep holes for drainage.

IV. Conclusion

The NRC inspectors reviewed Element Report CO 11103-SQN, Rev. 5 and the Employee Concerns Task Group (ECTG) file.

The NRC staff concludes that TVA's investigation of the three issues were adequate, and their conclusions and resolution of the concerns described in Element Report CO 11103 SQN, Rev. 5 is satisfactory. The corrective action for the snubber support design drawings, which TVA identified as a restart item, should be verified by NRC inspectors in a future inspection.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY FUNCTION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
(1110 SQN "HANGER INSPECTION DOCUMENTATION"

I. Subject

Category: Construction (10000)

Subcategory: Hangers/Supports (11100)

Element: Hanger Inspection Documentation (11106)

Employee Concerns: XX-85-053-001 and XX-85-053-002

The basis for Element Report CO 11106-SQN, Rev. 3, dated December 31, 1986 is Sequoyah-specific Employee Concerns XX-85-053-001 and XX-85-053-002 which state (respectively):

"Sequoyah - Documentation sampling plan for pipe supports and conduit supports was inadequate: plan allowed accepting systems with only 10% of the originally required documentation. Cases of missing documentation were "evaluated" away. In cases where 10% of the documentation was not found, inspections/tests were only re-done to the extent necessary to reach 10%. The CI does not believe this was adequate, and might not have met NRC requirements. (Unit 1 - 1978 to 1980, Construction Engineering). Aux., Control, and Diesel Gen. Buildings."

"Sequoyah - Engineering evaluations for documentation missing on pipe supports and conduits supports was not always done properly: sometimes the hardware was not examined before the evaluation was made. EG in one case, the NRC found a hanger documented as bolted, but it was actually welded. (CI has no more information) Unit 1 - 1978 to 1980 construction/engineering - Aux., Control and Diesel Gen. Buildings."

Concern XX-85-053-002 was previously evaluated by TVA's Nuclear Safety Review Staff (NSRS) as potentially nuclear safety-related and re-evaluated by the TVA Employee Concern Task Group (ECTG), subsequent to completion of their evaluation of the concern, as not nuclear safety-related. The basis for this re-evaluation, as stated on the Safety-Related Determination Status Change form (Attachment H in ECTG Procedure M.1) is that the problem identified by the concern is only with construction records.

II. Summary of Issue

The problem as defined by TVA is that engineering evaluations were not performed properly on pipe and conduit supports. The hardware was not always examined prior to the evaluation. Cases of missing documentation were evaluated away; where 10 percent of the documentation was not found, inspection tests were redone to the extent necessary to reach 10 percent.

III. Evaluation

The issues raised by the concerns relate to a program developed to review and evaluate the adequacy of inspections and tests for pipe and conduit supports based upon review of existing documentation.

TVA reviewed the Nuclear Safety Review Staff (NSRS) reports, Nos. I-85-605-SQN and I-85-709-SQN, Standard Operating Procedure (SOPs), No. 551, "Review of Records," Rev. 3, Construction Procedure No. P-24 Rev. 1, 2, 3 and 4, "Inspection and Test Status," Construction Procedure No. P-8, Rev. 13, "Quality Assurance Records," hanger typical drawings, documentation for engineering evaluations on pipe drawings, documentation for engineering evaluations on pipe and conduit supports and interviewed Construction and Quality Control personnel.

TVA concluded that the engineering evaluations and the documentation sampling were conducted in accordance with the site procedures. The procedures did not require visual inspection of the hardware unless existing documentation was evaluated as inadequate. When the existing documentation did not show that 10 percent or more of the concrete anchors in a given lot had been tested, tests were redone to the extent necessary to reach 10 percent.

It was decided to have TVA's Division of Nuclear Engineering evaluate the adequacy of this documentation sampling based on Attachment F to SOP-551, and corrective action to perform this evaluation was issued by line management.

TVA concluded that these concerns are not of generic applicability and that the corrective action is not a restart item.

IV. Conclusions

The NRC inspectors reviewed Element Report CO 11106-SQN, Rev. 3, the TVA Employee Concern Task Group (ECTG) file, and discussed the issue with TVA personnel.

Although the NRC inspectors do not agree that XX-85-053-022 is not nuclear safety-related, the re-evaluation was performed by the ECTG in conformance with ECTG Procedure M.1 (Attachment H), and did not affect their evaluation of the issue or the corrective action.

The NRC staff concludes that TVA's investigation and resolution of the concern described in Element Report CO 11106-SQN, Rev. 3 was adequate. No further action by the NRC is required.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1&2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
CO 11203-SQN "POOR PLANNING AND COORDINATION AS
RELATED TO CONSTRUCTION"

I. Subject

Category: Construction (10000)

Subcategory: Work Plan/Work Control (11200)

Element: Poor Planning and Coordination as Related to Construction (11203)

Employee Concern: MAS-86-003

The basis for Element Report CO 11203-SQN, Rev. 3 dated October 30, 1986, is Sequoyah-specific Employee Concern MAS-86-003 which states:

"Adequacy of work being done by construction concerning fuse identification work plans."

This concern was evaluated by TVA as potentially nuclear safety-related.

II. Summary of Issue

The problem as defined by TVA is that fuse identification discrepancies exist between the design drawings and the installed configuration and no corrective action had been, or was, being taken to resolve the discrepancies.

III. Evaluation

The TVA evaluators reviewed applicable documents including Workplan Number 10512 and interviewed TVA electrical maintenance personnel to determine the extent and specific details of the problem as defined. The evaluators found that there are fuse discrepancies, due to failures to keep as-built drawings up-to-date. The corrective action will use data developed from identification verification presently being performed. Discrepancies identified will be corrected as specified in work plans and upon completion, drawings will be marked up and revised. Current work practices at Sequoyah require a work plan, which must include approved design drawings prior to performing work.

IV. Conclusion

The NRC inspectors reviewed Element Report CO 11203-SQN, Rev. 3 and the Employee Concern Task Group (ECTG) file.

The NRC staff concludes that TVA's investigation of the concern was adequate and their resolution of the concern as described in Element Report CO 11203-SQN, Rev. 3, is acceptable. Implementation of the correc-

tive action, which TVA identified as a restart item, should be verified by NRC inspectors in a future inspection.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
CO 11206-SQN, "UNAUTHORIZED WORK/UNDOCUMENTED WORK
AS RELATED TO CONSTRUCTION"

I. Subject

Category: Construction (10000)

Subcategory: Work Control (11200)

Element: Unauthorized Work/Undocumented Work as Related to Construction
(11206)

Employee Concern: XX-85-007-X04

The basis for Element Report CO 11206-SQN, Rev. 2, dated March 10, 1987, is Sequoyah-specific Employee Concern XX-85-007-X04 which states:

"Sequoyah-drawings have been falsified. Details known to QTC, withheld due to confidentiality. Construction Dept. concern. CI has no further information."

This concern was evaluated by TVA as potentially nuclear safety-related and safety significant.

II. Summary of Issue

The problem as defined by TVA is that the Concerned Individual (CI) said his supervisor was signing as-built drawings which the CI had refused to sign. This supposedly occurred at the time of systems transfer for preoperational testing.

III. Evaluation

Employee Concern Task Group (ECTG) personnel reviewed Nuclear Safety Review Staff (NSRS) Report I-85-860-SQN and Sequoyah Nuclear Plant Construction Procedures. The NSRS report noted that Quality Technology Corporation (QTC) had recontacted the CI at NSRS request, but little additional information could be provided. The specific drawings handled by the CI could not be identified. The NSRS concluded that drawings had not been falsified and the CI had misunderstood the drawing approval procedure.

The ECTG investigation focused solely on the procedural aspects of the problem. They did not attempt to contact the CI due to confidentiality

considerations. According to procedures, signing of the drawings by the "unit supervisor" is sufficient. TVA, therefore, concluded the concern was not valid and no further action was required.

IV. Conclusion

The NRC inspectors reviewed the Element Report and the associated ECTG files, and discussed the issue with the ECTG evaluator and Sequoyah personnel.

The NRC staff believes that the TVA investigation of the concern was adequate, and their conclusions as described in Element Report CO 11206-SQN, Rev. 2, are satisfactory.