



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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT CO 11306-SQN

"TESTING OF ANCHORS"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Construction (10000)
Sub Category: Anchorages (11300)
Element: Testing of Anchors (11306)
Concerns: IN-85-285-002, IN-85-347-007, IN-86-115-001, IN-86-190-003 and
XX-85-023-001.

The basis for element report CO 11306, Revision 5, dated July 9, 1987 are five employee concerns which question TVA's testing of anchor bolts.

II. SUMMARY

The Employee Concerns Task Group (ECTG) report identified the following four issues from the employee concerns:

- a. Shell-Self-Drilling (SSD) type anchors were improperly tested or the pull test was bypassed.
- b. SSD type anchors are tested by sampling methods instead of on an individual basis.
- c. SSD type anchors are being overtorqued.
- d. There is no torquing requirement for instrument panel bolts.

III. EVALUATION

A technical review of Employee Concerns Element Report CO 11306-SQN, Revision 5 was performed by an NRC contractor under NRC Contract No. 05-86-156. The results of this review are summarized in the attached contractor technical evaluation report dated January 21, 1988, on Employee Concerns Element Report CO 11306, Revision 5.

Element Report CO 11306-SQN, Revision 5 found that there was a programmatic concern with all TVA sites concerning the issue of overtightening of anchor bolts. The recommended corrective action was that Sequoyah initiate a program

to address this issue. In addition, the element report recommended that TVA's procedures be revised to assure anchor shells are not in contact with the base plates when they are tested. Resolution of this corrective action was not considered a restart item in the ECTG report. The contractor review of Element Report CO 11306, Revision 5 found that TVA's evaluation of the employee concerns and the proposed corrective actions were adequate. The staff concurs with the conclusions presented in the contractor technical evaluation report.

IV. CONCLUSIONS

Based on the review of Employee Concerns Element Report CO 11306, Revision 5 the staff concludes that Employee Concerns IN-85-285-002, IN-85-347-007, IN-86-115-001, IN-86-190-003 and XX-85-023-001 have been adequately addressed at Sequoyah.

SEQUOYAH NUCLEAR POWER PLANT, UNITS #1 & 2
TECHNICAL EVALUATION REPORT FOR EMPLOYEE
CONDURNS ELEMENT REPORT CO 11306-SON
"TESTING OF ANCHORS"

1. Subject

Category: Construction (10000)
Sub Category: Anchorages (11300)
Element: Testing of Anchors 11306
Shell - Self-Drilling (SSD) type anchors were
improperly tested, not pull tested, tested by
sampling method, overtorqued and were not
torqued.
Concerns: IN-85-285-002, IN-85-347-007, IN-86-115-001,
IN-86-190-003 and XX-85-023-001.

The basis for element report CO 11306 Rev #5 dated 7/9/87 are
the following concerns:

IN-85-285-002

"TVA INSPECTED AND PULL TESTED REDHEADS IMPORPERLY: PULL
TESTING WAS NOT 100%. BASE PLATE OR HANGER WAS BOLTED IN
PLACE. EVEN REDHEADS THAT WERE LOOSE COULD HAVE PASSED BY
BEARING AGAINST THE BACK OF THE PLATE. BECAUSE THE HOLES
WERE NOT INSPECTED BEFORE REDHEADS WERE SET QC COULD NOT
TELL IF REBAR HAD BEEN CUT. CI HAD NO MORE INFORMATION.
CONST. DEPT. CONCERN. NO FOLLOW UP REQUIRED."

IN-85-347-007

"PROCEDURE DOES NOT REQUIRE TORQUING OF INSTRUMENT PANEL
BOLTS."

IN-86-115-001

"SELF DRILLING EXPANSION SHELL ANCHORS ARE BEING
OVERTORQUED. THIS IS DONE TO CORRECT EXCESSIVE GAP BETWEEN
BASEPLATE AND WALL. CRAFT PERSONNE' ARE NOT TRAINED TO THE
REQUIREMENTS OF SPEC. G-32 PARAGRAPH 3.2. CONSTRUCTION
DEPT. CONCERN -CI HAS NO FURTHER INFORMATION UNITS 1 & 2."

IN-86-190-003

"AN EMPLOYEE TOLD THE CI THAT THE SAFETY RELATED CONCRETE
ANCHORS (REDHEADS), WERE TESTED BY A SAMPLING PLAN RATHER
THAN INDIVIDUALLY. CI QUESTIONED THE ACCEPTABILITY OF THIS
PRACTICE. NUC POWER CONCERN. UNIT #1. CI HAS NO
ADDITIONAL INFORMATION."

XX-85-023-001

SEQUOYAH UNIT #2. PULL TESTS WERE ROUTINELY BY-PASSED AND/OR INCORRECTLY DOCUMENTED ON HANGERS/ANCHORS INSTALLED IN THE ANNULUS AREA. MID-1977. NO NAMES OR SPECIFIC LOCATIONS WERE PROVIDED. CONSTRUCTION DEPT. CONCERN. CI HAS NO MORE INFORMATION. NO FOLLOW-UP REQUIRED.

Concerns IN-85-285-002, IN-86-115-001, IN-86-190-003 and XX-85-023-001 were evaluated by TVA to be potentially nuclear safety significant and Concern IN-85-347-007 was evaluated by TVA to be not nuclear safety related.

II. Summary of Issues

The problem as defined by TVA is as follows:

- A. Shell-Self-Drilling (SSD) type anchors were improperly tested or the pull test was bypassed.
- B. SSD type anchors are tested by sampling methods instead of on an individual basis.
- C. SSD type anchors are being overtorqued.
- D. There is no torquing requirement for instrument bolts.

III. Evaluation

The TVA Employee concern task group (ECTG) evaluators reviewed applicable documents and interviewed cognizant sequoyah engineering personnel to determine if the above concerns are valid.

IN-85-5-285-002 addressed three concerns.

- o Pull testing of red head expansion anchors was not 100%
- o Pull testing was performed improperly. Red dead shell beared against back of base plate.
- o Holes were not inspected before red deads were set. QC could not tell if rebar had been cut.

100% pull testing of expansion anchors was never a requirement in SQN procedures. The SQN procedures specify that the testing be performed on a sampling basis. This is an acceptable method.

The TVA procedures do not specific that the red head expansion anchors be tested with the base plate not in place or that the base plate be shimmed to prevent the shell of the anchor

contacting the base plate during testing. This is a weakness in TVA's procedures. However the inspections and testing performed for the 79-02 response did require that the base plates be shimmed when the anchors were tested with the base plate left in place. The results of the reinspection programs performed since 79-01 indicate the failure rates are within acceptable limits.

This evaluation is acceptable. However the TVA procedures should be revised to ensure that the base plates will be shimmed when testing is performed through the base plate.

This element report does not address the concern that rebar could have been cut but it is addressed in element report number CO 11305-SQN.

Concern IN-85-347-007 states that the procedure does not require torquing of instrument panel bolts" The TVA evaluation agrees that the procedures do not require SSD type expansion anchor be torqued. Setting of SSD bolts is accomplished by using a method other than torquing and torquing is not a requirement of this type of bolt. The procedures do require that the wedge type be torqued.

This reviewer agrees with the evaluation.

Concern IN 86-115-001 states that "self drilling expansion shell anchors are being overtorqued." Interviews with responsible personnel indicated that this issue had never been addressed by SQN. The evaluation recommends that this issue be evaluated by SQN personnel.

This reviewer agrees with this evaluation.

The responses to concerns IN-86-190-003 and XX-85-023-001 are included in response to IN-85-285-002.

IV. Conclusion

As part of my review of this element report CO 11306, I also reviewed, General Construction specification #G-32 Rev #1, M&AI procedures #9 Rev 7 & 11 Rev. 15.

TVA's investigations of these concerns are adequate and TVA conclusions resolutions and commitments to resolve the concerns addressed in this element report are satisfactory.

The commitments are as follows:

- o The specifications and procedures will be revised to ensure that testing procedures do not allow pull testing of the anchors when the shell is in contact with the base plate.
- o The potential of overtightening of SSD type anchors will be evaluated by SQN personnel.

Safety Evaluation Report
Sequoyah Nuclear Plant
Employee Concerns

I. SUBJECT

CATEGORY: Construction (15000)
SUBCATEGORY: Damage (15100)
ELEMENT: Damage to Electrical Penetrations (C015102)
CONCERN: (IN-85-346-002) - Electrical penetrations entering the reactor building are not strong enough and have been damaged because of being walked on.

II. SUMMARY OF ISSUE

A generic concern about the condition of the electrical penetrations was identified as result of a review conducted on Watts Bar specific item IN-85-346-002. An additional concern over the adequacy of the penetration covers was also identified.

III. EVALUATION

The licensee determined that there was no damage to containment electrical penetrations and that the damage identified by the concerned individual was actually to the penetration covers. The electrical penetration covers are constructed of sheetmetal and are plant specific. In addition, the electrical covers have been included in the seismic calculations completed for the penetrations. The licensee determined that the penetration covers specific to Sequoyah were more sturdy than those used at Watts Bar and that there was no present damage to either the electrical penetrations or the electrical penetration covers.

IV. CONCLUSION

The licensee's review of potential reportable occurrences and field verification appear to be adequate to determine that there is no damage to the electrical penetrations at Sequoyah. The licensee has also determined that, at Sequoyah, adequate penetration covers are in place and that no excessive penetration cover damage exists. No actions are required to be completed prior to the startup of either unit. This issue is closed.

Safety Evaluation Report
Sequoyah Nuclear Plant
Employee Concerns

I. SUBJECT

CATEGORY: Construction (15000)
SUBCATEGORY: Damage (15100)
ELEMENT: Damage to Instrumentation Tubing (015109)
CONCERN: (IN-86-200-006) - Copper and stainless instrumentation tubing throughout Units 1 and 2 is unprotected and span between hangers are bent.
(IN-85-119-002) - Instrumentation lines through out power block are damaged, bent, flattened and touching.
(IN-85-618-004) - Instrument tubing in the Unit 2 accumulator #4 area is being severely damaged; protection should be provided.

II. SUMMARY OF ISSUE

A generic concern about damage to instrumentation tubing was identified as a result of three Watts Bar specific items (IN-86-200-006, IN-85-119-002, and IN-85-618-004).

III. EVALUATION

The licensee reviewed a Watts Bar specific element report (C015109-WBN) and determined that the Division of Nuclear Construction had a program to limit instrument line damage at Watts Bar. It was determined that the Division of Nuclear Power at both the Watts Bar site and the Sequoyah Nuclear Plant did not have a program expressly designed to limit instrument line damage.

The need for a program to limit instrument line damage was assessed by the licensee through a walkdown of approximately 800 instrument tubes. No instrument tube damage was identified during the walkdown process. In addition, interviews with knowledgeable personnel did not identify any instrument line damage issues specific to the Sequoyah Nuclear Plant.

IV. CONCLUSION

The licensee's actions to evaluate the extent of instrument line damage appear to be adequate. In the absence of present damage, the determination by the licensee that a damage-prevention program was not needed at the Sequoyah Nuclear Plant, appears to be appropriate. There are no actions required by the licensee prior to the startup of either unit. This issue is closed.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
CO 17101-SQN "VALVES"

I. Subject

Category: Construction (10000)

Subcategory: Mechanical (17100)

Element: Valves (17101)

Employee Concerns: IN-85-055-N04 and XX-85-094-007

The basis for Element Report CO 17101-SQN, Rev. 2, dated October 10, 1986 is Bellefonte Employee Concern XX-85-094-007 and Sequoyah-specific Employee Concern IN-85-055-N04, which state (respectively):

"Bellefonte: Limitorque valves were stored and installed with wrong altitude (upside down) and were not maintained (stroked, etc.). Construction Dept. concern. CI has no further information. No follow up required."

"NRC identified the following concern from review of QTC file.
"Emergency hand valve incorrectly installed."

These concerns were evaluated by TVA as potentially nuclear safety-related, and XX-85-094-007 was evaluated by TVA as potentially applicable to Sequoyah (generic).

II. Summary of Issue:

The problems as defined by TVA are that (a) Limitorque motor operators for valves were not stored, installed or maintained properly, and (b) an "emergency hand valve" was incorrectly installed at Sequoyah and thus could not be manually operated.

III. Evaluation:

The two issues were separately investigated and evaluated by the Employee Concern Task Group (ECTG) evaluators. They reviewed applicable maintenance, inspection, storage and installation procedures for the Limitorque valve motor operators, and also reviewed contract and design documents and held discussions with cognizant Sequoyah personnel. The ECTG evaluators found that Sequoyah procedures and instructions met all of the vendor's requirements for storage, maintenance and installation. Valves have been installed in other than the manufacturer's preferred orientation; however, both Limitorque and TVA's engineering staff have stated that if proper lubricant and maintenance practices are implemented the performance of Limitorque motor operators for valves is not affected by the mounting position.

The second issue, involving the "emergency hand valve," was determined by the ECTG evaluators to be invalid. Procedures in effect at Sequoyah should result in the identification and correction of equipment inaccessibility problems.

IV. Conclusions:

The NRC agrees with the TVA findings and conclusions as described in Element Report No. CO 17101-SQN Rev. 2. No further action by the NRC required.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT REPORT
CO 17105-SQN, "PIPE/FITTINGS AS RELATED TO CONSTRUCTION"

I. Subject

Category: Construction (10000)

Subcategory: Mechanical (17100)

Element: Pipe/Fittings as Related to Construction (17105)

Employee Concerns: IN-85-211-002, IN-86-282-004, and WI-85-053-012.

The basis for Element Report CO 17105-SQN, Rev. 2, dated March 10, 1987 is Watts Bar Employee Concerns IN-85-211-002, IN-86-282-004, and WI-85-053-012, which state (respectively):

"ERCW line was designed to be stainless steel however it is not."

"Pressure tests were not applied on many vendor NPP-1 ASME code data forms for containment penetrations. The penetrations were installed and hydro tests were never verified and documented. Additional information known to QTC, withheld to maintain confidentiality. No further information may be released. Construction Dept. Concern. CI has no further information."

Buried penetrations have vendor welds that were not inspected during hydro tests. Construction Dept. concern. CI has no further information. No followup required."

These concerns were evaluated by TVA as potentially nuclear safety-related and potentially applicable to Sequoyah (generic).

ii. Summary of Issue

The problems as defined by TVA are that the ERCW piping was installed using material other than the design specified stainless steel, and the hydrotest inspection of penetration welds were not verified or documented.

iii. Evaluation

TVA performed a detailed investigation of Nuclear Safety Review Staff (NSRS) Investigation Reports IN-85-166-WBN and I-85-118 WBN and of applicable SQN documents to determine if the concerns were applicable to SQN. It was found that the ERCW System was designed to carbon steel piping, but that a portion of the system was being changed to stainless steel because of flow restrictions due to accumulation of corrosion products. TVA

implemented programs to monitor the performance of the ERCW System, Surveillance Instruction SI-566 ERCW Flow Verification Tests, and to replace carbon steel pipe with stainless steel as required, to ensure design flow rates at the safety-related components in the ERCW System under various postulated plant conditions and system configurations. Most of the small bore (2 inch or less) lines have been already changed to stainless steel.

TVA determined that Sequoyah had installed some penetrations on which at least one internal process pipe weld was not hydrostatically tested by either the vendor, or by TVA as part of the system hydrotest. However, the ASME code applicable to Sequoyah allows substitution of 100 percent radiography of the weld for the hydrostatic test, and the vendor had performed 100 percent radiography of the subject welds.

IV. Conclusion

The NRC inspectors reviewed the Element Report and the related ECTG file, discussed the issues with the ECTG evaluator and Sequoyah personnel, and reviewed related documentation available at Sequoyah which was not in the ECTG file.

The NRC staff agrees with the evaluation, conclusions, and resolution of the concerns covered in Element Report CO 17105-SQN, Rev. 2. The corrective actions to be implemented by TVA are adequate. The one corrective action defined by TVA as required prior to restart, which concerns seismic analyses for the change from carbon steel to stainless steel pipe, should be verified by NRC inspection prior to restart. No other action by the NRC is required.