

TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

REPORT NUMBER: CO17303-SQN

REPORT TYPE: Sequoyah Nuclear Plant Element
(FINAL REPORT)

REVISION NUMBER: 3

TITLE: Instrument Line Clamps

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REASON FOR REVISION:

| | |
|--|------------|
| Incorporate TAS and SRP comments. | Revision 1 |
| Incorporate line management response and finalize report | Revision 2 |
| Incorporate SRP rejection comments and finalize report | Revision 3 |

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I. INTRODUCTION

The concerns evaluated are related to instrument line clamps which were improperly installed (IN-85-016-003) and substituted (EX-85-047-001). These concerns were evaluated at Watts Bar Nuclear Plant (WBN) and determined to be potentially generic to SQN during the WBN evaluation.

II. SUMMARY OF PERCEIVED PROBLEMS

Instrument line clamps were either improperly installed and/or damaged during or after installation. Some instrument line clamps are altogether missing. Unacceptable clamp substitutions were made in local instrument panel applications.

III. EVALUATION METHODOLOGY

- A. Reviewed Significant Condition Report, SCR SQNCEB8612, to determine if it is applicable to the areas of concern.
- B. Reviewed the preliminary findings of the Bolt Torque Survey and interviewed the responsible Division of Nuclear Engineering (DNE) coordinator to determine if the work adequately addresses the areas of concern.
- C. Reviewed Special Maintenance Instruction, SMI-0-317-25 R0, "Inspection and Corrective Maintenance of Small Diameter Instrument and Sensing Lines," and interviewed the responsible mechanical maintenance coordinator to determine if work adequately addressed the areas of concern.
- D. Reviewed Construction Specification N2C-946, "Requirements for Tightening of Non-High Strength Bolts in Friction-Type Connections," to determine if this specification was adequate and addressed the areas of concern.
- E. Reviewed Modification and Additions Instruction, M&AI 09, "Inspection of Bolted Connections," to determine if future work would adequately address the areas of concern.

IV. SUMMARY OF FINDINGS

- A. Significant Condition Report, SCR SQNCEB8612, identified a potential problem related to bolt tightening instructions. Sequoyah Construction Procedures; SQN Inspection Instruction Number 1, "Inspection of Bolted Connections," dated August 8, 1973, and SQN Inspection Instruction Number 66, "Inspection of Supports," dated January 7, 1977, both gave tightening instructions for

IV. SUMMARY OF FINDINGS (Continued)

hangers, supports, and miscellaneous steel which were vague; i.e., "show no slack and handtight." The lack of specific tightening instructions could cause non-high strength bolt connections to be unqualified.

- B. In response to SCR SQNCEB8612, DNE onsite coordinated a sample program which reviewed the bolt torque on a number of installed supports. This program specifically identified that forty-nine percent of the 302 clamps sampled were loose (i.e., undertorqued). Over fifty-three percent of the 183 instrument line clamps sampled were found loose. In addition, this sample program inadvertently identified an unspecified number of missing clamps (especially instrument line clamps). When these missing clamps were identified, a work request was issued to correct the discrepancy.
- C. Special Maintenance Instruction, SMI-0-317-25 R0, was initiated on March 27, 1986 to walkdown all accessible unit 1 and 2 instrument lines. This included all instrument sensing lines, sampling lines, and radiation monitoring lines, as well as, any associated drain lines. The work instructions and acceptance criteria were as follows:
1. Check supports for any loose (i.e., without slack and as a minimum, handtight) bolting or missing clamps.
 2. Install new clamps, bolts, nuts, spring nut, and etc., when determined to be missing. Tighten all such items found to be loose.
 3. Inspect maintenance work performed.
 4. Document all work performed.

According to the responsible coordinator, the scope of this SMI includes verification that the appropriate size clamp was used on the instrument lines. Local instrument panel applications were also included within the scope of this SMI.

The responsible coordinator estimated that this SMI was approximately 95-percent complete outside containment and only just begun inside containment, when terminated. The reason for termination was knowledge of the changing torque requirements, as defined in Construction Specification N2C-946, for bolted connections in supports for piping and tubing. Therefore, either a new SMI or a revision to the existing SMI will be initiated to incorporate the new torque requirements.

IV. SUMMARY OF FINDINGS (Continued)

- D. Construction Specification N2C-946, dated June 25, 1986, defines the requirements for reinspection and correction of certain friction-type bolted connections using non-high strength bolts in supports for piping and tubing. This specification applies to unistrut-type clamps supporting safety-related piping and tubing. Safety-related covers systems under the Appendix B, QA program including category 1(L) seismic supports. The construction or installation restart requirements are as follows:
1. Tightening or reinspection of clamps on tubing is not required before restart of the units. This work shall be complete for unit 2 and common supports before the return to service from the unit 2, cycle 4 outage and for unit 1 and common supports before the return to service from the unit 1 cycle 5 outage.
 2. Before plant restart, all unistrut-type clamps on critical supports, on all piping systems required for safe shutdown, shall be inspected and corrected.
 3. At the discretion of the Sequoyah Power Plant Superintendent (Maintenance), the inspection and correction of all clamps in some plant areas or all of a certain type clamp may be implemented before restart.

The construction quality control for unistrut-type clamps assures that unistrut-type clamps shall be inspected in accordance with note 60 on drawings 47A050-18 and-18A. Clamps which require corrections shall be reinstalled in accordance with note 58 on drawing 47A050-17.

- E. Modification and Additions Instruction, M&AI 09, was revised on June 26, 1986 to incorporate the change in design requirements mentioned in Construction Specification N2C-946. M&AI 09 governs the installation and inspection on all future bolted connections and adequately addresses the areas of concern.

Conclusion

Based on the sample program and the documentation from the Special Maintenance Instruction, SMI-0-317-25, RO, the concerns are substantiated. However, both the ongoing Special Maintenance Instruction, (SMI-0-317-25, R1 or similar instruction) and the Modification and Addition Instruction, M&AI 09, will ensure that all the instrument line clamps are adequately installed and inspected.

The schedule for the construction or installation restart requirements, per Construction Specification N2C-946, has only been partially justified. DNE onsite has justified (by piping analysis) the use of loose instrument line clamps, but no justification exists for the altogether missing instrument line clamps. Therefore, the schedule for the restart requirements has not been totally justified.

V. ROOT CAUSE

The root cause of these employee concerns (IN-85-016-003 and EX-85-047-001) is a combination of inadequate installation/inspection procedures and changing design requirements.

VI. CORRECTIVE ACTIONS

The following is the line management's planned corrective action.

The corrective action is a restart item.

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A sample survey of instrument lines on critical systems will be conducted by Mechanical Maintenance. DNE will evaluate the resulting data to determine if sufficient justification for restart exists under present conditions. If sufficient justification exists, then any corrective action will be performed prior to restart.

VII. GENERIC APPLICABILITY

These employee concerns are potentially generic to all TVA nuclear facilities.

VIII. ATTACHMENTS

Attachment A Listing of concerns indicating Safety Relationship and Generic Applicability

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| R3
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ATTACHMENT A

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|-------------------------|----|-------|---|-----|-------------------|--------------|---|---|
| EX-85-047-001 T50162 | CO | 17300 | N | WBN | Y Y Y Y REPORT | SR | UNIT 1, ELEVATION 676, 3/4" PIPE CLAMPS HAVE BEEN USED IN PLACE OF THE REQUIRED 1/2" PIPE CLAMPS, IN INSTRUMENT PANEL APPLICATIONS. CI HAD BEEN TOLD BY OTHER PERSONNEL THAT THIS TYPE OF SUBSTITUTION HAD BEEN DONE THROUGHOUT THE PLANT. CONSTRUCTION DEPT CONCERN. CI HAS NO FURTHER INFORMATION. FOLLOWUP REQUIRED. | |
| IN-85-016-003 T50030 | CO | 17300 | N | WBN | Y Y Y Y REPORT | I-85-165-WBN | SS | TUBING NOT CLAMPED PROPERLY. THIS IS A SITEWIDE CONDITION. TUBE 3/8" Ø S.S. INSTRUMENT LINES. UNIT 1. CLAMPS ARE BENT, CROOKED, TIGHT OR LOOSE. CONDITION WAS NOTICED ABOUT A YEAR AGO. |

Enclosure 4