TVA EMPLOYEE CONCERNS SPECIAL PROGRAM

REPORT NUMBER: C011103-SQN

REPORT TYPE: Sequoyah Nuclear Plant Element (Final Report)

REVISION NUMBER: 5

TITLE: Methods Used During Installation

REASON FOR REVISION:

To incorporate TAS and SRP comments.	Revision 1
To incorporate corrective action by line management for concern IN-86-116-001.	Revision 2
To incorporate further evaluation.	Revision 3
To incorporate SRP rejection of corrective action for concern IN-86-116-001	Revision 4
To incorporate line management response and finalize report.	Revision 5

PREPARATION

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CONCURRENCES

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APPROVED BY:

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I. Introduction

This element addresses three concerns. Two of these concerns (IN-85-288-001 and IN-86-116-001) were determined to be potentially generic to Sequoyah Nuclear Plant (SQN) by the Watts Bar Nuclear Plant (WBN) ECTG evaluation. The other concern (XX-85-070-007) was site specific to SQN.

II. Summary of Perceived Problems

The perceived problems of this element are:

A. There are no procedures governing the handling of snubbers.

B. Snubbers are not installed according to the design drawings.

C. Not all vertical tube steel sections located in outside areas are capped. |R5

Perceived problems A and C are generic items resulting from the WBN evaluation. Perceived problem B is site specific to SQN.

III. Evaluation Methodology

The evaluation methodology used for this element was:

A. Reviewed Nuclear Safety Review Staff (NSRS) Report I-85-713-WBN, Generic Concern Task Force (GCTF) Report for Employee Concern IN-85-288-001, and WBN ECTG Element Report CO11103 to determine if the findings are applicable to this evaluation and how much additional evaluation was required.

B. Reviewed the 47A050 Hanger Drawing General Notes (050's) to determine if there was a requirement for adding cap plates to the tube steel.

C. Interviewed personnel cognizant of the aspects involved in this element.

D. Performed a field walkdown of outside areas around the plant to determine if the vertical tube steel sections have been capped.

E. Reviewed Engineering Change Notice (ECN) 6237 and Work Plan (WP) 11287 to determine the extent of the as-constructed snubber program that is currently in progress at SQN.

F. Reviewed the following instructions to determine if the procedures exist at SQN for handling snubbers:

- Surveillance Instruction (SI) 162.1, R7, "Snubber Visual Inspection (Hydraulic and Mechanical)"
- SI-162.2, R4, "Snubber Functional Testing (Hydraulic and Mechanical)"
- Maintenance Instruction (MI) 6.13A, R3, "Removal and Reinstallation of Hydraulic and Mechanical Snubbers"
- Administrative Instruction (AI) 36, R9, "Storage, Handling, and Shipping of QA Material"
- AI-15, R15, "Torch Cutting, Welding, Open Flame, Grinding and Spark Producing Work Permit - Program Area 19 - Fire Protection Manual (Formerly DPM No. N82FP1)"
- AI-29. R2, "Painting Work Permit"
- MI-10.14, R19, "Application Repair of Protective Coating in the Reactor and Auxiliary Buildings"
- Modifications and Additions Instruction (M&AI) 1, R10, "Control of Weld Documentation and Heat Treatment"
- M&AI-5, R11, "Welding Material control and Welder Certification Procedure"
- Sequoyah Nuclear Plant Standard Practice (SQM) 17, "General Welding Requirements for Nuclear Plants - DPM N73M2"

G. Reviewed Pacific Scientific Company (PSCO) Instruction Manual, Document Number 141, R7, "Installation and Maintenance, Mechanical Shock Arrestors"

IV. Summary of Findings

Concern IN-85-288-001, dealing with the mishandling of snubbers, was evaluated by the GCTF to determine if this was a problem at SQN. This evaluation by the GCTF involved reviewing the in-place procedures dealing with snubbers, interviewing cognizant personnel about how the procedures are applied, and reviewing a sample of the test documentation for installed snubbers. (See attached GCTF report for details.)

IV. Summary of Findings (continued)

The findings of the GCTF report concluded that there was a problem with snubbers being stored outdoors during the construction phase. However, the initial testing done according to Sequoyah Nuclear Plant Inspection Instruction A-3, as well as, periodic surveillance testing done according to SQN SI-162.2 for snubbers would have detected any damage. Although the GCTF evaluation appears to be adequate, it is not adequate with respect to handling requirements given in PSCO Instruction Manual 141,R7. Examples of these requirements are: (1) At no time shall installed arrestors (snubbers) be used as steps or hand-holds, (2) When arc welding, do not attach ground to arrestor or any part of the arrestor which will cause arcing current to pass through arrestor, (3) Do not sand blast arrestors, and (4) If sandblasting is to be performed on adjacent parts such as unfinished pipe of structure, arrestor and bearings in attaching parts must be masked for protection. Interviews with cognizant Mechanical Maintenance and Mechanical Modification engineers revealed that these requirements are not delineated in any plant procedures or instructions. A review of applicable plant instructions support this statement.

Concern XX-85-070-007 was expressed addressing 115 snubbers in SQN Unit 2 that were not installed in accordance with the design drawings. After talking with a cognizant person in the Modifications Group, it was discovered that the only instance where this might be a problem would be in the 47A053 series typical support drawings, which are the only typical drawings involving snubbers. These drawings were used in both units and it was often necessary to deviate from the typical configuration to achieve a constructible configuration. When this was done a support variance was issued by construction and approved by design. However, some of these variance sketches have been lost and the supports are not easily identified in the field. As a result, ECN 6237 was issued requiring all 47A053 typical snubber supports to be as-built and evaluated by design. A discussion with the Mechanical Maintenance Unit personnel, responsible for as-building these supports, revealed that this work was being done according to WP 11287 and all drawings have been as-built and sent to design for their evaluation. A review of ECN 6237 and WP11287 revealed that this condition was identified in September 1984 and involved 128 supports for each unit. This timeframe and support quantity closely match that expressed in the concern. Workplan 11287 is for documentation only and does not address field modifications. |R5

The addition of cap plates to open-ended vertical tube steel sections located in outside areas was found to be a deficient item at WBN and was determined to be potentially generic to SQN. A review of the 050 notes, and a discussion with the responsible modifications person, failed to identify any requirements for adding cap plates to outside tube steel at SQN. However, the absence of a requirement does not alleviate the need for the cap plates to be installed to prevent damage because of water collecting and freezing in the tubes. A field evaluation of the outside areas around the Intake Pumping Station revealed several vertical tube steel sections that were not capped and water was standing in all of them.

Conclusions

A. During the construction process, there were some problems dealing with the storage and handling of snubbers. However, the initial testing according to SQN Inspection Instruction A-3, as well as periodic surveillance testing according to SQN SI-162.2 would have detected any damage resulting from bad construction practices. Currently, there are no plant procedures or instructions that fully provide all necessary requirements for handling snubbers at SQN.

B. The 47A053 snubber support typicals were not always followed. However, this was documented during the construction phase on support variances. In September 1984, it was determined to be necessary to as-built these typicals due to missing documentation (Reference ECN 6237). This work is currently in progress and all snubber rework, as determined by design, will be complete before restart. |R5

C. Not all vertical tube steel sections in outside areas have caps on them. During this evaluation no damage to existing tubes was observed. However, water was standing in all tubes. Based on past occurrences at Bellefonte Nuclear Plant and Watts Bar Nuclear Plant, this water can freeze causing the tube steel to balloon and crack.

V. Root Cause

The root cause for the tube steel not being capped is a failure by design to realize the environmental effects on tube steel and a lack of communication between design projects.

The root cause for improper handling of snubbers is a failure by management to provide adequate controls governing snubbers.

VI. Corrective Actions

The line management responses to corrective action are as follows:

Corrective action for CATD Number 11103-SQN-01

This corrective action is not a restart item.

A review of all previous performances SI-162.1, "Snubber Visual Examination (Hydraulic and Mechancial)" and SI-162.2, "Snubber Functional Testing (Hydraulic and Mechanical)", was performed. This review failed to identify significant conditions attributed by the subject problem description. Considering this, the following corrective actions will be adequate to properly inform employees of the sensitive nature of snubbers.

1. Snubbers are not to be used as steps or handholds.

   Additional similar items exist that are not to be used as steps or handholds such as mirror insulation, electrical conduit, instrumentation, etc. The proposed corrective action is to furnish an instructional statement in HCI-G16, "General Safe Work Rules and Employee Conduct." The intent of this statement will be to inform the employee that snubbers are not be used for steps or handholds. Also, while working around fragile equipment such as the items listed above, to use good judgement considering personnel safety and protection of plant equipment. R5

2. Snubbers are not to be used as a ground for welding operations.

   The corrective action is to provide specific instructions in AI-15, "Torch Cutting, Welding, Open Flame, Grinding and Spark Producing Work Permit".

   These instructions will include specific grounding requirements to follow while welding around snubbers.

3. Snubbers are not to be sandblasted.

   The corrective action is to provide specific instructions in MI-10.14, "Application Repair of Protective Coating in the Reactor and Auxiliary Buildings" prohibiting the sandblasting of snubbers and requiring that sensitive equipment such as snubbers are to be protected when sandblasting in the area.

Note: Since field personnel will no longer be able to paint snubbers, a request (SO2 861203 998) has been made to R. A. Edland of DNE to: |R5

1. Evaluate the vendor-supplied coating on snubbers for acceptability in Level 1 applications. |R5

2. If vendor coating is determined unacceptable, provide an alternate coating and system of application. |R5

Corrective action for CATD 11103-SQN-02

This corrective action is a restart item.

The referenced variances for both units will be evaluated by DNE. Those requiring physical work will be modified by the field before restart of the respective unit. Those requiring, documentation only drawing changes, will be completed six months after startup of the respective unit. ECN 6237 has been issued and fieldwork for unit 2 is in progress.

Corrective action for CATD 11103-SQN-03

This corrective action is not a restart item. |R5

1. A review of the outside areas, including the auxiliary building roofs and the ERCW pumping station confirmed that a few hangers, as referenced, did exist. All supports in operating areas (exempting the abandoned ERCW cubicles) will be capped or will have weep holes drilled to allow any collected water to drain. Discussion between L. D. Alexander of Modifications and L. D. Ketchum of DNE have taken place, and final details of the implementation will be finalized by them.

2. By adding a note to the 47A050 drawing stating that the field may install the caps at their discretion, confusion would be created as to when the plates are required for structural purposes and when they were added at the discretion of the field. At times, these plates are required by DNE due to torsional stresses. DNE representative, L. A. Ketchum, has agreed that the Sequoyah Pipe Support Design Manual will be revised to alert designers to conditions in which caps should be utilized. |R5

3. Sequoyah is an operating plant with several programs directed at minimizing contaminated waste which are not in effect in construction plants such as Watts Bar Nuclear Plant. Additionally, security programs are in effect, thus reducing the potential of unauthorized objects being taken into vital areas.

VII. Generic Applicability

The problems with handling of snubbers and capping open-ended tube steel were determined potentially generic to all nuclear plants by the WBN evaluation.

VIII. Attachments

Attachment A - Listing of concerns indicating Safety Relationship and Generic Applicability

Attachment B - TVA-SQN Generic Concerns Task Force report on Concern IN-85-288-001

ATTACHMENT A

IN -85-288-001 T50160	CO	11100 N WBN	Y Y Y Y REPORT	I-85-713-WBN	SS	SNUBBERS ARE NOT HANDLES 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.
IN -86-116-001 T50249	CO	11100 N WBN	Y Y Y Y REPORT			NOT ALL PIPING HANGERS HAVE ENDS OF TUBE STEEL CLOSED/CAPPED, BUT ELECTRICAL HANGERS DO. WHEN CAPS HAVE BEEN INADVERTANTLY 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.
XX -85-070-007 T50180	CO	11100 N SQN	N N Y N REPORT	I-85-772-SQN	SS	SEQUOYAH, SEPT. 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.

Revision 1
4/25/86

ATTACHMENT B

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

GENERIC CONCERN TASK FORCE

EMPLOYEE CONCERN # IN-85-288-001

Subject: Improper Handling of Snubbers

Date of Irvestigation: April 25, 1986

Investigator: Paul L. Shepherd / 4-28-86
P. L. Shepherd — Date

Reviewed By: R. C. Denny / 4-29-86
R. C. Denny — Date

Approved By: W. R. Lagengren / 4-29-86
W. R. Lagengren — Date

R. C. Lauer / 4/29/86
MRG Member — Date

M V Rudolphi / 5/10/86
WBN EC Task Force Rep — Date

I. BACKGROUND

Sequoyah Nuclear Plant (SQN) Generic Concern Task Force has identified the following potential generic issue:

Improper Handling of Snubbers

This issue was generated from an employee concern communicated to Quality Technology Company (QTC) in response to the Watts Bar Employee Concern Program. The specific concern # IN-85-288-001 was expressed to QTC as follows:

> 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 department concern; CI has no more information.

II. SCOPE

The scope of this investigation was directed toward the verification of the occurrence of this concern at SQN and assessment of impact on SQN performance.

A. During the course of the investigation, discussions were held with cognizant personnel in Mechanical Maintenance, Power Stores, Modifications Branch, and Design Services' sections of NUC PR.

B. Answers to these questions were discussed:

1. What are the manufacturer's recommended practices for handling, adjusting and installation of snubbers.

2. Do any manufacturers recommend:

   a. Protecting snubbers with waterproof coverings,

   b. Storing and carrying snubbers compressed,

   c. Adjusting snubber paddles only while the snubber is held vertical.

III. SUMMARY OF FINDINGS

Through discussions with NUC PR personel, which included some who had worked in Construction during initial snubber storage, handling, and installation, the allegation of improper handling of snubbers at SQN was substantiated.

1. Even though an attempt was made by Construction to store snubbers inside, some of them may have been stored outside. Currently, all snubbers are stored inside by SQN Power Stores where they are kept under controlled conditions.

   Mechanical snubbers are stored at SQN Power Stores in the compressed position, but only because the vendor packages the snubbers during shipment in the compressed position.

   During a telecon between Individual #1, of SQN Mechanical Maintenance, and Individual #2, of Pacific Scientific on January 8, 1986, the following was verified:

   > The vendor, Pacific Scientific, does not specify storage and/or handling requirements concerning the position of mechanical snubbers.

2. The end-plug is sometimes referred to in the field as the "paddle." The vendor, Pacific Scientific, lists on "good practice" of placing the arrestor in a vertical position on a table to make end-plug adjustments. MI-6.13A does not use this "good practice," but paragraph 6.3.2.4 provides sufficient instructions and precautions to properly rotate the end-plug or "paddle." The advice provided by the vendor is intended to help in preventing possible damage to internal components of mechanical snubbers which could occur if the support cylinder was completely removed from the housing assembly.

3. TVA, Division of Construction, Sequoyah Nuclear Plant Inspection Instruction No. A-3, "Inspection and Cycling of Shock Suppressors," Revision 6 dated December 29, 1980 (Reference #5) required that all snubbers be cycled and documented during installation. Twenty two II A-3 documents were randomly sampled in two systems to verify that cycling was documented as completed.

   SI-162.2 requires that replacement snubbers and snubbers which have repairs that might affect the functional test results will be tested to meet the functional test criteria before installing in the unit.

III. SUMMARY OF FINDINGS (continued)

There has been an SI-162.2 inspection performed during each unit refueling outage. There have been three unit one and two unit two refueling outages. All five of these data packages were reviewed for failures that could be attributed so storage/installation damage. There were 858 snubbers inspected with 44 failures (5.1%). Twelve of these failures (1.4%) could have been caused by improper storage resulting in failure due to rust or corrosion and 10 of these failures (1.2%) could have been caused by improper end paddle rotation during installation. The remainder of the failures were not related to possible storage/installation damage.

Summary: Storing mechanical snubbers in the compressed or extended position or any position in between does not affect the operability of mechnical snubbers. Rotation of the "paddle" is seldom required. Whenever this adjustment is made, the support cylinder is kept engaged with the housing assembly. There is no cause for moving the support cylinder in a linear direction. The adjustment is rotational only, and many times this adjustment is made with the snubber installed while both ends are pinned or fixed in place. This concern is only applicable to size PSA 1/4 and PSA 1/2 mechanical snubbers because of their specific design. This concern is not relative to other PSA snubber sizes. Post-maintenance tests are always performed on new snubbers or snubbers repaired to the extent that snubber operability might be affected as discussed in the scope of SI-162.2.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

Although the concern of "improper handling of snubbers" was substantiated at SQN, the accumulated evidence indicates that initial testing and periodic surveillance testing would have detected any damage that would have prevented the snubbers from performing their intended safety function.

B. Recommendations

None

DOCUMENTS REVIEWED AND REFERENCES

1. Sequoyah Nuclear Plant Surveillance Instruction SI-162.1, "Snubber Visual Inspection (Hydraulic and Mechanical)," Revision 7.

2. Sequoyah Nuclear Plant Surveillance Instruction SI-162.2, "Snubber Functional Testing (Hydraulic and Mechanical), "Revision 4.

3. Sequoyah Nuclear Plant Administrative Instruction AI-36, "Storage, Handling, and Shipping of QA Material, " Revision 8.

4. Sequoyah Nuclear Plant Maintenance Instruction MI-6.13A, "Removal and Reinstallation of Hydraulic and Mechanical Snubbers," Revision 2.

5. TVA, Division of Construction, Sequoyah Nuclear Plant Inspection Instruction No. A-3, "Inspection and Cycling of Shock Supressors," Revision 6 dated December 29, 1980.