TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-439-BLN

EMPLOYEE CONCERN: XX-85-122-021

SUBJECT: HUMAN FACTORS CONTROL ROOM DESIGN REVIEW

DATES OF INVESTIGATION: JANUARY 13-14, 1986

INVESTIGATOR: N. T. Henrich — N. T. HENRICH — 2/25/86 — DATE

REVIEWED BY: L. E Brock — L. E. BROCK — 2/26/86 — DATE

APPROVED BY: W D Stevens — W. D. STEVENS — 2/27/86 — DATE

I. BACKGROUND

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of an expressed employee concern identified to the NSRS during the investigation of employee concern XX-85-087-001. The concern addressed by this report was not related to the concern under investigation at that time and was outlined in a memorandum from C. E. Chmielewski to R. C. Sauer dated December 31, 1985 (Ref. 1).

The employee concern addressed by this investigation report did not come through the Quality Technology Company (QTC)/Employee Response Team (ERT). Therefore, no Employee Concern Assignment Request Form is available summarizing the concern of record.

II. SCOPE

A. The scope of this investigation was determined from the concern of record as summarized in reference 1 to be that of three specific issues requiring investigation:

1. Conax connectors installed inside Sequoyah Nuclear Plant (SQN) unit 1 containment do not always meet vendor wire bend radius requirements.

2. Alleged deficiencies in Conax connector installation were inspected by SQN Quality Control (QC) and accepted.

3. No action was taken by SQN QC management to investigate or document these deficiencies when they were made aware of them.

B. To accomplish this investigation, vendor manuals and environmental qualification data sheets were reviewed to determine Conax connector installation requirements. Procedures governing the actual installation of these connectors were reviewed and compared against these requirements. Discussions were also held with QC personnel to determine if Conax connector installation deficiencies have been identified and any corrective action planned or taken to resolve the deficiencies should they exist.

III. SUMMARY OF FINDINGS

A. Requirements and Commitments

Not applicable to this investigation.

B. Findings

1. Conax Corporation Manual, Installation Manual for Electric Conductor Seal Assemblies with Long Body for Pipe Thread Equipment Interface, IPS-725, was originally issued June 26, 1981. The latest revision to this manual is revision "G" which

was issued February 15, 1985 (Ref. 4). This manual provides basic information, handling, and installation instructions for Conax electrical conductor seal assemblies type ECSA.

Section 7.2 of the manual specifies the minimum wire bend radii requirements. Based on a review of the manual revision log, it appears that these requirements were identified in the original issuance of the manual.

2. Reference 3 documents that Conax electrical conductor seal assemblies type ECSA are environmentally qualified for forty years with one design basis accident and 100-day postaccident operation. However, the initial installation and subsequent reinstallation or replacement of the seal following maintenance must be performed in accordance with Conax installation instructions outlined in reference 4.

3. Workplans 11077 R1, 11231, and 11335 (Refs. 6, 7, and 8, respectively) were written to install Conax connectors to meet environmental qualification requirements set forth in NUREG-0588.

Each of these workplans were prepared and worked prior to issuance of a modification and additions instruction regarding installation of Conax connectors. These workplans did not specify minimum connector wire bend radius requirements and did not require verification of installed wire bend radii. Each of these workplans had been reviewed and approved by SQN QC personnel. Work was performed in accordance with the workplans, and specified QC inspections were performed.

4. Discussions with QC personnel revealed that some, but not all, of the SQN QC inspectors received Conax connector installation training when it was offered to craft personnel. QC inspectors evaluated Conax connector installations against requirements identified in approved workplans. The inspection criteria did not include evaluation of wire bend radii.

5. Modifications and Additions Instruction M&AI-19 R0 (Ref. 2a) was approved April 12, 1985, and provides guidelines for initial field installation of electrical Conax connectors for SQN. As initially issued, this procedure did not address minimum bend radius requirements for these connectors nor did it identify a need to inspect completed installations for acceptable wire bend radii.

6. Modification and Additions Instruction M&AI-19 was subsequently revised July 26, 1985 (Ref. 2b) and incorporated vendor recommendations for the minimum bend radius of electrical pigtails as specified by Conax Corporation in reference 4.

7. Maintenance activities have confirmed that valves 2-FSV-43-310 and 2-FSV-43-319 installed under wokplan 11077 R1 have wire bend radii which do not meet minimum requirements set forth in M&AI-19 R1 (Ref. 2b) and Conax manual IPS-725 (Ref. 4).

8. Work requests B-106737 and B-106242 have been initiated to inspect a sample of installed Conax connectors for proper wire bend radii. Preliminary inspections indicate that a number of valves using Conax connectors on both units do not meet the specified wire bend radii requirements.

9. On February 10, 1986, SQN Corrective Action Report (CAR) SQN-CAR-86-02-005 (Ref. 5) was issued to identify an adverse condition related to the installation of Conax connectors. This CAR states:

> Contrary to the requirements of M&AI-19 and the Conax vendor manual IPS-725, not all Conax connectors were installed with wire bend radii within allowable limits. In addition, M&AI-19 is not consistent with the vendor manual revision referenced in the EQ binder. Adherence to these requirements is necessary to maintain equipment environmental qualification.

As written, M&AI-19 R1 (Ref. 2b) specifies a different torquing sequence and different final torquing values than Conax installation manual IPS-725 (Ref. 4). In addition, M&AI-19 R1 does not provide details regarding application of Grafoil sealant.

10. In accordance with SQN Administrative Instruction AI-12 (Ref. 9) an evaluation of the root cause of the deficiency addressed by SQN-CAR-86-02-005 must be completed within 30 days of the issuance of a CAR. This evaluation must also address remedial corrective action, action to prevent recurrence, and an estimated schedule for completing the corrective action.

11. QC has begun reviewing all workplans and/or work instructions for work affecting any equipment within the scope of the environmental qualification program against vendor instructions to ensure compliance with vendor recommendations.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. The first issue raised by the concern of record is substantiated in that several Conax connectors have been installed on both units 1 and 2 without meeting the minimum wire bend radii requirements set forth in Conax installation manual IPS-725.

2. The second issue raised by the concern of record could not be substantiated. Conax connectors were installed in accordance with approved workplans. These workplans had been reviewed and approved by QC. QC inspectors were not directed to inspect Conax installations for proper bend radii. It should be noted, however, that the workplans did not adequately address Conax installation recommendations identified in the vendor's manual regarding minimum wire bend radii.

3. The third issue raised by the concern of record could not be substantiated. CAR SQN-CAR-86-02-005 has been issued to document Conax connector installation deficiencies. A response is required by March 12, 1986, unless an extension is approved.

B. Recommendations

I-86-101-SQN-01, Resolution of Deficiencies

The deficiencies identified in corrective action report SQN-CAR-86-02-005 should be addressed and resolved in accordance with SQN AI-12. [P2]

DOCUMENTS REVIEWED IN INVESTIGATION I-86-101-SQN
AND REFERENCES

1. Informal memorandum from C. E. Chmielewski to R. C. Sauer, "Employee Concern at Sequoyah Nuclear Plant (SQN)," dated December 31, 1985

2. Modifications and Additions Instruction M&AI-19, "Installation of Conax Connectors"

   a. R0 dated April 12, 1985
   b. R1 dated July 26, 1985

3. SQN Environmental Qualification Binder, "Conax Conductor Seal Assemblies (ECSA)," No. SQNEQ-CSC-001

4. Conax Corporation, Installation Manual for Electrical Conductor Seal Assemblies with Long Body for Pipe Thread Equipment Interface, IPS-725 RG, dated February 15, 1985

5. SQN Corrective Action Report SQN-CAR-86-02-005 dated February 10, 1986

6. Workplan 11077 R1, "Installation of Conax Connectors in PASF Valves Inside Containment," prepared October 15, 1984

7. Workplan 11231, "Various Equipment Seals - NUREG-0588," prepared September 24, 1984

8. Workplan 11335, "Various Equipment Seals - NUREG-0588," prepared November 7, 1984

9. SQN Administrative Instruction - AI-12, "Adverse Conditions and Corrective Actions," R20, dated August 2, 1985.

TVA 91 (08-84)

UNITED STATES GOVERNMENT

Memorandum

I-86-101-SQN

TENNESSEE VALLEY AUTHORITY

TO : R. C. Sauer, Nuclear Safety Review Staff, 3B 33C-K

FROM : C. E. Chmielewski, Nuclear Safety Staff, BR 1N 69B-C

DATE : December 31, 1985

SUBJECT: EMPLOYEE CONCERN AT SEQUOYAH NUCLEAR PLANT (SQN)

During my investigation of Employee Concern No. XX-85-087-001 as assistance to the Nuclear Safety Review Staff (NSRS), a TVA employee at the Sequoyah plant site expressed a new concern unrelated to the containment coating concern I was investigating. I recontacted the concerned individual (CI) to request that the concern be pursued in the normal management chain of the CIs organization. The CI indicated reservations with doing this and preferred to express the concern to NSRS. I, therefore, attempted to obtain as much relevant information as I could to aid in the NSRS investigation.

The information made available to me regarding this concern, based on the knowledge and belief of the concerned individual is as follows:

1. Conax connectors installed inside Sequoyah Unit 1 containment during the last outage did not always meet bend radius requirements.

2. These alleged deficient installations were inspected by SQN Quality Control (QC) and accepted.

3. First line Sequoyah QC management was made aware of the alleged deficiencies but did not take any action to either investigate or document the condition.

4. No specific installations or location areas where the work took place can be recalled by the CI other than inside Unit 1 containment.

5. The installation of conax connectors was for the purpose of resolving equipment qualification concerns.

6. The CIs professional background is such that this individual would be expected to be knowledgeable of the proper installation requirements for electrical connections.

7. The CI requests anonymity because of the belief that the CI may be discriminated against for raising a concern.

As we previously discussed, I will be the only person who will know the identity of the concerned individual.

CEC:TJD

CEC