TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

REPORT NUMBER: 228.0(B)

REPORT TYPE: SEQUOYAH ELEMENT

REVISION NUMBER: 1

TITLE: UNISTRUT SUPPORT DESIGN

Unistrut Support Design

REASON FOR REVISION:

1. Incorporated TVA Line Organizational Comments

PREPARATION

PREPARED BY:

Jim Kitchens J W Benkert — SIGNATURE — 11/13/86 — DATE

REVIEWS

~~PEER~~: REVIEW COMMITTEE

Karl Spedden C W Jordan J Parkinson — SIGNATURE — 11-14-86 & 11/17/86 — DATE

TAS:

SIGNATURE — DATE

CONCURRENCES

N. A Scalzo — 11/17/86

CEG-H: George R McNutt — 11-18-86

SIGNATURE — DATE

SRP: SIGNATURE — DATE

APPROVED BY:

ECSP MANAGER — DATE

MANAGER OF NUCLEAR POWER — DATE

CONCURRENCE (FINAL REPORT ONLY)

1. CHARACTERIZATION OF ISSUE(S):

Concern:
WI-85-100-024
XX-85-122-033, 34, 35
"Sequoyah: Unistrut material is used to support instruments, pipe, conduit, control stations and panels, fluid piping on skids, instrument lines, CO_2 fire protection lines, fire protection water piping, lighting, etc. Unistrut is unacceptable for use as seismic Category I supports and items so supported may either fail or become missiles to cause other safety related equipment to fail. CI has no further information. Anonymous concern via letter."

Issues:

a. Unistrut is unacceptable for use as seismic Category I supports for instruments, pipe, conduit, control stations, panels, fluid piping on skids, instrument lines, CO_2 fire protection lines, fire protection water piping, lighting, etc.

b. If failed, may become missiles to endanger other safety-related equipment.

2. HAVE ISSUES BEEN IDENTIFIED IN ANOTHER SYSTEMATIC ANALYSIS? YES X NO

Identified by TVA Nonconformance Report, NCR SQN SWP 8305 (02/22/83)

Nonconformance Report, NCR SQN SWP 8213 (08/03/83)

Nonconformance Report, NCR WBN SWP 8237 (12/06/82)

Significant Condition Report, SCR SQN CEB 8612 (02/20/86)

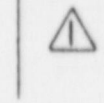
CAQ Engineering Report, SCR SQN CEB 8612 (06/03/86)

3. DOCUMENT NOS., TAG NOS., LOCATIONS OR OTHER SPECIFIC DESCRIPTIVE IDENTIFICATIONS STATED IN ELEMENT:

Unistrut supports

4. INTERVIEW FILES REVIEWED:

File XX-85-122-033 was reviewed and no additional unreviewed information for Sequoyah regarding this concern was identified.



5. DOCUMENTS REVIEWED RELATED TO THE ELEMENT:

See Appendix A.

6. WHAT REGULATIONS, LICENSING COMMITMENTS, DESIGN REQUIREMENTS OR OTHER APPLY OR CONTROL IN THIS AREA?

See Appendix A.

7. LIST REQUESTS FOR INFORMATION, MEETINGS, TELEPHONE CALLS, AND OTHER DISCUSSIONS RELATED TO ELEMENT.

See Appendix A.

8. EVALUATION PROCESS:

a. Reviewed TVA report I-85-979-SQN, "Unistrut acceptability for use on seismic Category I support."

b. Identified other documents needed to perform review. Most technical issues, if any, are likely in clamps and other fittings. Reviewed test results of fittings.

c. Reviewed design drawings and calculations to ascertain adequacy of Unistrut material.

d. Reviewed available transcripts of NRC investigative interviews.

9. DISCUSSION, FINDINGS AND CONCLUSIONS:

Discussion:

The issues relate to a concern that Unistrut material is unacceptable for use as seismic Category I support and, if failed, may become missiles to endanger other safety-related equipment.

NRC General Design Criterion 2 requires Category I structures, systems, and components to be designed to withstand the effects of

natural phenomena such as earthquakes. Sequoyah commitment to comply with this criterion is stated in SNP FSAR Section 3.1. The seismic design bases of Category I items are described in FSAR Sections 2.5 and 3.7. Specific application of these bases for Category I supports of the various commodities listed in the concern is contained in FSAR Section 3.2, Design Criteria SQN-DC-V-3.0, SQN-DC-V-13.7, SQN-DC-V-10, SQN-DC-V-11, SQN-DC-V-24.1, and Appendix F of Sequoyah Nuclear Power Plant Quality Assurance Manual.

TVA's typical hanger and support detail drawings and mechanical instruments and controls drawings (App. A, 5.a) show that Unistrut materials are used to support the various commodities stated in Section 1.

The use of Unistrut materials as Category I supports, which required the design of Unistrut accessories (clamps, bolts, etc.), channel members, and channel-to-channel connections, is the basic issue discussed herein. For the purpose of discussion, the term "Unistrut clamps" used in this report includes Unistrut standard pipe strap and other types of one-hole clamps and two-piece clamps manufactured by Unistrut Building Systems, as listed in Drawing 47A050-17, R0.

To establish the allowable load for Unistrut standard pipe strap P2558 series, TVA tested the capacity of the pipe strap at Singleton Laboratory in 1975 (App. A, 5.k). Using the results of the tests, the design allowable loads were calculated and documented in EN DES calculation (App. A, 5.e). These design allowable loads were later refined and appear in the Sequoyah Pipe Support Design Manual (PSDM), Volume 3. TVA Singleton's test data on Unistrut P2558-series pipe strap and a similar test performed by Unistrut Corp. in 1977 (App. A, 5.p) were reviewed by the evaluation team. Both test data are in general agreement within statistical variation taking into consideration the difference of in-place bolt torque, with exceptions as noted below:

a. For pipe strap 3 inches in diameter (P2558-30) and load-tested in the 'slip along' direction (direction of load parallel to the Unistrut channel where the pipe was attached), the ultimate load obtained from Singleton's test

was much lower than that of the Unistrut test. However, this might be due to a defective strap material tested by Singleton since the test indicated the failure mode was 'strap failure' and none of the other test samples failed in this manner.

b. For pipe strap 2 to 4 inches in diameter (P2558-20 to 40) and load tested in the 'slip-through' direction (direction of load parallel to pipe axis), the ultimate load obtained from Singleton's test was two to three times higher than that of Unistrut Corp., even though the in-place bolt torque of Singleton's test was lower than that of Unistrut Corp. The Singleton's test had only one sample of each strap size while Unistrut Corp. tested three samples per strap size. The apparent discrepancy between the two sets of test data requires reconciliation since the design allowable loads for the Unistrut pipe strap tabulated in SQN PSDM were based on Singleton's test result. For example, SQN PSDM's allowable load for P2558-40 pipe strap under emergency/faulted condition in the slip-through direction is 1,564 pounds with a safety factor of 2.33 based on an ultimate load of 3,640 pounds. Unistrut's test showed a failure ultimate load of 1,275 pounds in one of the three test samples and an average ultimate load of 1,415 pounds for the three samples. No specific factor of safety was recommended by Unistrut Corp.

In June 1982, nonconformance reports were issued for Watts Bar (NCR WBN SWP 8237) and SQN (NCR SQN SWP 8231) stating that Unistrut clamps had been used in conditions subject to simultaneous loading in more than one direction and no interaction equation was used in the design of clamps. To address the WBN NCR, Watts Bar performed a detail analysis (App. A, 5.d) to determine the acceptability and justify the use of Unistrut clamps subjected to simultaneous loads in more than one direction. This analysis used an interaction equation and demonstrated by evaluation that the Unistrut clamps are adequate when subjected to simultaneous loads. Watts Bar revised its PSDM, Volume 3, in August 1982 to include the use of an interaction equation in the design of Unistrut standard pipe strap. Subsequently (in April 1983), SQN also issued its PSDM, Volume 3, to include the same. The SQN NCR was then closed out based on the Watts Bar evaluation. During the course of investigating this employee concern (App. A, 5.o), TVA NSRS also indicated that the WBN analysis was applicable to Sequoyah before the issuance of SQN PSDM. The SQN PSDM includes an interaction equation for Unistrut standard pipe strap only and not other types of Unistrut one-hole clamps and two-piece clamps, which are also used to secure tubing, conduit, and piping to their Unistrut type supports. | 

Although bolt tightening requirements for installation of Unistrut clamps are not directly raised as an employee concern, it was established during the evaluation team's investigation that bolt torque requirements of clamps should also be reviewed in order to address the issues stated in Section 1. SQN design documents originally did not specify any bolt tightening requirements for installation of Unistrut clamps. In February 1983 an SQN NCR was written describing this condition and was followed by SCR SQN CEB 8612 in February 1986. The latter SCR stated that the lack of specific bolt tightening instructions could cause non-high strength bolt connections to be unqualified.

The SCR dealt with tubing, conduit, and piping clamps. The clamps can be Unistrut clamps or Basic Engineers type clamps, or similar clamps fabricated by TVA. However, the discussion in this report is limited to Unistrut clamps in order to address the concern. A sampling program was implemented on Unistrut type clamp bolts to determine the installed condition. The program examined approximately 300 sample clamps including Unistrut standard pipe strap, one-hole clamps and two-piece clamps, randomly selected throughout the plant. The clamps were checked for as-installed bolt torque.

TVA's Singleton Laboratory conducted clamp testing to establish bolt torque vs load capacity curves. SQN performed an engineering evaluation, and the results of the evaluations, conclusions, and subsequent actions taken by SQN were as follows (App. A, 5.f, 5.m, 5.n):

a. The as-built tubing and clamp[1] installation was able to resist a safe shutdown earthquake (SSE) without the tubing exceeding the code allowable loads. However, since some tubing carries fluid and is subject to thermal expansion and contraction, SQN established 100 percent inspection requirements under a long-term bolt tightening maintenance program to ensure proper installation of all seismic Category I and I(L) tubing clamp bolts. SQN also concluded that the tubing lines were acceptable for restart.

1 The engineering-assigned issues of instrument line clamps were addressed in detail in Element Report No. 223.1 (B). The same subject, but for other concerns covering construction-assigned issues, is being investigated under Construction Category Report Number CO17303-SQN; this report also covers a new issue of missing clamps identified in March 1986. The present report defers to the Construction Category for issue resolution.

b. The as-built conduit and clamp installation was also found adequate to meet design requirements. However, since conduits do not carry fluid and normally are not subject to vibratory loads, SQN concluded that conduit clamp bolts do not require further torquing for existing supports.

c. For the as-built piping and clamp installation where the existing bolt torque of Unistrut-type supports does not meet design requirements, SQN committed to tighten clamps on critical supports before plant restart and to tighten all remaining clamps after restart.

d. SQN has revised design drawings to specify bolt tightening and inspection requirements. Drawings 47A050-17 and 47A050-18 were added to the Mechanical Hanger Notes to provide bolt tightening installation and inspection requirements for Unistrut clamps effective 05/19/86. The bolt torque requirement of Unistrut clamps is generally 6 ft-lb unless otherwise noted in Drawing 47A050-17. All newly installed or retightened Unistrut clamps will be inspected to verify that the correct clamp has been used. TVA DNE also committed (App. A, 7.g) to review and revise the design documents to replace general clamp callouts, e.g., "Unistrut P2000 Series," with more specific designations to preclude any inadvertent installation of unauthorized clamps. Construction Specification N2C-946 was also issued defining requirements for tightening non-high strength bolts.

The evaluation team reviewed the calculation of SQN engineering evaluation for its assumptions, collection of data, logic, analysis, and conclusions. The team considered the calculation technically adequate.

To examine SQN design adequacy of Unistrut support channels (e.g., Unistrut P1000) and their connections, the mechanical seismic support drawings listed in App. A, 5.a and their associated TVA EN DES calculations (App. A, 5.b) were reviewed. The Unistrut channels shown in the seismic support drawings were Unistrut P1000, and the calculated stresses on these channels were low. Unistrut channel-to-channel or channel-to-structure connections were welded type connections. The calculations, in general, are considered acceptable. TVA EN DES calculation for an instrumentation rack frame partially made of Unistrut channels (App. A, 5.c) where

instruments were mounted was also reviewed and found to meet design requirements. However, no calculation was made available for evaluation team review for a double cantilevered conduit hanger (Drawing 47A056-66B, Rev. 0) where the Unistrut channel P1000 may be subjected to torsional loading.

The evaluation team reviewed the attachments to the two NRC letters from Youngblood to White (02/18/86) and (06/23/86) for material applicable to this element report. The team also reviewed NSRS report I-85-478-WBN, prepared for concern IN-85-845-002, which addresses the issues identified in the Youngblood to White letters and TVA memo from Domer to Cottle (02/05/85). Although this report and memo are specifically for WBN, the team concludes that the content is equally applicable to SQN and adequately resolves the issues identified in the Youngblood to White letters.

Findings:

a. The issue that Unistrut is unacceptable for use as seismic Category I supports for the various commodities stated in Section 1 is not valid. SQN's sampling program of bolt tightening of Unistrut clamps and resulting TVA engineering evaluation and committed action plans (App. A, 5.f, 5.m, 5.n) satisfactorily addressed the adequacy of Unistrut as-built installations for tubing, conduit, and piping.

b. The issue that failure of various commodities enumerated in Section 1 may cause them to become missiles and endanger other safety-related equipment is not valid. The bolt tightening program undertaken by TVA assures adequate bolt torque of Unistrut type clamps to secure the said commodities firmly to their Unistrut type supports.

c. The TVA Singleton Lab and Unistrut Corp. test data on Unistrut pipe strap P2558 series (App. A, 5.k, 5.p) were in general agreement within statistical variation, taking into consideration the difference of in-place bolt torque. However, for strap 2 to 4 inches in diameter (P2558-20 to 40) and load-tested in the direction parallel to the pipe axis, the ultimate load obtained from Singleton's test was two to three times higher than Unistrut's. This discrepancy between the two sets of test data needs reconciliation since the allowable loads for Unistrut pipe strap given in SQN PSDM were based on TVA Singleton's test results. 

d. TVA EN DES calculations for mechanical seismic supports and an instrumentation rack made of Unistrut materials were reviewed for their adequacy to meet design requirements. The evaluation team found them adequate with the exception that no calculation was made available for review of the double cantilevered conduit hanger shown on Drawing 47A056-66B, Rev. 0, where the Unistrut P1000 member may be subjected to torsion. | ⚠

Conclusions:

The evaluation team concludes that Unistrut type materials are acceptable for use in supporting Category I components provided they are properly designed to ensure that stresses in the channel sections, section-to-section connections, and accessories are within allowable design limits. Review of SQN design confirms this conclusion with the following exceptions:

a. Discrepancy exists between TVA Singleton Lab and Unistrut Corp. test data on Unistrut pipe strap P2558-20 to P2558-40. | ⚠

b. Calculation of double cantilevered conduit hanger was unavailable. | ⚠

APPENDIX A

5. DOCUMENTS REVIEWED RELATED TO THE ELEMENT:

a. TVA Drawings:

47A050-17, R0	- "Mechanical Hanger Drawing General Notes"
47A050-18, R0	- "Mechanical Hanger Drawing General Notes"
47A051-2, R3	- "Mechanical Seismic Support Instrument Sensing Lines"
47A051-2A, R1	- "Mechanical Seismic Support Instrument Sensing Lines"
47A052-8, R0	- "Mechanical Seismic Support Radiation Monitoring Lines"
47A052-8A, R0	- "Mechanical Seismic Support Radiation Monitoring Lines"
47A052-7, R4	- "Mechanical Seismic Support Radiation Monitoring Lines"
47A053-10A, R1	- "Mechanical Seismic Support Process Pipe 2-inch diameter and less"
47A053-61, R0	- "Mechanical Seismic Support Process Pipe 2-inch diameter and less"
47A054-1A, R4	- "Mechanical Seismic Support Control Air Lines"
47A054-2, R2	- "Mechanical Seismic Support Control Air Lines"
47A054-2A, R2	- "Mechanical Seismic Support Control Air Lines"
47A056-66, R4 & 5	- "Mechanical Seismic Support Conduit"
47A056-66A, R5 & 6	- "Mechanical Seismic Support Conduit"
47A056-66B, R0 & 1	- "Mechanical Seismic Support Conduit"
47A057-7, R2	- "Mechanical Seismic Support Lighting Fixtures Mercury Type/Ballast"
47W600-14, R4	- "Mechanical Instrument and Controls"
47W600-23, R11	- "Mechanical Instrument and Controls"

b. TVA Mechanical Seismic Support Calculations:

SWP 820218 087, R3, "Instrument Sampling Line Typical Support Calculation"

SWP 820302 017, R2, "Control Air Typical Support Calculation"

APPENDIX A (Cont'd)

SWP 800107 044, R1, "Conduit Support Calculations"

SWP 800107 049, R0, "Lighting Fixture Typical Support Calculation"

c. TVA Calculation, "Seismic Analysis of Instrumentation Rack Frame of Drawing 47W352," (06/29/72)

d. TVA Calculation, "Evaluation of NCR WBN SWP 8237, R1," [WBP 840629 003], (07/06/84)

e. TVA Calculation, "Unistrut Pipe Strap Load Ratings, R2," [WBP 840801 037], (08/23/84)

f. TVA Calculation, "Tightening of Non-High Strength Bolted Connections for Conduit, Piping and Tubing," SQCG 1006 [B25 861021 800], (10/21/86)

g. TVA SQN Pipe Support Design Manual, Volume 3, Section 9.4, R1, (07/22/86)

h. TVA WBN Pipe Support Design Manual, Volume 3, Section 9.4, R3, (06/12/85)

i. TVA memo from R. O. Barnett to J. P. Vineyard, "NCR SQN SWP 8305 - Bolt Tightening Requirements," [B41 851009 001], (10/09/85)

j. TVA memo from J. C. Standifer to Those Listed, "NCR WBN SWP 8237," [SWP 830128 053], (01/25/83)

k. TVA memo from R. D. Lane to G. G. Stack, "Transmittal of Unistrut Clamp Load Test Data," (07/28/75)

l. TVA memo from R. O. Barnett to J. P. Vineyard, "SCR SQN CEB 8612 Specific Bolt Tightening Instructions," [B41 860220 005], (02/19/86)

m. TVA memo from R. E. Field, Jr. and W. J. Kagay to SQN Engineering Project Files, "SQN SCR SQN CEB 8612 - Technical Justification for Bolt Tightening Recommendations," [B25 860815 019], (08/15/86)

n. CAQ Engineering Report for SCR SQN CEB 8612, (06/03/86)

APPENDIX A (Cont'd)

o. TVA Nuclear Safety Review Staff NSRS Investigation Report No. I-85-979-SQN, "Unistrut Acceptability for use on Seismic Category I Supports," (03/11/86)

p. Unistrut Corporation Test Report No. C-36-A, "P-2558 series pipe or conduit clamps," (5/13/77)

q. TVA memo from J. A. Raulston to R. O. Barnett, "SQN Unistrut one-and two-piece Tubing Clamps with stainless steel tubing," [B46 860612 001], (06/16/86)

r. TVA Employee Concerns Sequoyah Element Report No. 223.1 (B), RO, "Instrument Support Design"

s. TVA letter to Bechtel (TLB-044), "WBN-Employee Concerns Evaluation Program - Job 16985-026," [U10 861010 801], (10/10/86)

t. TVA memo from J. P. Vineyard to Those listed, "NCR SQN SWP 8213," [PWP 830803 009], (08/03/83)

u. Letter from B. J. Youngblood, NRC, Director PWR Project Directorate #4, NRR to S. A. White, TVA, Manager of Nuclear Power, "Concerns Regarding TVA Nuclear Program," [L44 860226 001], (02/18/86)

v. Letter from B. J. Youngblood, NRC, Director PWR Project Directorate #4, NRR to S. A. White, TVA, Manager of Nuclear Power, "Transcript of Interview ...," [none], (06/23/86)

w. NSRS Report I-85-478-WBN, "Unapproved Use of Unistrut Hangers on System 43, Sampling and Water Quality," (11/20/85)

x. TVA WBN memo from R. G. Domer, Acting Director of Engineering Projects Nuclear to W. T. Cottle, Site Director, WBN, (02/05/86)

APPENDIX A (Cont'd)

6. WHAT REGULATIONS, LICENSING COMMITMENTS, DESIGN REQUIREMENTS, OR OTHER APPLY OR CONTROL IN THIS AREA?

a. SNP FSAR Update through Amendment 3

Section 2.5, "Geology and Seismology"

Section 3.1, "Conformance with NRC General Design Criteria"

Section 3.2, "Classification of Structures, Systems, and Components"

Section 3.7, "Seismic Design"

b. TVA SQN Design Criteria "The Classification of Piping, Pumps, Valves, and Vessels," No. SQN-DC-V-3.0, R2

c. TVA SQN Design Criteria, "Alternate Piping Analyses and Support Criteria for Category I Piping Systems," No. SQN-DC-V-13.7, R2

d. TVA SQN Design Criteria, "Location and Design of Piping Supports and Supplemental Steel in Category I Structures," No. SQN-DC-V-24.1, R0

e. SNP General Design Criteria for Seismically Qualifying Conduit Supports, SQN-DC-V-13-10, R2

f. SNP General Design Criteria for Support of Lighting Fixtures in Category I Structures, SQN-DC-V-13.11, R1

g. Appendix F of Sequoyah Nuclear Plant Quality Assurance Manual, "Design Criteria for Qualification of Seismic Class I and Class II Mechanical and Electrical Equipment," R2

h. TVA Civil Engineering Branch, "Design Data for Support of Category I Stainless Steel and Copper Tubing," No. CEB 75-9, R1

i. TVA SQN Construction Specification "Requirements for Tightening of Non-high Strength Bolts in Friction-type Connections," No. N2C-946, R0

APPENDIX A (Cont'd)

7. LIST REQUESTS FOR INFORMATION, MEETINGS, TELEPHONE CALLS, AND OTHER DISCUSSIONS RELATED TO ELEMENT.

a. RFI SQN #536, (09/05/86)

b. Deleted

c. RFI SQN #626, (10/08/86)

d. RFI SQN #630, (10/13/86)

e. RFI SQN #645, (10/18/86)

f. RFI SQN #651, (10/22/86)

g. Telephone call from N. Shah, Bechtel, to L. Katcham and R. Field, Jr., TVA, IOM #285, (10/02/86)

h. RFI SQN #656, (10/22/86)

ECTG C.3
Attachment A
Page 1 of 1
Revision 2 - A

ECSP CORRECTIVE Action Tracking Document (CATD)

INITIATION

1. Immediate Corrective Action Required: ☐ Yes ☒ No
2. Stop Work Recommended: ☐ Yes ☒ No
3. CATD No. 22800-SQN-01 4. INITIATION DATE 11/17/86
5. RESPONSIBLE ORGANIZATION: TVA-DNE
6. PROBLEM DESCRIPTION: ☒ QR ☐ NQR

DELETED

☐ ATTACHMENTS

7. PREPARED BY: NAME [signature] DATE: 11/17/86
8. CONCURRENCE: CEG-H [signature] DATE: 11-18-86
9. APPROVAL: ECTG PROGRAM MGR. _____ DATE: _____

CORRECTIVE ACTION

10. PROPOSED CORRECTIVE ACTION PLAN:

☐ ATTACHMENTS

11. PROPOSED BY: DIRECTOR/MGR: _____ DATE: _____
12. CONCURRENCE: CEG-H: _____ DATE: _____
    SRP: _____ DATE: _____
    ECTG PROGRAM MGR: _____ DATE: _____

VERIFICATION AND CLOSEOUT

13. Approved corrective actions have been verified as satisfactorily implemented.

SIGNATURE _____ TITLE _____ DATE _____

ECTG C.3
Attachment A
Page 1 of 1
Revision 2 - A

ECSP CORRECTIVE Action Tracking Document (CATD)

INITIATION

1. Immediate Corrective Action Required: ☒ Yes ☐ No
2. Stop Work Recommended: ☐ Yes ☒ No
3. CATD No. 22800-SQN-02 4. INITIATION DATE 11/01/86
5. RESPONSIBLE ORGANIZATION: TVA - DNE
6. PROBLEM DESCRIPTION: ☒ QR ☐ NQR
   DISCREPANCY EXISTS BETWEEN TVA SINGLETON LAB AND UNISTRUT CORP.'S TEST DATA ON UNISTRUT PIPE STRAP P2558-20 TO P2558-40 LOAD-TESTED IN THE SLIP-THROUGH DIRECTION. THE DESIGN ALLOWABLE LOADS FOR THE UNISTRUT PIPE STRAP TABULATED IN SQN PSDM WERE BASED ON SINGLETON'S TEST RESULTS.

☐ ATTACHMENTS

7. PREPARED BY: NAME [signature] DATE: 11/01/86
8. CONCURRENCE: CEG-H NAL George Romanutt DATE: 11-18-86
9. APPROVAL: ECTG PROGRAM MGR. _____ DATE: _____

CORRECTIVE ACTION

10. PROPOSED CORRECTIVE ACTION PLAN: _____

☐ ATTACHMENTS

11. PROPOSED BY: DIRECTOR/MGR: _____ DATE: _____
12. CONCURRENCE: CEG-H: _____ DATE: _____
    SRP: _____ DATE: _____
    ECTG PROGRAM MGR: _____ DATE: _____

VERIFICATION AND CLOSEOUT

13. Approved corrective actions have been verified as satisfactorily implemented.

SIGNATURE	TITLE	DATE

ECTG C.3
Attachment A
Page 1 of 1
Revision 2 - A

ECSP CORRECTIVE Action Tracking Document (CATD)

INITIATION

1. Immediate Corrective Action Required: ☒ Yes ☐ No
2. Stop Work Recommended: ☐ Yes ☒ No
3. CATD No. 22800-SQN-03 4. INITIATION DATE 11/01/86
5. RESPONSIBLE ORGANIZATION: TVA-DNE
6. PROBLEM DESCRIPTION: ☒ QR ☐ NQR
   CALCULATION OF DOUBLE CANTILEVERED CONDUIT HANGER (DRAWING 47A056-66 B, R0) WAS UNAVAILABLE FOR EVALUATION TEAM REVIEW.

☐ ATTACHMENTS

7. PREPARED BY: NAME [signature] DATE: 11/01/86
8. CONCURRENCE: CEG-H NAL [signature] DATE: 11-15-86
9. APPROVAL: ECTG PROGRAM MGR. _____ DATE: _____

CORRECTIVE ACTION

10. PROPOSED CORRECTIVE ACTION PLAN: _____

☐ ATTACHMENTS

11. PROPOSED BY: DIRECTOR/MGR: _____ DATE: _____
12. CONCURRENCE: CEG-H: _____ DATE: _____
    SRP: _____ DATE: _____
    ECTG PROGRAM MGR: _____ DATE: _____

VERIFICATION AND CLOSEOUT

13. Approved corrective actions have been verified as satisfactorily implemented.

SIGNATURE	TITLE	DATE