

# C A S E

(CITIZENS ASSN. FOR SOUND ENERGY)

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Dallas, Texas 75224

214/946-9445

January 27, 1990

Mr. William Council  
Vice Chairman  
TU Electric  
2001 Bryan Tower, Suite 1900  
Dallas, Texas 75201

Dear Mr. Council:

Subject: Texas Utilities Electric Company, et al.  
(Comanche Peak Steam Electric Station,  
Units 1 and 2), Docket Nos. 50-445/50-446  
CASE Concerns

With further reference to my January 24, 1990, letter to you regarding CASE concerns, I am attaching copies of two additional CASE Concerns which have been written up as part of the "CASE Concerns process" discussed in my January 24th letter. They are:

CASE Concern No. 89-0025, "SUBJECT: Apparent substandard shop applied support welds, internal to secondary side of the Steam Generators (all four)."

CASE Concern No. 89-0034, "SUBJECT: A specific wiring and connection method is damaging safety-related electrical wiring."

As discussed in my previous letter, these two Concerns are not new, and we recognize that TU Electric may well have already taken care of them; however, we are not certain of this and they both rose to a level of more importance than the others during our still-in-progress review.

I am not certain whether or not these could have potential impact on fuel load/low power licensing, but wanted to get them to you as soon as possible; Susan Palmer is picking up copies of them and this cover letter today while she is in Dallas and will see to it that the copies for TU Electric personnel are delivered.

Our review of those concerns of CASE which are in the "CASE Concerns process" is continuing and we will forward them to you as they are finalized.

On another but related subject, as I have discussed with Susan Palmer today, CASE Consultant Jack Doyle plans to be at the site on Monday, January 29th, and I would appreciate your having someone work with him to set up a mutually agreeable time sometime next week for him to meet with knowledgeable TU personnel on the root cause analysis program and on the downgrading of safety systems or portions of systems. As discussed in my January 24th letter, this is necessary in order for CASE to make an accurate

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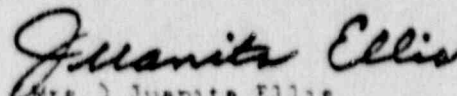
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assessment of the status of the current root cause analysis program, how much it has progressed, etc., and the extent of problems with the downgrading of safety systems.

If you have any questions or need additional information, please let me know.

Sincerely,

CASE (Citizens Association for Sound  
Energy)

  
(Mrs.) Juanita Ellis  
President

cc: Dr. Thomas Murley, Director, Office of Nuclear Reactor Regulation, NRC  
Mr. Dennis Crutchfield, Assistant Director of Special Projects, NRC  
Mr. Christopher I. Grames, Director, Comanche Peak Project Division,  
Office of Nuclear Reactor Regulation, NRC  
Mr. R. G. Warnick, Assistant Director for Inspection Program, Comanche  
Peak Project Division, NRC  
Dr. Ausaf Husain, Chairman, Operations Review Committee (ORC), TU  
Electric  
Mr. W. J. Cahill, Jr., Executive Vice President, TU Electric  
Mr. George L. Edgar, Esq., Newman & Holtzinger, P. C.  
Ms. Susan Palmer, Stipulation Manager, TU Electric

Date Submitted by CASE to TU Electric: 1-27-90  
Potentially Impact Unit 1 Fuel Load? \_\_\_\_\_

Preliminary Discrepancy Category: (Check all potentially applicable.)

SAFETY RELATED _____	NON-SAFETY RELATED <input checked="" type="checkbox"/>	HOUSEKEEPING _____
HARDWARE <input checked="" type="checkbox"/>	IMPORTANT TO SAFETY <input checked="" type="checkbox"/>	MAINTENANCE _____
DOCUMENTATION _____	PROCEDURAL DEVIATION _____	ACCESS _____
TRAINING _____	QUALIFICATIONS _____	TESTING _____
CODE DEVIATION _____	STANDARD DEVIATION _____	CALIBRATION _____
10CFR50.55(e) _____	PART 21 _____	PROCUREMENT _____
FSAR DEVIATION _____	UNIT 2 ENHANCEMENT <input checked="" type="checkbox"/>	STORAGE _____
OSHA _____	SECURITY _____	TRENDING _____
WORKER SAFETY _____	MANAGEMENT DEFICIENCY _____	OTHER _____

QA PROGRAMMATIC BREAKDOWN \_\_\_\_\_  
10CFR50, APPENDIX B, CRITERION \_\_\_\_\_

WRONG-DOING \_\_\_\_\_  
INTIMIDATION/HARASSMENT \_\_\_\_\_

POOR INDUSTRY CONSTRUCTION PRACTICE X \_\_\_\_\_  
POOR MANAGEMENT PRACTICE \_\_\_\_\_  
DISCIPLINE(S) INVOLVED QA, QC, Welding Engineering, (Supplier) \_\_\_\_\_

TO: (MRS.) JUANITA ELLIS, PRESIDENT OF CASE

FROM: \_\_\_\_\_  
E. OTTNEY  
ON-SITE PROJECT MANAGER -- CASE

*Owen R. Shero 1/26/90*  
CONSULTANT -- CASE

CASE-PERCEIVED POTENTIAL DISCREPANCY  
(Use Continuation Sheets when necessary.)

1. SUBJECT: Apparent substandard shop applied support welds, internal to secondary side of the Steam Generators (all four).

CONCERN: The exposed structural shop welds, identified during inspection of the Steam Generator internals, appeared to the CASE Monitors to be of questionable quality and integrity. The welds which were visible (not covered by visquine to protect installed equipment) exhibited what appeared to be substandard workmanship, e.g., excessive undercut, porosity, cold welds, possible undersize, poor profile, lack of fusion. The general condition of the welds did not appear to meet any code or standard weld inspection criteria (e.g., AWS, ASME, ANSI) previously known to the CASE monitors.



CASE CONCERN NO. 89-0025  
-----BACKGROUND DATA:

As a result of monitoring a welding engineering audit, during the CASE Monitors' inspection of the Moisture Separator Modifications performed by Westinghouse Field Services personnel, the CASE Monitors identified several apparent substandard weld workmanship conditions to the TU Electric Reactor Engineer accompanying the CASE Monitors and later (on or about 6/13/89) to the TU Electric Stipulation Manager. These welds were shop welds applied during fabrication of the four Steam Generators. The CASE Monitors requested to review the weld inspection procedure that contained the workmanship criteria utilized by the vendor's quality control inspection personnel during weld acceptance. To date, TU Electric has not identified the Welding Code/Standard or produced the procedure utilized by the vendor to apply or inspect the structural welds associated with the Steam Generator Internals (secondary side).

CASE MONITORS' CONCLUSION:

A majority of the welds internal to the Steam Generators which were inspected by the CASE Monitors were of poor quality and lacked apparent integrity, which also did not meet the inspection requirements known to the CASE Monitors as being standard industry practice (e.g., AWS D1.1, ASME Section III, NF).

Therefore, the CASE Monitors are unable to verify the acceptability of the welds, and have reason to question the integrity of the welds.

RECOMMENDATION:

The CASE Monitors recommend that TU Electric:

- 1) Require a complete reinspection, by qualified Quality Control Inspectors, of the structural welds applied internally to the four Steam Generators. CASE recommends that ASME Section III, NF, or AWS D1.1 acceptance criteria be applied.
  - 2) Document as a deficiency all unacceptable welds.
  - 3) Rework all unacceptable and/or questionable welds.
  - 4) Apply items 1, 2 and 3 to the Unit 2 Steam Generators to assure the quality of the Unit 2 welds.
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Date Submitted by CASE to TU Electric: 1-27-90

Potentially Impact Unit 1 Fuel Load? ?

Preliminary Discrepancy Category: (Check all potentially applicable.)

SAFETY RELATED <input checked="" type="checkbox"/>	NON-SAFETY RELATED _____	HOUSEKEEPING _____
HARDWARE <input checked="" type="checkbox"/>	IMPORTANT TO SAFETY _____	MAINTENANCE _____
DOCUMENTATION _____	PROCEDURAL DEVIATION _____	ACCESS _____
TRAINING _____	QUALIFICATIONS _____	TESTING _____
CODE DEVIATION _____	STANDARD DEVIATION _____	CALIBRATION _____
10CFR50.55(e) <input checked="" type="checkbox"/>	PART 21 _____	PROCUREMENT _____
FSAR DEVIATION _____	UNIT 2 ENHANCEMENT <input checked="" type="checkbox"/>	STORAGE _____
OSHA _____	SECURITY _____	TRENDING _____
WORKER SAFETY _____	MANAGEMENT DEFICIENCY _____	OTHER:
		TU Electric
		Specification
		Deviation <input checked="" type="checkbox"/>

QA PROGRAMMATIC BREAKDOWN \_\_\_\_\_  
10CFR50, APPENDIX B, CRITERION IX, X, XVI

WRONG-DOING \_\_\_\_\_  
INTIMIDATION/HARASSMENT \_\_\_\_\_

POOR INDUSTRY CONSTRUCTION PRACTICE X  
POOR MANAGEMENT PRACTICE \_\_\_\_\_  
DISCIPLINE(S) INVOLVED QA, QC, Electrical Construction

TO: (MRS.) JUANITA ELLIS, PRESIDENT OF CASE

FROM: \_\_\_\_\_  
E. OTTNEY  
ON-SITE PROJECT MANAGER -- CASE

*Quinn L. Thew* 1/26/90  
CONSULTANT -- CASE

CASE-PERCEIVED POTENTIAL DISCREPANCY  
(Use Continuation Sheets when necessary)

1. **SUBJECT:** A specific wiring and connection method is damaging safety-related electrical wiring.

**CONCERN:**  
Sample of improperly stripped wire.  
Unit 1 (Unit 2) - Generic

During CASE monitoring of TU Electric Audit QAA-89-21A, "Electrical Construction Audit," the CASE Monitor observed two (2) conditions that were contrary to quality, one of which was an out-of-scope observation.

**NOTE:** These two (2) observations by the CASE Monitor were immediately discussed with the TU Electric Lead Auditor; however, the events were not documented in the final Audit Report as either deficiencies of observations. The Lead Auditor did, however, state that



CONCERN (continued):

he discussed the items with the audited organization during the audit exit meeting. It does not appear that the one out-of-scope deficiency was handled as such; i.e., was not reported by the TU Electric auditor to the QA individual designated to follow up on CASE out-of-scope observations, but was discussed as part of the electrical construction audit exit meeting.

BACKGROUND:

A CASE Consultant monitored the field portion of the TU Electric QA Audit QAA-89-21A dealing with the electrical terminations made in Weidmuller Termination Blocks. This activity took place from July 24 through July 28, 1989.

Two (2) activities were observed by the CASE Monitor which, in the assessment of the CASE Monitor, were contrary to good construction practices, and should have been formally addressed in the subject audit report as deficiencies. These observations were discussed with the Audit Team Leader at the time and were verified by him to be potential problems, contrary to quality. The CASE Monitor was not able to be at the audit exit meeting, but it is understood that the two (2) conditions were discussed at the exit with the audited organization's management in attendance; however, there is no documented evidence of this happening. Moreover, there is no evidence from the audited organization that a problem was recognized by them and that adequate corrective action would result. The two observed conditions were as follows:

- 1) A very large construction worker was removing electrical cable from a cable reel which was attached to a fixture which allowed the reel to rotate. Instead of the reel being rotated by hand and another craft worker coiling the cable as it was removed from the reel, the construction worker himself was manually both pulling the cable off the reel and then coiling the cable on the floor. The excess cable from the reel became entangled with the fixture and stopped the reel from moving.

The immediate reaction from the worker was to pull on the cable with more force until it became obvious that force alone would not solve the situation; he then cut the cable free from the fixture and continued on with the operation as before. This does not necessarily mean that the cable was stretched and/or pulled with a force greater than allowed, but in the assessment of the CASE Monitor, it certainly could have been.

To the knowledge of the CASE Monitor, this event was not investigated by either the auditor or the audited organization to see if damage could have occurred or if pull tension could have been exceeded. Also, to the knowledge of the CASE Monitor, similar or previous activities were not investigated by either the auditor or the audited organization to see if it was common practice by the specific craft worker or others to remove cable from a reel by pulling on the cable itself, rather than rotating the reel to avoid stressing the cable. This, in the assessment of the CASE Monitor, definitely could have resulted in damage if the cable being removed was coax.

- 2) It was observed by the CASE Monitor during the wire-strapping operation, prior to terminating the wire into the Weidmuller Terminal Block, that the mechanical wire-stripping tool being used to strip the insulation from the wire center conductor was of a type (adjustable cutting jaws) that, in the experience of the CASE Monitor, has been a source of trouble in the manufacturing industry, in that it has a history of scraping and nicking center conductors and damaging the insulation material during the operation. The CASE Monitor's experience was that General Electric had eliminated the use of this tool (made by Ideal) in their wiring and termination operations, as well as other locations that the CASE Monitor was personally aware of.

When the CASE Monitor recognized the type of tool being used during the audit, the matter was immediately discussed with the TU Electric auditor. The TU Electric auditor had the technician strip a sample for the CASE Monitor using the same tool and technique. The wire sample showed signs of the jaws scraping a strand of the center conductor, which is unacceptable according to the inspection criteria (i.e. no evidence of damage is allowed). The three wires already stripped were then inspected and two (2) were found to be scraped/damaged and were redone.

The stripping tool utilized also damaged the wire insulation on both sides where the tool gripped the wire. The jaw tension was such that it tore/cut/bruised the insulation in several places. Apparently no evaluation was conducted to see if it exceeded specification limits (10% into the insulation).

The Inspection Report (IR) contained in the Work Package did not appear to require inspection of the insulation for damage. The Inspection Report did, however, reference S2323-E100, Appendix K, for inspection criteria. This specification is massive and was not available at the work station for review or reference. There was no visible

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indication to the CASE Monitor that the QC Inspector examined the insulation for damage.

Finally, it is the experience of the CASE monitor (at General Electric, Duane Arnold Energy Center) that wiring and connection methods, of which wire stripping is a part, are treated as a Special Process which includes, among other controls, qualification of the process, procedures, equipment, and personnel. The same level of control does not seem to be applied at CPSES. This is considered by the CASE Monitor to be paramount, especially with reduced inspection intervals for ring tongue terminations.

CASE MONITOR'S CONCLUSION:

- 1) The Ideal-manufactured tool used to strip four (4) wires (including the sample) produced two (2) defective stripping results (i.e., the wires were scraped, exposing bare copper). The tool therefore, has the potential, based on the examples discussed, of producing up to 50% defective wire stripping operations, even when utilized by a trained operator.
  - 2) As a separate matter, the CASE Monitor was informed by the operator that the Ideal-manufactured stripping tool is widely used and, to his knowledge, is the only type provided to the operators. This fact is of great concern to the CASE Monitor and, in the assessment of the CASE Monitor, puts the status of the wiring at CPSES in an indeterminate status whenever that type of tool, or a similar type of tool, is used.
  - 3) The use of the Ideal-manufactured stripping tool becomes a large potential problem due to reduced inspections (i.e., one per week) when applied to ring tongue terminals.
  - 4) The practice of removing cables from cable reels by pulling on the cable itself can create overstressing/stretching of cables, especially if used for coax.
  - 5) The two deficiencies described in this CASE Concern should have been documented in the audit report and by the audited organization's QA program and corrective action taken. The overall impact of these deficiencies apparently was not evaluated for all previous activities affecting quality. There is no documented evidence that the use of the Ideal Stripping Tool (and/or other types with mechanical adjustments) has been evaluated for future use.
  - 6) The inspection criteria contained in the Inspection Report (IR) appeared to be deficient in that inspection of the wire insulation after stripping was not required.
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- 7) The referencing of other documents for information necessary to accomplish work (rather than having complete instructions included in the work procedure itself) appears to put an unnecessary and possibly counterproductive burden on the user to carry to the field when required. The inspection criteria utilized during this operation did not appear to stand on its own merits without reference to other documents which were not available at the work station.

RECOMMENDATION:

The CASE Monitor recommends that TU Electric:

- 1) Discontinue use of the Ideal-manufactured stripping tool and any other similar mechanically adjustable stripping tools.
- 2) If the Ideal-manufactured tool or similar tools are still to be used, explore the possibility of only using the tool to separate the insulation once cut, not for completely removing the insulation from the wire. Once cut, the insulation can easily be removed by hand, without the risk of possible damage from the tool. Take steps to assure that everyone using such tools is correctly trained in their use.
- 3) Explore adding wiring and connection methods as a special process in order to support reduced interval inspections. Perform a random sample (i.e., utilizing MIL STD 105D as a guide) of previously completed work utilizing the Ideal-manufactured stripping tool (or any comparable type of mechanically adjustable tools) to assure that the quality and integrity of each operation meets specification criteria.
- 4) Upgrade present procedures to assure proper removal of cables from cable reels. Train all personnel to the acceptable criteria/methods. Evaluate the amount of pulling tension that can be applied before damage to various cables can result. Determine if manual pulling tension can exceed that requirement. Evaluate the condition reported.
- 5) Review the audit practice of not reporting apparent deficiencies in the audit report. Review out-of-scope reporting and corrective action requirements. Retrain as necessary. Review the use of the Ideal-manufactured stripping tool with the audited organization and determine its effect on past and future operations.
- 6) Review the Inspection Report utilized for the stripping operation reported in this CASE Concern. Determine if it was adequate for wire insulation criteria. Perform a program to inspect previous wire operations where the Ideal tool was

utilized to assure that any insulation damage is within specification limits.

- 7) Review the practice of using extensive references to support field activities (rather than having complete instructions included in the procedure itself). Upgrade present criteria to assure all inspection attributes/requirements are included in each inspection report.
- 8) Review the generic implications of item 7) above for other procedures and instructive-type documents planned to be used in the field in radiation work areas once the plant goes into operation.

REFERENCE:

- A. 10 CFR Part 50, Appendix I, Criterion IX, Control of Special Processes, states:

"Measures shall be established to assure that special processes, including welding, heat treating, and non-destructive testing, are:

- "a) controlled; and
- "b) accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria and other special requirements."

NOTE: Although TU Electric does not specifically classify wiring and connection methods as a "Special Process," it is the experience and assessment of the CASE Monitor that the process of wire stripping and cramping requires special tools, training, and skills by the operator, and should be treated as such.

- 10 CFR Part 50, Appendix B, Criterion X, Inspection, states, in part:

"Examinations, measurements, or tests of materials or products processed shall be performed for each work operation where necessary to assure quality. If inspection of processed material or products is impossible or disadvantageous, indirect control by monitoring processing methods, equipment, and personnel shall be provided."

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10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, states, in part:

"Measures shall be established to assure that conditions adverse to quality, such as . . . deficiencies, deviations, . . . are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

B. Procedure NQA 3.09-3.05, Quality Control Inspection of Termination Activities, states, in part:

6.1.8 "Limited frequency inspection of the listed items shall be performed at a frequency as noted below:

Item No. 2 "Conductor insulation removal - weekly"

"Items 2 and 3 listed above are for terminations which utilize ring tongue terminals."

NOTE: The operation reviewed by the CASE Monitor did not involve ring tongue terminals; however, the concern is that if the "ideal" type of a stripping tool was also used in this application, an extensive nonconforming condition could exist, since there are potentially hundreds of thousands of these terminals used throughout the power plant in safety-related systems.

Figure 7.8, Item 2, requires the inspector to look for "Conductor insulation removal/conductor damage." This figure also refers the inspector to Specification S2323-E100, Appendix K, Paragraph 5.4.1, which states: "During limited frequency inspections verify that conductor strands are not cut or missing and free from gouges or scrapes, that expose bare copper."

Specification S2323-E100, Appendix K also gives the following inspection criteria (Section V):

5.8.1 "Weidmuller Terminal Blocks"

(d) (in part) "Conductor strands shall not be cut/missing and shall be free of gouges or scrapes."

5.19 "Field Terminations"

(e) "Exposed jacket/insulation shall be free of damage as specified in Section I of this Appendix."

Section I, page 39, paragraph 1.7.1 states, in part:

"The following cable conditions are acceptable. . ."

1.7.1.E "Insulation cuts, scrapes, gouges or bruises that extend 10% or less into the insulation wall thickness, provided that damage is located inside equipment enclosures, junction boxes, or cabinets."

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