U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF SPECIAL PROJECTS

NRC Inspection Report: 50-445/87-33
50-446/87-25

Permits: CPPR-126
CPPR-127

Dockets: 50-445
50-446

Category: A2

Construction Permit
Expiration Dates:
Unit 1: August 1, 1988
Unit 2: Extension request
submitted.

Applicant: TU Electric
Skyway Tower
400 North Olive Street
Lock Box 81
Dallas, Texas 75201

Facility Name: Comanche Peak Steam Electric Station (CPSES),
Units 1 & 2

Inspection At: Comanche Peak Site, Glen Rose, Texas

Inspection Conducted: December 2, 1987, through January 5, 1988

Inspector: P. C. Wagner 1/21/88
P. C. Wagner, Reactor Inspector Date

Reviewed by: H. H. Livermore 1/21/88
H. H. Livermore, Lead Senior Inspector Date

Inspection Summary:

Inspection Conducted: December 2, 1987, through January 5, 1988 (Report 50-445/87-33; 50-446/87-25)

Areas Inspected: Nonroutine, unannounced resident inspection of applicant actions on previous inspection findings, follow-up on violations and deviations, general plant areas (tours), and the Corrective Action Program.

Results: Within the areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

*W. H. Benkert, Staff Assistant Manager, Operations Quality Assurance (QA), TU Electric
*R. D. Best, Nuclear Operations Inspection Report Item Coordinator, TU Electric
*D. N. Bize, Engineering Assurance (EA) Regulatory Compliance Supervisor, TU Electric
*M. R. Blevins, Manager, Technical Support, TU Electric
*M. D. Gaden, CPRT, IT Corporation
*P. E. Halstead, Manager, Quality Control (QC), TU Electric
*T. L. Heatherly, Regulatory Compliance Engineer, TU Electric
*O. W. Lowe, Director of Engineering, TU Electric
*L. D. Nace, Vice President, Engineering & Construction, TU Electric
*D. E. Noss, QA Issue Interface Coordinator, TU Electric
*D. M. Reynerson, Director of Construction, TU Electric
*M. J. Riggs, Plant Evaluation Manager, Operations, TU Electric
*A. B. Scott, Vice President, Nuclear Operations, TU Electric
*C. E. Scott, Manager, Startup, TU Electric
*C. R. Smaney, Unit 1 Assistant Project Manager, TU Electric
*M. R. Steelman, CPRT, TU Electric
*P. B. Stevens, Manager, Electrical Engineering, TU Electric
*B. B. Taylor, Nuclear Operations, Maintenance Manager, TU Electric

The NRC inspectors also interviewed other applicant employees during this inspection period.

*Denotes personnel present at the January 5, 1988, exit interview.

2. Applicant Action on Previous Inspection Findings (92701)

a. (Closed) Unresolved Item (445/8603-U-01; 446/8602-U-01): Components required for safe shutdown of the facility. A review of recent changes to the Final Safety Analysis Report (FSAR) contained in Amendments 60 and 65 disclosed clarifications of equipment required for safe shutdown of the facility. Section 7.4 of the FSAR defines Hot Standby as the Safe Shutdown design basis and Section 7.4.1.1.2 clarifies that the steam generator power operated relief valves are available to remove heat from the steam generators to the atmosphere for gradual cooldown while the safety valves provide overpressure protection. The NRC inspector found these clarifications acceptable to resolve the concern over the steam relief capability necessary for safe shutdown.

b. (Closed) Unresolved Item (445/8603-U-03): Acceptability of installed electrical wire inside Unit 1 cable spreading room termination cabinets. In evaluating a concern raised by an anonymous caller that wire size reductions were made differently than specified by a design change authorization (DCA), the NRC inspector determined that the wire inside two Unit 1 cabinets had been changed from that originally installed by the vendor. (Related problems in Unit 2 were documented as Violation 446/8602-V-08 and are discussed in paragraph 3.)

As documented in the inspection report discussion of this unresolved item, a previously implemented DCA (No. 8939) had authorized the use of replacement qualified wire, if required. The applicant issued DCA 24,0148 on February 20, 1986, to correct the disagreement between the drawing notes which specified wire insulation color and the existing wire insulation color for a number of termination cabinets. In addition, Nonconformance Report (NCR) E86-100580S, Revision 2, was dispositioned on July 21, 1986, to rework the wires to reduce their size using an approved method; the NCR was issued because supporting documentation could not be located to explain the wire size reduction activity. This NCR was transferred to Construction Deficiency Report (CDR) 87-2811-EC on February 23, 1987, which was subsequently transferred to a new NCR, CE 87-2243. The new NCR was dispositioned on March 16, 1987, to replace the affected wires. The replacement activities were documented on QC Inspection Reports (IRs) 1-0116785, 1-0116786 and 1-0116700 for cabinet 1TC-22 and 1-0119752, 1-0116701, and 1-0119753 for cabinet 1TC-23; these activities were completed in June of 1987. The NRC inspector reviewed these IRs and verified that the rework activities had been performed as required.

c. (Closed) Unresolved Item (445/8604-U-09; 446/8603-U-09): Criteria used to determine source inspection requirements and release for shipment. The NRC inspector had been unable to locate information on the procurement interfaces with Gibbs and Hill (G&H) and the procedures which provided the above criteria for early project procurement. The inspectors discussed these concerns with applicant QA personnel on October 6, 1987, and were provided additional information during this report period. A review of G&H project procedures disclosed the following:

. PC-4, "Vendor Drawings, Documents and Requests for Deviation Handling Procedure," Revision 4, dated April 1978, required the lead job engineer to review and classify transmittals from vendors.

- PC-5, "Vendor Drawing Review Procedure," Revision 2, dated May 1973, provided the lead job engineer with guidance on how to classify drawings and related documents.

- V-30, "Vendor Documentation Closeout, Checklist and Vendor Document Index," dated May 24, 1983, established an engineering task force to review and resolve questions or discrepancies with vendor documents. The procedure also provided for updating the checklists as necessitated by purchase order supplements or change orders. (This procedure was deleted in November 1984.)

- QCI-VS-1, "Vendor Surveillance," Revision 3, dated July 10, 1977, was the QC procedure for establishing the receipt or source release checklists. The procedure required the nuclear projects QA department to prepare instructions on how vendor surveillance was to be performed, including requirements for final acceptance.

In addition, the NRC inspector reviewed the following TU Electric (TUGCO at that time) procedures:

- QCP-VC-1, "Final Inspection and Release for TUGCO," Revision 1, dated February 19, 1979, presented the requirements for source inspection and release for shipment.

- QCP-VC-2, "Surveillance or Witnessing Trip," Revision 1, dated February 19, 1979, provided instructions for the TUGCO QA representative on how and what to inspect at the vendor facility.

These documents resolved the NRC inspector concerns relating to procedural controls for procurement surveillance. Further, the applicant's August 4, 1986, response to related Violation 445/8604-V-02, 446/8603-V-02, (item I.B.2 of Appendix B to NRC Report EA 86-09) stated that a complete review of vendor drawings was being conducted to assure that all vendor drawings had been properly dispositioned.

3. Follow-up on Violations/Deviations (92702)

(Closed) Violation (446/8602-V-08): Failure to revise a design change document. The applicant had implemented a wire size reduction method inside two Unit 2 cable spreading room termination cabinets differently than specified on the DCA. Since the NRC inspector had determined that the DCA prescribed method was impractical and that the method implemented by the

operations traveler was acceptable, the violation involved only an administrative problem of documentation and authorization controls. The applicant's January 12, 1987, response to this violation stated that the involved DCA (No. 18,016) was revised to reflect the acceptable and implemented method of reducing the conductor wire size and that the procedure controlling the traveler program (CP-CPM 6.3) had been revised to require a review of the authorizing document for the work activity.

The NRC inspector reviewed Revision 1 of DCA 18,016 dated February 6, 1986, and Revision 12 to CP-CPM 6.3, dated July 9, 1986. The DCA now allows wire size reduction as implemented and the procedure now requires that "A traveler package issued as the result of a DCA shall be reviewed by the originator to ensure that any specifics required by the DCA are incorporated into the traveler." The NRC inspector found these revisions to be acceptable.

See Unresolved Item 445/8603-U-03 for concerns related to the Unit 1 termination cabinets.

4. Final Safety Analysis Report (FSAR) Review (37301)

The NRC inspector reviewed Amendment 65 to the applicant's FSAR, which was submitted to the NRC by letter dated November 20, 1987, to determine the acceptability of the changes made. The areas of interest included startup testing, safe shutdown equipment (see paragraph 2, above), electrical separation, and fire protection requirements. The inspector referred questions related to the acceptability of deleting the power coefficient test and the acceptability of the electrical separation requirements to the NRC technical review staff.

The inspector also noted that the new fire water supply system had not been included and that the electrical conduit fill was still stated to be limited in accordance with the National Electrical Code.

Since the inspector had previously observed that all of the conduits which provide power to the pressurizer heaters contained the "K" designation indicating they were not safety related, he reviewed the applicable portions of the electrical section of the FSAR. The power supply for four groups of heaters were shown on drawings as Class 1E, 480 volt motor control centers (MCCs) through an isolation transformer (each group from a separate MCC and four groups for each unit). Further review disclosed that Section 8.3.1.4.4 specified that beyond an isolation device the associated cables become non-Class 1E cables.

No violations or deviations were identified.

5. Plant Tours

a. Follow-up on Previous Inspection Observations (51063)

(1) Cable Terminations in 2CR21

On December 15, 1987, the NRC inspector observed that approximately 50 of the 300 conductors had been terminated inside the Unit 2 cable spreading room Termination Cabinet 2CR-21. The inspector observed no problems with the connections but did note the shield wires for Cables EO246140 and EO2416186 were slightly shorter than the conductors which made their connections, while acceptable, appear to be stretched. The inspector also noted that 14 of the broken Weidmuller terminal board (TB) segments had been replaced but 2 additional segments remained broken and would require replacement in accordance with the ongoing work documentation. The replacement segments were the black colored material which is authorized for use throughout the plant as opposed to the existing tan colored segments which are not allowed in harsh environments.

On December 30, 1987, the inspector observed that an additional 150 to 175 conductors had been terminated. No problems were noted from an inspection of these additional terminations.

These terminations were discussed in NRC Inspection Report (IR) 50-445/87-23; 50-446/87-17 in relation to Violation 446/8604-V-02 and will continue to be observed as part of the normal NRC inspection program.

(2) Cable Rework in Unit 2

The NRC inspector had observed electrical cables which had been pulled back for rework and documented those findings in IR 50-445/87-30, 50-446/87-22. On December 2, 1987, the inspector noticed that all of the cables which had been in temporary storage in the electrical equipment room had been repulled. A check of the involved documentation was made on December 16, 1987, to determine the status of the rework activities. The NRC inspector found that NCR 87-00056, which he had reviewed in Revision 0, had been revised twice. A review of Revision 2 disclosed a change in the problem discussion and a "use as is" disposition. Revision 2 stated that

while initial attempts to pull the lodged rope and attached rag from conduit C24000361 had been unsuccessful, that another rope with cable pulling lubricant was pulled through the conduit with a fish tape. After the interior of the conduit was lubricated, the original pull rope and rag were easily pulled out. The inspector detected no technical problems with the above operation; however, the NCR did not provide a clear indication of what work was actually completed. Therefore, the inspector asked applicant personnel to verify that the original disposition, to pull all of the cables back for inspection, had been completed.

The applicant personnel showed the NRC inspector how the documentation packages for the various cables (47 cables were installed in this 4" conduit) described the implementation of the disposition of Revision 1 of the NCR. The disposition was stated to be an "exploratory investigation" which involved pulling all of the installed cables back out of the conduit far enough so that the length inside the conduit could be checked for damage. This approach was necessary because if damage was detected, some rework would have been necessary. Since no damage was detected (as evidenced by satisfactory QC inspection reports), Revision 2 of the NCR was dispositioned "use as is." The NRC inspector agreed with this method of handling the problem and verified that the originally installed cables had been pulled back for inspection by reviewing the documentation packages for 13 of the 47 involved cables. Of these 13, 4 were selected from the 8 cables which were not included in the pull back; these cables were to be reworked, or in one case had been reworked, for other considerations. The QC inspection required when the rework is accomplished includes inspection of the cables for damage.

No violations or deviations were identified.

b. Jumper Wire Installation (51063)

On December 4, 1987, the NRC inspector observed two craft personnel making jumper wires for installation in the Unit 2 cable spreading room Termination Cabinet CP2-ECPRTC-20 (2TC-20). The jumpers were made by removing the black conductor from a Class 1E cable, cutting the conductor to proper lengths and installing a ring tongue terminal lug on each end. A review of the rework package showed that Startup Work Authorization (SWA) 36787 dated April 27, 1987, corrected a condition

where Cable EG218278 was too short and needed to be replaced by a new, longer cable. The craft personnel working from this SWA and Drawing 2323-E2-0172, Sheet 20, Revision CP-3, observed that in addition to the black conductor of EG218278 being landed on Point 52 of Terminal Board 1 (TB1-52) the drawing showed the existence of three jumpers. These jumpers connected points TB1-52 to TB1-63, TB1-63 to TB1-74, and TB1-74 to TB2-4. The work being performed by the craft personnel appeared to the NRC inspector to be very good; however, he was concerned about the lack of detailed instructions for both the craft installation of the jumpers and subsequent QC inspector verification of the completed installation. The NRC inspector discussed this concern with applicant personnel and was informed that:

(1) The craft procedure (EEI-8) requires "all jumpers in a cabinet or piece of equipment should be installed when the first termination is made at that location," and

(2) The QC inspection procedure (NQA-3.09-3.05) while not explicitly requiring inspection of installed jumpers continued to contain an inspection attribute on the inspection report form for termination inspections.

The NRC inspector was also informed that the QC procedure would be revised to be more explicit on the requirements for inspecting jumpers. A review of NQA-3.09-3.05, Revision 1, dated September 28, 1987, and EEI-8, Revision 8, dated August 31, 1987, verified the above requirements.

No violations or deviations were identified.

c. Electrical Conduit Seal Assembly (ECSA) (51053)

On December 16, 1987, the NRC inspector witnessed the installation of an ECSA on the open limit switch for the residual heat removal system sump isolation valve (1-8811B). Since this valve is located in one of the four isolation tanks for which pressure boundary requirements had been deleted as discussed in Open Item 445/8730-O-05; 446/8722-O-05, the inspector reviewed the documentation to understand the change being made.

The replacement of the original electrical penetration assembly with a new assembly was authorized by Work Order C86-5707. (The limit switch cable electrical leads exit the top of the tank through a penetration separate from the power and control leads which exit through

Penetration 1E-79. In Unit 2, these leads exit a separate penetration on the side of the tanks.) The documentation also contained DCA 25835 which deleted the requirement for the penetration assembly at the exit of the isolation tank, and DCA 25502 which removed the splice junction box for EPA 1E-79 since site procedures now allowed splices in the cable trays.

The inspector observed that all work was performed and QC inspected in accordance with procedures. No violations or deviations were identified.

The inspector will follow all penetrations to these tanks as part of the above mentioned open item.

d. Limitorque Operator Maintenance (25576)

During a tour of Unit 1 Safeguards building, Room 77S, on Novem..er 20, 1987, the NRC inspector observed craft personnel working on the limitorque valve operator on Valve 1-8105. This valve is the charging pump to reactor coolant system isolation valve. The two craft electricians were removing the space heater from the valve operator and sparing its power supply cable (SP 121760).

In addition to observing three Buchanan-type splice connectors in the bottom of the operator, the NRC inspector observed four black colored jumper wires and four tan colored jumper wires which did not appear to have any identification markings. Since jumper wire identification is an issue in the environmental qualification (EQ) of the valve operators, the NRC inspector requested (on November 20, 1987) the status of the EQ walkdown effort as of the date of his inspection. This information had not been provided prior to the exit interview on December 1, 1987, for the inspection period which included the valve operator inspection.

Upon review of the walkdown data sheets, the NRC inspector made the following observations:

(1) The existence of preinsulated compression wire joints was noted on the splices section,

(2) the existence of a number of jumpers not identified as being the correct wire was noted in the miscellaneous section in what the NRC inspector assumed was a second walkdown documented on the same data sheets, and

(3) numerous changes, additions and corrections were made to the original walkdown data.

The data sheets signature section showed that the original walkdown was conducted on October 22, 1986, and subsequent inspections conducted on April 27 and 30, 1987. There was, however, one entry related to the heater which was initiated and dated May 13, 1987. The data sheet was signed as being checked but the date was entered as June 1, 1986, when it should probably have been 1987; it was signed as reviewed on June 18, 1987.

The NRC inspector discussed the acceptability of these data sheets as permanent plant records and the problems with being auditable during NRC EQ inspections. The inspector also requested information on the frequency of revisions to the EQ data walkdown sheets. Applicant personnel agreed to review the EQ walkdown data to ensure that acceptable, auditable records are available and wrote Deficiency Report (DR) C87-4787 on December 29, 1987. The acceptability of the EQ documentation is an unresolved item pending further inspection effort (445/8733-U-01).

These matters will continue to be followed as part of the ongoing inspection activities and will be included in the NRC EQ Audit (see paragraph 6, below). No violations or deviations were identified.

6. Equipment Qualification (EQ) Corrective Action Program (CAP) (25576)

In an effort to follow-up on the observations and reviews conducted to evaluate the limitorque valve operator discussed in paragraph 5.d, above, the NRC inspector reviewed the field verification method (FVM) which was implemented to obtain the EQ walkdown data. The FVM, TE-FVM-EQ-047, "Limitorque Actuator Walkdowns," Revision 0, dated December 12, 1986, described the need for obtaining reliable data to establish the EQ of the valve operators. In addition to providing the data sheets as Attachment I (as discussed above) the FVM provided acceptance criteria for each of the data sheet sections (Table 1), a schedule (Attachment II) and a list of the 146 Unit 1 and Common MOVs requiring walkdown (Attachment III). The NRC inspector compared the information to be collected in the walkdowns to the information the NRC inspectors are directed to collect by Temporary Instruction 2515/76, "Evaluation of Licensee's Program for Qualification of Electrical Equipment Located in Harsh Environments." The inspector found that the FVM required information in excess of what would be necessary to fulfill the NRC review.

The NRC inspector also reviewed the training lesson plan for the FVM dated September 1986 because the data sheets reference

the lesson plan applicable to each section. The inspector found the lesson plan to be acceptable and the attached vendor information on the actuators, terminal boards and resistive heaters to be sufficient to enable walkdown personnel to identify the various internal components by type and/or manufacturer.

No violations or deviations were identified.

7. Electrical Erection Specification Review (51051)

The NRC inspector documented concerns with the electrical erection specification (ES-100) in IR 50-445/87-30; 50-446/87-22. A number of the concerns were to be resolved with the issuance of Revision 4 of ES-100. The inspector reviewed Revision 4 of ES-100, which was approved on November 25, 1987, to verify that the agreed to changes had been incorporated. The following revisions were noted:

a. The open design changes against ES-100 had been reduced to six recently issued DCAs as of December 29, 1987. There was also a Construction Hold Notice (No. 463, approved on December 1, 1987) which placed holds on all work related to AMP preinsulated environmental sealed (PIES) splices, taping of joints with insulated tape and using Yellow-77 cable pulling lubricant. (See paragraphs 5.a, c, d, and e of the above report.)

b. DCA 58763 was incorporated into paragraph 1.4.1.4 of Appendix E of Revision 4 as follows:

> "1.4.1.4 Pulling lines may be removed or left in place upon completion of cable pulling, whichever is more practical. If pulling lines are to be left in, they shall be cut off as close as practical to the end of the raceway and pushed back into the raceway in such a manner that the line does not extend past the outer edge of the bushing or hub. No pulling lines shall be present in the area where the fire protection material is to be installed. This applies to all enclosed raceway in all areas."

This condition will remain an open item (445/8730-O-03; 446/8722-O-03) pending further NRC review. (See paragraph 5.f of the above report.)

c. DCA 61927, which applicant personnel had stated would clarify guidance on adequate support of raceways for cable pulling and require the PIES to be heat sealed, was an open design change to Revision 4. NRC inspectors

review of this DCA showed that the following changes were included:

(1) Spared conductors need not be end sealed but shall be deluged and remain visible for reuse later if needed. Backfit of this requirement was not required.

(2) The requirement to swab the interior of a conduit until there is no evidence of oil was relaxed to allow traces of oil.

(3) The cable spacing requirements within cable trays were revised to be consistent with the installation bases, and raceway percent fill and loading requirements were revised.

(4) Termination requirements for ECSAs were revised to require the use of compression splices in place of the Weidmuller terminal blocks which are being removed in harsh environments. Backfit of this change will be required and is discussed in TU Electric letter NE-11900.

(5) The torque values for electrical connections to Rosemount transmitters were revised to allow flexibility. No backfitting was required.

(6) The model number of NAMCO limit switches which use ECSAs was specified; Model EA180 limit switches will replace the EA-170 switches.

The NRC inspector observed no problems with the revisions other than the open items stated above.

On December 30, 1987, the NRC inspector was informed that Anaconda brand electrical cable had been installed in Unit 1 in addition to Unit 2. This was contrary to previous information (see paragraph 5.e of the above referenced report for the concern).

Upon further review, the NRC inspector became aware of a previous applicant report (SDAR CP-81-02) on the use of the cable pulling lubricant (Yellow-77) which was restricted for use on Anaconda and which prompted the earlier inspector's questions related to the use of Anaconda cable. The acceptability of the cable pulling lubricant from a flame propagation standpoint is described in NRC IR 50-445/81-11, 50-446/81-11 which was transmitted by letter dated August 28, 1981. The applicant wrote DR C87-05328 on December 17, 1987, to describe that the potential exists that Anaconda brand

cable may have been installed in conduits where Yellow-77 lubricant had been used.

The acceptability of the installations of Anaconda brand electrical cable and the use of Yellow-77 cable pulling lubricant was the issue behind Open Item 445/8730-O-02, 446/8722-O-02; this open item will continue to be followed as part of the normal inspection program.

8. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during the inspection is discussed in paragraph 5.d.

9. Exit Interview (30703)

An exit interview was conducted on January 5, 1988, with the applicants representatives identified in paragraph 1 of this report. During this interview, the NRC inspector summarized the scope and findings of the inspection. The applicant acknowledged the findings.