APPENDIX B

U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF SPECIAL PROJECTS

NRC Inspection Report: 50-445/88-64
50-446/88-60

Permits: CPPR-126
CPPR-127

Dockets: 50-445
50-446

Category: A2

Construction Permit
Expiration Dates:
Unit 1: Extension request submitted.
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: September 9 through October 4, 1988

Inspector: William D. Dickens for
M. F. Runyan, Resident Inspector, Civil Structural

10-17-88
Date

Consultant: W. Richins, Parameter (paragraphs 2, 3, and 4)

Reviewed by: RF Warnick for
H. H. Livermore, Lead Senior Inspector

10-17-88
Date

Inspection Summary:

Inspection Conducted: September 9 through October 4, 1988 (Report 50-445/88-64; 50-446/88-60)

Areas Inspected: Unannounced, resident safety inspection of Post-Construction Hardware Validation Program (PCHVP), Comanche Peak Response Team (CPRT), issue-specific action plans (ISAP), and general plant tours.

Results: Within the areas inspected, a weakness and open item was identified concerning the implementation of PCHVP out-of-scope findings (paragraph 2), one violation was identified for undersized and mislocated welds (paragraph 2), a weakness and open item was identified for a documentation problem associated with the PCHVP (paragraph 2), and an open item was identified to review a future calculation to verify a confirmation-required Design Change Authorization (DCA) (paragraph 4).

DETAILS

1. Persons Contacted

*J. W. Beck, Vice President, Nuclear Engineering, TU Electric
*H. D. Bruner, Senior Vice President, TU Electric
M. R. Clem, CAP Structural, Stone and Webster Engineering Corporation (SWEC)
*W. G. Counsil, Executive Vice President, TU Electric
*B. R. Garde, Attorney, CASE
N. D. Hammett, Engineering Assurance, Brown & Root (B&R)
*T. L. Heatherly, Licensing Compliance Engineer, TU Electric
C. R. Hooten, Civil Engineering Manager, TU Electric
*C. B. Hog, Engineering Manager, Bechtel
*O. W. Lowe, Director of Engineering, TU Electric
*J. W. Muffett, Manager of Civil Engineering, TU Electric
*L. D. Nace, Vice President, Engineering & Construction, TU Electric
D. Noss, Licensing Compliance, Daniel
*E. F. Ottney, Representative, CASE
*A. B. Scott, Vice President, Nuclear Operations, TU Electric
M. E. Sheridan, CAP EMD, SWEC
*M. R. Steelman, QART, TU Electric
E. O. Tomlinson, CAP Structural, SWEC
K. W. Van Dyne, Engineering Assurance, Southern Technical Services
*J. R. Waters, Licensing Compliance Engineer, TU Electric

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

*Denotes personnel present at the October 4, 1988, exit meeting.

2. Post-Construction Hardware Validation Program (PCHVP)

a. Pipe Whip Restraints (CPE-SWEC-FVM-EE/ME/IC/CS-089 and CPE-SWEC-FVM-ME/EE/IC/CS-090) (48053)

(1-5)MS-1-002-910-C67W, MS-1-002-911-C67W, MS-1-002-912-C67W, MS-1-002-913-C67W, MS-1-002-914-C67W, pipe whip restraints, Reactor building:

These pipe whip restraints constrain movement of a main steam line and consist of one U-bolt type restraint (MS-1-002-910-C67W) and four bumper type restraints all attached to a single support structure. The NRC inspector reviewed the PCHVP packages including referenced documents and inspected the pipe whip restraints. The applicant's

QC inspectors had identified unsatisfactory conditions including: (1) configuration of structural members, (2) weld location, (3) nondeformed cotter pins, and (4) inaccessible bolting. The NRC inspector verified that the above conditions were addressed by nonconformance reports (NCRs).

The NRC inspector identified numerous intermittent welds used to install three shim plates between the bumper type restraints and the support structure. These intermittent welds were not shown on any of the drawings, DCAs, etc. supplied in or referenced by the PCHVP packages. The FVM-090 welding inspection of these pipe whip restraints was performed using Procedure NQI-3.09-M-004, Revision 5, "Field Verification of Pipe Whip Restraints" which requires verification of weld location presence only. Weld location was accepted by the QC inspector on the inspection reports for the four bumper type restraints. Procedure NQI-3.09-M-004, Revision 5, states, in part:

"Current revisions of work package documents used for inspection shall be annotated on the applicable inspection report in the remarks section."

The NRC inspector reviewed all such documents and concluded that the documents noted specifically on the inspection reports did not show the intermittent welds.

The NRC inspector discussed this discrepancy with the applicant. The applicant provided a copy of DCA 13425, Revision 4, dated July 8, 1983, which shows the intermittent welds. This DCA is applicable to drawing 2323-S1-0581, Revision 3, which is a general notes drawing for Reactor building internal structure pipe whip restraints. Drawing 2323-S1-0581 was identified on the appropriate inspection reports as required by Procedure NQI-3.09-M-004 and was stamped "This document affected by design changes."

The applicant engineering assurance and QC supervisors responsible for this inspection effort stated that the QC inspector used the above DCA and should have identified the DCA on the applicable inspection reports but failed to do so. They also stated that the oversite would be corrected. The engineer responsible for the pipe whip restraint PCHVP activity stated that the reference of

drawing 2323-S1-0581 on the inspection reports implies that DCA 13425 was used for the inspections and that DCAs to general note type drawings are often not identified specifically on the inspection reports.

The NRC inspector, while unable to confirm that the QC inspector used DCA 13425, concurred with the applicant's position described above. This concurrence was based on the fact that (1) the original QC inspector had the DCA in his files, (2) no other applicable DCAs were identified as missing from the inspection reports, and (3) the intermittent welds were accepted by the QC inspector even though obviously not shown on other documentation supplied in or referenced by the PCHVP inspection package. The discrepancy is a weakness in the documentation of PCHVP inspection packages and the applicant's resolution will be tracked as an open item (445/8864-O-01).

The NRC inspector identified two undersized welds on the support structure for the pipe whip restraints. Drawing 2323-S1-0576, Figure 7, Revision 3, specified 5/16-inch (typical) fillet welds along the bottom and top edges of 1/2-inch plates. The NRC inspector identified that bottom welds for two of the plates were undersized by at least 1/16-inch for the full length of the weld. The applicant was unable to provide documentation showing that the undersized welds had been identified on NCRs or that the design had been modified.

Criterion V of Appendix B to 10 CFR Part 50, as implemented by Section 5.0, Revision 3, of the TU Electric Quality Assurance Plan requires that activities affecting quality shall be prescribed by and accomplished in accordances with documented instructions, procedures, or drawings. The above undersized welds are identified as a violation (445/8864-V-02, Example 1).

The NRC inspector identified that a single square groove weld was installed in areas (between shims) where two 1/4-inch fillet welds were required by the drawings. DCA 13425, Revision 4, specifies the use of intermittent 1/4-inch fillet welds for shims 3/4-inch thick or less. The applicant was unable to provide documentation that the condition had been identified on NCRs or that the design had been modified.

NQI-3.09-M-004 states, in part, regarding weld inspection requirements:

"Verify weld location presence only . . . . Note: Presence of welds which are additional to design required welds, i.e., two sides when shown as one side only are unacceptable and are in scope observations and shall be addressed per paragraph 6.1.4.1 (inspection report documentations) . . . ."

The square groove welds are in addition to the design required welds and the required intermittent 1/4-inch fillet welds are not present. These discrepancies were not identified on the PCHVP inspection report or on NCRs and are identified as a violation (445/8864-V-02, Example 2).

Weld size was not part of the PCHVP inspection as weld location presence was the only welding attribute inspected by the PCHVP for pipe whip restraints. The CPRT VII.c Results Report for pipe whip restraints recommended that welds be reinspected and corrected as necessary to ensure that the required field welds have been installed. No further weld inspection attributes were recommended by CPRT.

Procedure NQI-3.09-M-004, Revision 5, "Field Verification of Pipe Whip Restraints" controls field inspection of welds for the PCHVP pipe whip restraint inspections. This procedure requires that out-of-scope observations be identified on NCRs. The NRC inspector discussed the inspection of welds and the handling of out-of-scope observations under NQI-3.09-M-004 with the applicant's representatives. The NRC inspector was told during discussions with QC inspectors and supervisors that QC inspectors were instructed not to take tape measures or fillet weld gauges with them while performing inspections using this procedure. Without these standard welding inspection tools, identification of undersized welds as out-of-scope observations would be difficult. NQI-3.09-M-004 directs the QC inspectors to make out-of-scope observations, but the lack of proper tools could circumvent this process. This is identified as a programmatic weakness and an open item (445/8864-O-03).

(6) S1-1-180-901-C47W, pipe whip restraint, Reactor building, Unit 1: The NRC inspector reviewed the documents in the PCHVP package and inspected the

pipe whip restraint. The engineering walkdown (FVM-089) identified two attachments to the main structure supporting the pipe whip restraint: a pipe support and a structural beam attached to a platform surrounding the steam generator. The NRC inspector verified the presence of these attachments and reviewed calculation SRB-130C, Set 4, which concluded that these attachments would have a negligible effect on the support structure. The NRC inspector concurred with the conclusion of this calculation.

A QC inspector had identified unsatisfactory nut engagement for structural bolting resulting in gaps between a shim and a cross member. NCR 88-10189 was issued to address this condition. Bolting replacement was performed per FVM-090. NCRs 88-09719 and 88-09863 were issued to address (1) bolts where craft was unable to achieve full nut rotation; (2) inaccessible bolts, nuts and washers; and (3) gaps between structural members.

The NRC inspector verified the above conditions in the field and concluded that the conditions were correctly addressed by the NCRs. The NRC inspector also concluded that the inspection was performed correctly per FVM-089 and FVM-090.

(7) CS-1-077-903-C47W, pipe whip restraint, Reactor building: The NRC inspector reviewed the documents in the PCHVP package and inspected the pipe whip restraint. A QC inspector had identified unsatisfactory conditions related to configuration and weld location. NCR 88-05065 was issued to document areas inaccessible for inspection. NCR 88-05064 identified a pipe support attached to the support structure which was not illustrated on drawing 2323-SI-0596, Revision 4, and various inconsistencies between observed welds and those depicted on the drawing. The NRC inspector concurred with the description of nonconformances presented in the NCRs and verified that other attributes were satisfactory as stated in the inspection reports (IRs). The NRC inspector concluded that this inspection was performed correctly.

b. Structural and Miscellaneous Steel (CPE-SWEC-FVM-EE/ME/IC/CS-086 and CPE-SWEC-FVM-ME/EE/IC/CS-090 (48053)

(1) CS-090-AB1-810-207-S7, loaded embedded plate, Auxiliary building: The embedded plate corresponding to this package was determined by the QC inspector to be unsatisfactory for base metal damage/defects, the only attribute relevant to the inspection. NCR 88-03935 was issued documenting eight areas of damage closer than 12 inches to the attachments welded to the plate. Specification 2323-SS-30 requires attachments to embedded plates to be located a minimum of 12 inches from unrepaired drill holes and any other unrepaired damage. The damage in this case was comprised of drill holes and unused threaded rods. The NCR had not been dispositioned at the time of the NRC inspection. The NRC inspector observed the plate and confirmed that the NCR accurately depicted the damage to the plate.

(2) CS-090-AB1-810-207-S15, loaded embedded strip plate, Auxiliary building: The NRC inspector reviewed the PCHVP package and visually inspected the strip plate. The QC inspector had determined that the only applicable attribute, base metal damage/defects, was unsatisfactory due to a 1/4-inch diameter partially drilled hole located 5 3/4-inch from the welded attachment. The hole had been improperly repaired and exhibited a 1/16-inch depression. NCR 88-03480 was initiated to document this condition. Subsequently, the applicant determined that this was not a nonconforming condition based on DCA-74696, Revision 1, to Specification 2323-SS-30, which exempts 1/4-inch diameter holes from the spacing and repair criteria. The NRC inspector verified the characterization of the hole and the basis for excluding it from further analysis. The NRC inspector did not observe any other base metal defects in the strip plate and considered this package to be satisfactory.

(3) CS-090-SG1-790-066-S01, embedded strip plate, Safeguards building: In accordance with Procedure NQI 3.09-M-005, the only attribute inspected by the applicant QC inspector was base metal damage. The QC inspector determined that this attribute was satisfactory. The NRC inspector examined the strip plate and concurred with the QC inspection report.

(4) CS-090-AB-852-241N-S02, loaded embedment, Auxiliary building: This loaded embedment is an attachment plate for the Chiller Surge Tank platform. The NRC inspector reviewed the PCHVP package and inspected the embedded plate. Two minor discrepancies were noted. The PCHVP inspector had documented the location of the embed as being 8 feet east of F-A on the 9-A wall south face. The NRC inspector measured this dimension as 5 feet 3 inches. Nevertheless, due to other information in the package, the NRC inspector determined that the QC inspector had inspected the correct item. Also, the QC inspector did not identify the attachments to the embed as required by Procedure NQI 3.09-M-005. These two examples are added to previous examples of the same kind identified in Unresolved Item 445/8858-U-01. Further NRC inspection will be conducted to define the extent of this problem.

Only base metal is required to be inspected for embedded plates. The NRC inspector concurred with the QC inspector that the base metal for this embed was satisfactory.

The NRC inspector made an observation for which additional information was requested from the applicant. DCA 2132, Revision 1, included in the PCHVP package, documented that four embedded plates (including the subject plate) had been omitted in the original construction of the concrete wall. The DCA, dated January 7, 1977, presented as a solution the installation of a plate per an attached sketch. This sketch showed the plate attached to the wall using 3/4-inch Hilti bolts with a note to weld the bolts to the plate and grind the connection flush. This implies that the bolts were to be cut flush to the plate surface.

The NRC inspector questioned the adequacy of this design, in particular whether Hilti bolts can be successfully welded for this application and whether the set on the Hilti bolts could be maintained in this configuration. No external evidence of this design could be observed as the plate was heavily coated with paint. In reponse the applicant provided for NRC review DCAs 62581 and 63003, dated January 12, 1988, which resulted from a general survey of Gibbs & Hill calculations. DCA 62581 contained a revised detail for the plate in question providing two additional bracing plates welded to the original plate and secured to the concrete wall

with one inch Hilti Super Kwik bolts. DCA 63003 contained similar details for three other embedded plates which provide attachment for the platform supporting a second chiller surge tank. This modification has not been implemented, but will be completed prior to startup. This information resolved the NRC inspector's specific concerns regarding the structural integrity of the subject embedded plate.

The applicant stated that they are confident that this is the only example of a welded Hilti bolt detail in the plant drawings. A 100 percent review of Gibbs & Hill calculations was performed in the Design Validation Program and this was the only design detail found where Hilti bolts were shown welded to a base plate. The applicant is continuing to investigate instances of welded Hilti bolts (not identified on design drawings) in its resolution of Corrective Action Report (CAR)-88-22. The NRC is tracking this issue as an open item (445/8858-O-04) initiated in a previous report.

(5) CS-090-SG1-810-82-S12, embedded angle and welded plate, Safeguards building: This item is an embedded angle welded to a plate which forms a bearing surface for 4-inch floor grating. The QC inspector had marked "N/A" for every attribute in the package including two which appeared to be applicable to this inspection: base metal damage/defects and weld size, length, and location. Normally, only base metal damage/defects is required to be inspected for loaded embedments. But in this case, the PCHVP component list defined the scope as "loaded embeds and welding of plate to embed." This implies that a welding inspection is applicable.

The NRC inspector met with the applicant to discuss questions regarding this package. During this meeting, it was established that the embedded angle and attached plate were non-nuclear safety (NNS) (based on drawing 2323-S1-0637, Detail A) and therefore out of the scope of the PCHVP. In addition, embedded corner angles are not included in the PCHVP scope for loaded embedments. The applicant explained that during the original engineering walkdown of the plant, many structural items were identified without attempting to determine the safety class or specific applicability. Thus, many items were initially included in the PCHVP and subsequently deleted when the QC inspector referred to the applicable drawings

or viewed the item. This information satisfactorily resolved the NRC inspector's questions concerning this item.

(6) CS-090-SG1-790-067-S01, loaded embedment, Safeguards building: This item is an embedded strip plate with several welded attachments. The PCHVP inspection of strip plates consists of only one attribute: base metal damage/defects. The NRC inspector concurred with the QC inspector that the base metal was acceptable and determined that the overall package was satisfactory.

(7) CS-090-DG1-844-99B-S24, monorail, Diesel Generator building, Unit 1: The NRC inspector reviewed the documents in the PCHVP package and inspected the monorail structure. The applicant's QC inspectors had identified unsatisfactory embedment for a 3/4-inch Hilti bolt. This condition was addressed by NCR 88-04299, Revision 0. The NRC inspector verified that the NCR properly addressed the unsatisfactory condition and concurred with the inspection performed and documented in the PCHVP package.

3. Applicant Action on CPRT Issue-Specific Action Plans (ISAPs) (48055)

The following CPRT ISAP activities were inspected during this report period:

Seismic Design of Control Room Ceiling Elements (ISAP II.d)

The primary objective for this ISAP was to provide assurance that all elements of the control room ceiling satisfy the seismic interaction provisions of Regulatory Guide 1.29 and FSAR Section 3.7B.2.8. The control room ceiling was redesigned and replaced. This activity has been reviewed by the NRC inspector and closed in previous NRC inspection reports (50-445/87-11, 50-446/87-09 and 50-445/87-13, 50-446/87-10).

The second objective for this ISAP was to address the generic implications of the initial issues associated with the control room ceiling. To accomplish this task, CPRT reviewed: (1) the completed parts of the Damage Study Program (DSP*) to assess the adequacy of the program related to seismic/non-seismic interaction and (2) the implementation and

*Currently referred to as the Systems Interaction Program

extension of the DSP to treat architectural features. The purpose of the seismic interaction portion of the DSP was to demonstrate that the failure of adjacent non-seismic commodities due to a safe shutdown earthquake (SSE) would not damage or impair the function of Seismic Category I commodities.

Damage Study Verification for Architectural Features (NRC Reference 02.d.04.00) and Review of Process for Evaluating Potential Seismic Interaction (NRC Reference 02.d.03.00)

CPRT reviewed the procedures and the process used by the applicant in the completed portions (through mid-1987) of the DSP as the first step in verifying the adequacy of the DSP. The review included an evaluation of the interfaces between the Damage Study Group (DSG) and other disciplines, DSP interaction criteria, DSP selection criteria for sources and targets, methods of identifying classified rooms*, and the potential for omission of generic areas. The details of this review process are contained in CPRT File II.d.4b.2, "CPRT Engineering Evaluation of Seismic Interaction Portions of the Damage Study Program," and summarized in the ISAP II.d Results Report.

The objective of the CPRT review of the architectural features portion of DSP was to provide an assessment of the following three DSP activities:

- The process by which architectural features have been identified for seismic interaction consideration;
- The subsequent damage study of those architectural features; and,
- The resolutions of any resulting unacceptable interactions.

The CPRT reviewed the procedures used by the applicant to accomplish these activities. The identification of potential sources was based on concurrence between the applicant civil/structural group and the DSG. The DSG then performed walkdowns to identify and document potential interactions. CPRT reviewed the applicant's architectural features evaluation. This evaluation resulted in the identification of several interactions involving various groups of source commodities. Many of these interactions have been resolved by the DSG. The remaining unresolved interactions were addressed

*Classified rooms were rooms identified as having so many potential target commodities that it became practical to seismically support large bore Class 5 piping, Train C conduit, and nonsafety-related equipment.

in a series of Specific Technical Issue Reports (STIRs) listed below:

Source Commodity	STIR No.
Sheet Rock (drywall) Walls	STIR-CPRT-S-006
Doors and Security Barriers	STIR-CPRT-S-007
Floor Gratings	STIR-CPRT-S-011
Handrails	STIR-CPRT-S-012
Ladders	STIR-CPRT-S-016

The STIRs also provide detailed guidance for implementation of ongoing activities and establish commitments for the completion of these activities.

The activities associated with the implementation of STIR-CPRT-S-006, -012, and -016 were complete when the ISAP II.d Results Report was issued (October 21, 1987). Most of the activities associated with implementation of STIR-CPRT-S-007 and -011 were ongoing at that time. CPRT concluded that supporting documentation for the completed STIRs was acceptable. CPRT stated in the Results Report that ongoing applicant activity related to the above STIRs will be overviewed in accordance with direction from the Senior Review Team (SRT).

The NRC inspector discussed the above CPRT and applicant activities with CPRT personnel and reviewed the supporting documentation contained in CPRT Files II.d.4b.2. The NRC inspector also reviewed the conclusions reached by CPRT as stated in the ISAP II.d Results Report. The NRC inspector concluded that the CPRT review efforts were adequate to assess the DSP and concurred with the CPRT conclusion that the DSP verification and review process for architectural features was acceptable.

These NRC reference items are closed. Remaining NRC inspection activities for ISAP II.d include: (1) review of the DSP procedures, (2) review of the DSP acceptance criteria, and (3) inspection of the implementation of the DSP.

4. Plant Tours (92700)

The NRC inspectors made frequent tours of Unit 1, Unit 2, and common areas of the facility to observe items such as housekeeping, equipment protection, in-process work activities, compliance with construction procedures and specifications, etc. The NRC inspectors identified that a 3/4-inch Hilti bolt was installed 2 1/4 inches from a 1 1/2-inch unused Richmond insert. The minimum spacing required by Specification 2323-SS-30, Revision 3, "Structural

Embedments" is 3 inches. The Hilti bolt was used for a base plate for recently installed support FW-1-096-701-C62K.

The NRC inspector reviewed the construction work package pertaining to the above support. The unused Richmond to Hilti bolt spacing of 2 1/4 inches was identified in DCA 61417, Revision 3, for the base plate in question shown in Section L-L. The engineering basis for this condition was stated in the DCA: "Since the 1 1/2-inch Richmond insert will remain unused then there is no design impact." The NRC inspector questioned the applicant regarding the adequacy of this engineering basis.

The applicant's representatives explained that DCA 61417, Revision 3, is a DCA w/CR (a DCA with confirmation required), has not been completely reviewed and signed off, and will require a calculation to justify the specific spacing discrepancy or will be revised to rework the attachment. Project Procedure PP-023, Revision 6, stated, in part:

"Construction and inspection activities performed under the DCA w/CR shall be at economic risk only (i.e. the work cannot result in a loss of design integrity as all work performed under the DCA w/CR shall be reworkable/repairable if the design change, as documented by the DCA w/CR, is not subsequently confirmed/approved by Engineering)."

PP-023 clearly requires a review of the DCA w/CR by engineering personnel. The NRC inspector confirmed that a similar spacing discrepancy for the Section M-M base plate for the same support was documented on a DCA w/CR, confirmed/approved by engineering (rework was required), and that a calculation was performed to justify the as-built condition.

The NRC inspector concluded that the applicant's process for reviewing DCA 61417, Revision 3, would provide a calculation to either justify the spacing discrepancy identified or require rework. NRC review of the calculation required for engineering confirmation of the Section L-L base plate as-built condition identified in DCA 61417, Revision 3, is an open item (445/8864-O-04).

5. Open Items

Open items are matters which have been discussed with the applicant, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or applicant or both. Three open items disclosed during the inspection are discussed in paragraphs 2 (two items) and 4.

6. Exit Meeting (30703)

An exit meeting was conducted October 4, 1988, with the applicant's representatives identified in paragraph 1 of this report. No written material was provided to the applicant by the inspectors during this reporting period. The applicant did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. During this meeting, the NRC inspectors summarized the scope and findings of the inspection.