APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-445/90-35
50-446/90-35

Operating License: NPF-87
Construction Permit: CPPR-127

Dockets: 50-445
50-446

Licensee: TU Electric
400 North Olive, L.B. 81
Dallas, Texas 75201

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

Inspection At: CPSES, Glen Rose, Somervell County, Texas

Inspection Conducted: August 20-24, 1990

Team Leader: I. Barnes 10/12/90
I. Barnes, Chief, Materials and Quality Programs Section, Division of Reactor Safety — Date

Inspectors: M. B. Fields, CPSES Unit 2 Project Manager, NRR
D. R. Hunter, Senior Reactor Inspector, Operational Programs Section, Division of Reactor Safety
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Approved: for T. J. Callan 10/12/90
T. J. Callan, Director, Division of Reactor Safety — Date

Irspection Summary

Inspection Conducted August 20-24, 1990 (Report 50-445/90-35)

Areas Inspected: No inspection was performed of Unit 1 activities.

Results: Not applicable.

Inspection Conducted August 20-24, 1990 (Report 50-446/90-35)

Areas Inspected: Routine, announced, team inspection of plans and processes for completion of Unit 2 design activities.

Results: Within the area inspected, no violations or deviations were identified. The inspection identified that the licensee has instituted an integrated project organization for completion of Unit 2, with the onsite engineering contractors working to a common program for design control and reporting of deficiencies. The methodologies and approach to be used for Unit 2 design were found to be consistent with those used for Unit 1 design validation. Planned oversight of engineering activities by the licensee and its contractors appeared comprehensive in nature, and included the use of both quality assurance audits and engineering assurance assessments of performance. Five inspector followup items were identified. These items pertained to status of cable tray attributes in the Unit 2 Attribute Analysis Matrix (paragraph 2.2.1), issue of the Unit 2 Attribute Analysis Matrix as a controlled document (paragraph 2.2.1), program qualification requirements and implementation for Unit 2 engineering walkdown personnel (paragraph 2.4), licensee programmatic actions regarding handling of identified design deficiencies (paragraph 2.6.3), and issue and implementation of a revision to Station Procedure STA-685 (paragraph 2.8).

## DETAILS

### 1. PERSONS CONTACTED

#### 1.1 TU Electric

J. Ayres, Quality Program Manager
*O. Bhatty, Issue Interface Coordinator
*R. W. Braddy, Unit 2 Project Engineering Manager
*W. J. Cahill, Jr., Executive Vice President
M. Carmichael, Unit 2 Engineering Assurance (EA) Manager
W. Crisler, Unit 2 EA Supervisor
*J. Ettien, Unit 2 Acting Operations Manager
*S. W. Harrison, Manager, Unit 2 Engineering
*J. C. Hicks, Unit 2 Licensing Manager
*C. R. Hooton, Unit 2 Deputy Project Engineering Manager
*J. D. Houchen, Unit 2 Assistant Project Manager
C. Killough, Quality Assurance (QA) Procurement Manager
*D. McAfee, Manager, QA
*J. M. McLemore, Project Construction Engineer
*J. W. Muffett, Manager of Project Engineering
*S. Palmer, Stipulation Manager
D. Ranstrom, Quality Engineering Supervisor
W. Tucker, Unit 2 Project Engineer, Construction Support
M. Turtell, Document Control Center Supervisor
*R. D. Walker, Manager of Nuclear Licensing
*D. A. West, Project Engineer
*J. E. Wren, Quality Construction Manager

#### 1.2 CASE

*H. S. Phillips, Consultant
*O. L. Thero, Consultant

#### 1.3 Stone & Webster Engineering Corporation

*D. P. Barry, Project Manager

#### 1.4 NRC Region IV

*D. D. Chamberlain, Chief, Project Section B, Division of Reactor Projects
*A. T. Howell, Resident Inspector
*J. P. Jaudon, Deputy Director, Division of Reactor Safety
*J. R. Johnson, Acting Deputy Director, Division of Reactor Projects

*Denotes attendance at the exit interview held on August 24, 1990.

The inspectors also interviewed other licensee and contractor personnel during the course of this inspection.

## 2. UNIT 2 ONSITE DESIGN ACTIVITIES (37055)

The purpose of this inspection was to evaluate the adequacy and status of licensee and contractor plans and processes for completion of design activities on Unit 2. Activities addressed during this inspection included organization, translation of Unit 1 reverification requirements to Unit 2, control of design changes, qualifications of engineering walkdown personnel, 10 CFR 50.55(e) programmatic controls, onsite engineering contractor programs and responsibilities, licensee plans for oversight of engineering activities, and the permanent equipment transfer program.

### 2.1 Organization

Discussions with licensee personnel and review of organization charts identified that the licensee has established an integrated project organization for accomplishing completion of Unit 2. The engineering function within the project organization is headed by the Unit 2 Project Engineering Manager, to whom reports project engineers from the engineering contractors, a TU Electric project engineer for TU Electric scope of work, an EA manager, a project engineer for construction support, a project engineer for start-up, and engineering supervisors for cost and planning. Project engineering activities are coordinated with the TU Electric Unit 2 Engineering Manager and Unit 2 Licensing Manager. Engineering and project procedures have been established to provide a common program for control of design and work activities. These procedures are being supplemented by contractor procedures for activities specific to an individual contractor's scope of work. Procedures and documents reviewed by the inspectors during the inspection are listed in the Attachment to the inspection report.

### 2.2 Translation of Unit 1 Reverification Requirements to Unit 2

#### 2.2.1 Post-Construction Hardware Validation Program (PCHVP)

The inspector evaluated the licensee's process for translation of Unit 1 PCHVP reverification requirements to Unit 2; this is described in Procedure 2EP-2.04, Revision 1, "Evaluating Unit 1 Post-Construction Hardware Validation (PCHVP) Results for Applicability to Unit 2." The PCHVP was developed by TU Electric on Unit 1 to verify that the as-built structures, systems, and components were in accordance with the validated design. As part of the design validation program, TU Electric developed installation specifications to implement the commitments and criteria included in the design basis documents (DBDs). The installation specifications included inspection requirements and final acceptance attributes to confirm that installed items met the validated design requirements.

Each final acceptance attribute in the installation specifications for Unit 1 was listed in the PCHVP Commodity/Attribute Matrix (CAM) which identified more than 1800 attributes. The PCHVP utilized either physical validations or engineering evaluation methodologies to ensure that each of the attributes in the CAM was confirmed. Review of the licensee's program indicated that Unit 2 physical validations of equipment will be performed by QC inspection personnel

or by engineering walkdowns. A corresponding Unit 2 Attribute Analysis Matrix has been developed by the licensee to show the translation of the Unit 1 PCHVP reverification requirements to Unit 2. The Unit 2 Attribute Analysis Matrix identifies, for each attribute, the Unit 1 reverification requirement, the Unit 2 specification for acceptance criteria, the method of reverification for those items requiring reverification, the type of engineering justification for those items not requiring reverification, and other applicable documents and comments. The inspector compared the specific attributes requiring reverification for Unit 2 to the attributes which had required reverification in Unit 1 and found that most of the requirements were identical or equivalent for the two units.

The inspector then selected a sample of 11 attributes for more detailed review. The attributes selected involved cable tray location, routing, fill, separation and identification; welding characteristics; seismic II/I clearance requirements; valve locking device installation; and mechanical equipment bolting. The inspector assessed each of the attributes sampled for reasonableness of disposition (i.e., what type of evaluation had been done to demonstrate that reverification on Unit 2 was not required, what other types of field walkdowns or inspections were being credited toward reverification, or what had changed from a design or installation standpoint). The assessment included discussions with the project engineering support staff, and the review of applicable procedures, specifications, QA documents, and attribute evaluation forms.

Ten of the 11 attributes sampled appeared to have reasonable justifications for any changes in reverification requirements. The eleventh attribute sampled, Attribute No. 24, which is titled "Cable tray location/routing," and which is included with 58 other cable tray related attributes in the justification documentation, was shown on the Unit 2 Attribute Analysis Matrix as requiring reverification on both units. However, the licensee indicated that it plans to change the Unit 2 designation to "not required," and it was not clear whether the other 58 attributes relating to cable tray installations will also be changed to "not required." This is considered an inspector followup item (446/9035-01).

The inspector also reviewed a number of attributes which had been deleted from the matrix prior to translation to Unit 2. Each of the items reviewed was either duplicative of other items or had been determined to be not applicable (such as review of an NPT stamp on flexible hose) or not practical (such as in-process review of grouting). During discussions, the licensee stated that all of the deleted items will be added back into the Unit 2 matrix, with reasons given for the deletion of the reverification requirements.

The inspector concluded that the licensee's approach and methodology for developing and implementing the Unit 2 matrix appeared to be systematic and reasonable and that, in general, the quality of the reverification effort on Unit 2 should be equivalent to the quality of the reverification effort on Unit 1. The licensee noted that the Unit 2 matrix is not yet in the document control system, but that it should be made a controlled document in the near future. This is considered to be an inspector followup item (446/9035-02).

Evaluation of the implementation of the actions specified in the Unit 2 Attribute Analysis Matrix will be performed during future inspection activities in this area.

2.2.2 Corrective Action Program Commitments

The inspector evaluated the process for translation of Unit 1 Corrective Action Program (CAP) commitments to Unit 2. Development of the Unit 1 CAP resulted from TU Electric's evaluation of the 1987 findings of the Comanche Peak Response Team (CPRT). As a result of the numerous, broad-scope findings from CPRT, TU Electric initiated a comprehensive CAP that consisted of a complete design and hardware validation and provided for an integrated resolution of the identified problem areas. In the design area, ongoing design validation activities from the CPRT program plan were incorporated into the CAP, which was divided into the following design workscopes:

(1) mechanical systems
(2) electrical systems
(3) instrumentation and control
(4) civil/structural
(5) large bore piping
(6) small bore piping
(7) cable tray hangers
(8) conduit supports (Trains A and B, and Train C greater than 2 inches)
(9) conduit supports (Train C less than or equal to 2 inches)
(10) heating, ventilation, and air conditioning
(11) equipment qualification

In order to evaluate the process which translated these corrective action programs to Unit 2, the inspector compared a selected sample of issues identified in the Unit 1 Project Status Reports with corresponding commodities from the Unit 2 Attribute Analysis Matrix. The appropriate installation specification was then reviewed for inclusion of these commodities to verify the proper translation of corrective actions. This comparison consisted of the random selection of two issues from the Cable Tray and Cable Tray Hangers Project Status Report and five commodities from the Unit 2 Attribute Analysis Matrix.

The issues selected from the Project Status Report were Items A32, conduits attached to cable trays or supports and B3, cable tray tee fittings. The five commodities selected from the Attribute Analysis Matrix were associated with cable trays: covers, separation, fill above side rails, splice plate type, and run spacing. These items were compared with the corrective actions contained in the applicable Unit 2 Installation Specifications CPES-E-2004 and CPES-S-2005.

Based on the acceptability of the above review process, it was determined that appropriate corrective actions were reflected in the applicable Unit 2 installation specifications and that the process to translate Unit 1 CAP issues into Unit 2 design activities appeared to be functioning.

2.3 Control of Design Changes on Unit 2

The inspector reviewed the licensee's program and practices for the control of design changes on Unit 2. The review covered the initiation of design changes by Engineering or in the field, the review and issuance of changes, interfaces among the involved contractor and licensee organizations, verification that changes do not compromise the original design bases and, for field changes, assurance that appropriate verification is performed before the installation becomes irreversible.

Design changes for Unit 2 can be initiated by Design Change Authorizations (DCAs), Advance Design Changes (ADCs), or direct drawing revisions by Engineering. The Document Control Center (DCC) maintains the drawing data base and controls the issuance of revised drawings. By procedure, all DCAs and drawing revisions undergo essentially the same process, which includes the issuance of a revision number by DCC; development of the revised design by Engineering; interdisciplinary reviews by the appropriate organizations, such as Startup, Construction, and QC, as determined by the responsible engineer; review and approval by the lead discipline engineer; a design verification by an independent reviewer for all Class I and II items; initiation of changes to the DBD or FSAR if appropriate; DCC incorporation of the change into the controlled data base; and distribution for work.

ADCs are only applicable to those design documents issued as master control drawings (MCDs), and are used only in direct support of in-process field activities. ADCs are approved by field engineers and are applicable to required minor changes which do not change the intent of the specifications, and can be easily reworked if the change is subsequently disapproved during the design review process. All open ADCs are required by Procedure 2PP-5.06, "Advance Design Change Program," to be incorporated into the affected MCD within 45 days of issuance of the first ADC against that MCD, unless the changes are only ASME identification changes, in which case the time allowed becomes 90 days. In the case where a design change identifies an MCD as an affected document, either the MCD is recalled for revision or an ADC is processed to incorporate the design change on the MCD.

The inspector reviewed the applicable controlling documents, and discussed the design change control process with the Unit 2 EA Manager and staff, and verified that the Unit 2 program for controlling DCAs and direct drawing revisions does include appropriate reviews, approvals, authorizations, and controls on issuance and maintainability. The documents reviewed by the inspector included:

1. Procedure 2EP-5.02, Revision 0, "Preparation and Maintenance of Specifications,"

2. Procedure 2PP-5.01, Revision 0, "Processing of Design Change Authorizations (DCAs),"

3. Procedure 2PP-5.06, Revision 0, "Advance Design Change Program,"

4. Procedure ECO 5.01-03, Revision 1, "Design Modifications/Design Change Notices," and

5. Procedure 2PP-1.02, Revision 0, "Unit 2 Interface with Unit 1."

In particular, the inspector noted that Procedures 2EP-5.02 and ECO 5.01-03 contain provisions to ensure that Unit 2 design changes are evaluated for applicability to Unit 1, and that Procedure 2PP-1.02 provides for project evaluation of the applicability of Unit 1 design changes to Unit 2.

2.4 Qualifications of Engineering Walkdown Personnel

The licensee had recently initiated a series of engineering walkdowns of Unit 2 systems, structures, and areas to develop a configuration baseline for future reverification, modification, and construction efforts. Two of the four major engineering contractor organizations, Stone and Webster Engineering Corporation (SWEC) and ABB Impell, were currently involved in the engineering walkdowns. A total of 100 to 150 personnel were being used by the 2 organizations for the walkdowns.

The inspector reviewed the engineering walkdown process for Unit 2 and determined that formal qualification requirements had not been developed for the Unit 2 walkdown personnel. The inspector then reviewed the qualification requirements and forms which had been used for the Unit 1 walkdown personnel. The qualification process on Unit 1 used a point system to verify that the walkdown personnel had the necessary combination of education, training, and experience.

The inspector selected a sample of 10 SWEC walkdown personnel and 6 ABB Impell walkdown personnel, compared their resumes to the Unit 1 qualification requirements, and found no examples of personnel who would not meet the Unit 1 requirements. However, the inspector notified the licensee that the inspection team considered the importance of the baseline walkdowns to be such that the licensee should give consideration to implementing a walkdown personnel qualification process for Unit 2 similar to the one used on Unit 1. Licensee personnel informed the team leader by telephone subsequent to the inspection that formal qualification requirements would be imposed for Unit 2 engineering walkdown personnel. Review of the qualification requirements and implementation is considered an inspector followup item (446/9035-03).

2.5 10 CFR 50.55(e) Programmatic Controls

Another aspect of the licensee's onsite design activities evaluated during this inspection involved the review of the programmatic controls which govern 10 CFR 50.55(e) corrective actions. In particular, the inspector reviewed the following project procedures to determine the adequacy of the licensee's process for evaluating adverse conditions for reportability:

1. Procedure 2PP-9.01, Revision 0, "Evaluating and Reporting of Adverse Conditions Under 10 CFR 50.55(e) and 10 CFR 21,"

2. Procedure 2PP-3.05, Revision 0, "Procedure for Processing of TU Evaluation Forms (TUE) and Conditional Release Requests (CRRs)," and

3. Procedure 2PP-1.02, Revision 0, "Unit 2 Interfaces with Unit 1."

Based on the review of these controlling procedures and interviews with Unit 2 licensing and engineering personnel, it was determined that the process for evaluating adverse conditions for significance and reportability under the provisions of 10 CFR 50.55(e) appeared to be equivalent to the programs utilized for Unit 1 completion. The control of design changes appeared to be adequate and provisions have been established for providing comparable corrective actions for Unit 2 deficiencies that were initially identified in Unit 1.

## 2.6 Onsite Engineering Contractor Programs and Responsibilities

The objectives of this part of the inspection were to determine the scope of authority and responsibilities for each contractor with respect to the activities to be performed in the completion of CPSES Unit 2 and to verify that approved procedures were in place to control those activities. There were four principal contractors involved with design activities in addition to those activities performed by TU Electric. They are discussed individually below:

### 2.6.1 Bechtel Power Corporation

Bechtel was contracted on May 15, 1990, to provide engineering services to complete stress analysis and pipe support design for Unit 2. This included the completion of all required analyses, design and engineering support of construction for all ASME Code Section III, Class 2 and 3 piping and pipe supports, and all non-ASME piping and supports in Unit 2, with the exception of non-Class 1 extensions to ASME Code Section III, Class 1 pipe stress calculations.

At the time of this inspection, the inspector determined that Bechtel had not completed any support design work. However, over 6000 pipe support detail drawings had been previously "red lined" by Construction Engineering and were made available to Bechtel. "Red lined" was defined as marked up to reflect the actual as-built condition of the hangers in the plant. The remaining drawings were in the process of being red-lined and progress appeared to be ahead of schedule. The inspector discussed the process in general with Bechtel's supports supervisor and noted that design stress calculation packages were being developed in preparation for validation. It was explained to the inspector that none of the packages had been completed, principally because they were still in the process of organizing their activities. Project Procedure CPPP-7, "Design Criteria for Pipe Stress and Pipe Supports" for Units 1 and 2 was in the process of being reorganized for Bechtel's use. The Bechtel representative informed the inspector that CPPP-7 will be used on Unit 2 as it was on Unit 1; however, it was being divided into two procedures for Bechtel's use (i.e., one covering design criteria, and the other covering guidelines to follow while developing design documentation). This action was to be completed by September 17, 1990.

A QA plan was in the process of being implemented by Bechtel which addressed the applicable criteria of 10 CFR 50, Appendix B, and NUREG/CR-4640. In addition, the program implemented the applicable requirements of Appendix A of NRC Branch Technical Position (BTP) 9.5.1 for the fire protection system portions of the contract with TU Electric. Bechtel QA Manual 502, Revision 0, dated August 1989, was implemented to control onsite and offsite engineering services. At the time of the inspection, Bechtel had two QA engineers onsite who were organizing the QA program and coordinating training and qualifications of personnel in the project. The inspector was unable to view any audits, as none had been completed yet. However, Bechtel indicated that audit plans were forthcoming and the first audit was scheduled for September 1990.

The inspector noted that Bechtel had a TU Electric project coordinator assigned whose function was to provide technical oversight, contract administration, and an overview of the quality and quantity of the output of Bechtel deliverables (i.e., design documentation, test reports, and deficiency/nonconformance reports).

The inspector found that Bechtel had adopted site procedures for activities that would be common to the other design engineering projects. Therefore, it appeared that consistency existed between projects in the control of such activities as design specifications, design and field changes, drawing issuance, and the identification, documentation, and resolution of deficiencies/and nonconformances.

In terms of organization, implementation plans and procedures, and QA plans, the inspector concluded that Bechtel had all the elements of a design group capable of producing a quality product which will be auditable and well documented such that Unit 2 piping and piping supports will meet the CPSES design basis. In view of the current status of the project, it will be necessary to review the implementation of these programs at a later time to assess the effectiveness of the organization's activities and controls.

2.6.2 ABB Impell Corporation

Impell was contracted on May 29, 1990, to provide engineering services to complete civil/structural, engineering mechanics and suspended support systems analysis, design, and contruction support for CPSES Unit 2. This included validation of items such as structural design, tanks, fire barriers, geotechnical, containment liner and penetrations, and security barriers and doors. The contract also included all engineering activities required for the structural design and qualification of suspended support systems such as heating, ventilating and air conditioning (HVAC); conduit; cable trays; and instrument and control (I&C) tubing. Impell was tasked to resolve all commodity clearances, that is, ensure that appropriate physical clearances between components, piping, conduit and structure are present which will assure that operational or seismic interferences do not occur.

The inspector interviewed key personnel in the Impell project to determine the scope and status of activities in progress at the time of the inspection. The project was in the early stages of engineering production. In the HVAC area,

the inspector was informed that TU Electric had made a decision to replace all seismic Category I HVAC ducts rather than try to bring the existing ductwork into compliance with the specifications. There were a number of deficiencies which required welding on, or replacement of, sections of duct that cannot be performed without difficulty because of the stacking sequence used in the original installation. Impell had just published Engineering Assessment Procedure 2-EAP-017 on August 8, 1990, to gather input for design of the replacement duct and to confirm the practicability and feasibility of the task. Also in progress was the preparation of other engineering assessment procedures and the review of Impell procedures and site procedures that will control the various project tasks.

Commodity clearance walkdowns had started in early July 1990, in accordance with Engineering Assessment Procedure 2-EAP-011, with progress appearing to be on schedule. The intention was to complete all commodity clearance walkdowns by early December 1990, so that all existing problems could be identified and many of them resolved prior to the resumption of construction on Unit 2 in January 1991.

The inspector interviewed the only Impell QA representative onsite at the time. This individual acted as interface between TU Electric, the Impell project onsite, and Impell QA in Fort Worth, Texas. Other functions included maintaining control over quality-related procedures, and acting as training and qualifications coordinator for the project. The Impell Project Quality Plan had just been approved on August 13, 1990. In accordance with the contract with TU Electric, Impell implemented their own QA Manual, Revision 18 (No. 11C-001) dated January 1, 1988. The contract stated that Impell shall have a documented QA program that implements the applicable criteria of 10 CFR 50, Appendix B, and NUREG/CR-4640.

No QA audits had been performed at the time of this inspection; however, the first audit was scheduled for September 1, 1990. An audit plan was not yet available. Impell has conducted, as required by their Project Quality Plan, seven technical quality reviews of project instructions in the areas of engineering mechanics, civil/structural, and cable tray design activities. Four of these reviews were closed out with corrective actions identified on a tracking matrix monitored by project management, and three had not yet been signed off as completed.

The inspector reviewed the responsibilities of the TU Electric Project Coordinator assigned to Impell. This position appeared to provide close oversight of Impell's performance and good interface control for TU Electric. Besides being involved in budgets, personnel quality, output quality and quantity, and schedule performance, this individual also provided technical oversight to ensure that the engineering tasks are performed in an efficient manner, and that appropriate questions are asked when technical problems arise. Also, audits and assessments of contractor quality are coordinated as an enhancement to Impell's own QA programs.

The inspector reviewed the list of applicable Unit 2 procedures adopted by Impell. This list was a controlled document in the form of a civil/structural

project control and procedure interface instruction, and was placed in effect on June 7, 1990. It appeared that the good procedural consistency as discussed above for the Bechtel project also existed at the Impell project.

In terms of organization, implementation plans and procedures, and QA plans, the inspector concluded that Impell also had all of the elements of a design group capable of producing a quality product such that Unit 2 would meet the CPSES design basis. Again, in view of the current status of the project, it will be necessary to review the implementation of these programs at a later time.

2.6.3 Stone & Webster Engineering Corporation (SWEC)

SWEC was contracted on May 22, 1990, to provide systems engineering services which included mechanical, nuclear, electrical, and I&C disciplines. The contract excluded those activities to be performed by the nuclear steam system supplier (NSSS), Westinghouse.

2.6.3.1 Organization

The inspector found that the SWEC onsite engineering organization had been established and included support, discipline engineering, and field engineering functions. The SWEC project engineering organization was delineated and received day-to-day direction from the Unit 2 Project Engineering Manager and corporate direction from the Unit 2 SWEC Project Manager. An independent project QA organization was noted to be onsite, with the project QA manager reporting to the SWEC Vice President, QA in the corporate offices. The QA organization included discipline engineers, field QA engineers, and a part-time engineering assurance group. The overall responsibilities of the project QA organization were found to be defined in Procedure 2SW-000, " SWEC Management Plan for Project Quality," Revision 0, dated June 5, 1990. Interviews revealed that audits of SWEC Unit 2 engineering activities would be performed by the EA group located at the corporate offices, with the first audit being planned for September 1990.

2.6.3.2 Program, Procedures, and Implementation

Discussions and document reviews revealed that the SWEC QA Manual No. 346, Revision E, dated February 21, 1986, had been approved by TU Electric and would govern both onsite and offsite work activities. Subsequent revisions to the approved QA Manual were required to be submitted to the licensee for review and approval. The inspector additionally ascertained that the project QA group was involved in the development of the SWEC engineering program, the approval of implementing procedures, the training of SWEC project personnel, and followup of corrective actions for identified deficiencies. The inspector reviewed Revision 1 of the SWEC procedure applicability matrix dated July 31, 1990, which is maintained by the SWEC project QA group. This matrix listed licensee project and engineering procedures which have been endorsed for use by SWEC, and SWEC procedures that provide additional required instructions on work scope activities. "Desk Top" procedures were also noted to be used for accomplishment of specific tasks, with these documents being controlled by the discipline lead engineers.

Documents reviewed by the inspector included:

1. Procedure ECO 5.01-01, Revision 0, "Design Basis Documents,"

2. Procedure 2SW-3.00, Revision 0, "Design Confirmation,"

3. Procedure 2-EAP-001, Revision 0, "Electrical Separation,"

4. Procedure 2-EAP-028, Revision 1, "Electrical Device Walkdown and Verification," and

5. Procedure 2EP-5.02, Revision 0, "Preparation and Maintenance of Specifications."

The inspector determined from procedural review that appropriate guidance was provided for determining design inputs, and for specification preparation, review and approval, and revision. In order to assess procedural implementation regarding preparation of specifications, the inspector selected two specifications for review (i.e., CPSES-M-2003, Revision 1, "Field Fabrication and Erection of Piping (ASME III Code Classes 1, 2, and 3 - ANSI B31.1, Class 5 and 6)"; and CPSES-I-2002, Revision 1, "Installation of Piping/Tubing and Instrumentation." The specifications were found to have received the required reviews and approvals and to appropriately address overall requirements, applicable QA and QC requirements, associated acceptance criteria and documentation, and materials. Discussions revealed that the completed Unit 2 specifications were utilized by the Construction and QC groups in the preparation of installation and inspection instructions, with project engineering actively participating in those activities.

2.6.3.3 Actions Taken in Response to Identified Error in Unit 1 Peak Containment Pressure - Temperature Analysis

During Unit 2 offsite analysis work, SWEC identified on August 16, 1990, an error in the Unit 1 calculations that determined peak containment pressure and temperature following a postulated loss of coolant accident (LOCA) or main steam line break (MSLB). The error involved duplicate use of heat sinks from a superseded Gibbs & Hill calculation, 512-03, in applicable SWEC calculations NU(B)-003 and NU(B)-264. The results of removal of the redundant heat sinks from the analysis were initially determined to be that the containment temperature would exceed the 345°F peak containment temperature during the MSLB, and that the integrated leak rate test pressure may be exceeded. The CPSES site was promptly notified and a TU Electric "ONE FORM" was initiated (August 16, 1990, at 1600 hours) to document the problem for Unit 1. Review of the "ONE FORM" and the attached backup documentation revealed that a technical evaluation (TE) was not prepared. The inspector additionally noted that a "ONE FORM" had not been initiated to document the problem for Unit 2. On questioning licensee and SWEC personnel why the problem was not formally documented on a "ONE FORM" for Unit 2, the inspector was informed that the error did not affect Unit 2 in that it was discovered during review of design inputs and the formal Unit 2 calculations had not been prepared.

The inspector reviewed the general actions taken by the licensee with respect to notification of Unit 1 personnel. No specific safety concerns were identified in that the analysis was conservative and did not consider all available containment heat sinks. Subsequent evaluation by TU Electric of the "ONE FORM" demonstrated that adequate heat sinks were available to ensure that peak calculated containment pressure, following a postulated LOCA or MSLB, were equal to or less than previously calculated values. Discussions with the SWEC lead discipline engineer and the SWEC project QA Manager revealed that the containment pressure-temperature analysis deficiency was the only discrepancy that has been identified during engineering analysis reviews. However, the potential for identification of further design deficiencies (e.g., invalid assumptions, incorrect calculations, component qualification problems) was considered by the inspector to exist during completion of Unit 2 design activities.

The inspector reviewed existing program requirements for identification, review and evaluation, and tracking of identified design deficiencies on Unit 2. Procedures reviewed were 2PP-3.05, Revision 0, "Processing of TU Evaluation Forms (TUE) and Conditional Release Requests (CRRs);" 2PP-9.01, Revision 0, "Evaluating and Reporting of Adverse Conditions Under 10 CFR 50.55(e) and 10 CFR 21;" and NEO-3.01, Revision 5, "Corrective Actions." This review did not indicate to the inspector that existing program requirements provided clear and explicit guidance for formal identification of design deficiencies, review and evaluation, and tracking for followup and closure. This apparent program weakness was discussed with licensee personnel who indicated that the matter would be evaluated for determination of required actions. Review of licensee actions is considered an inspector followup item (446/9035-04).

2.6.4 Other Contract Support

The inspector was informed by a licensee representative that a contract would be issued in the near future with respect to the "Unit 2 NSSS Engineering and ASME Section III Class 1 Engineering Service." Review of design controls and procedures for the new contractor will be conducted during a future inspection.

2.7 Licensee Plans for Oversight of Engineering Activities

The inspector examined the licensee's methods for managing the engineering effort being performed to complete the design activities for Unit 2, with special emphasis on the management of the contract organizations. Some of the information provided to the inspector regarding the type and frequency of planned audits and technical oversight reviews was through discussions with onsite personnel. The NRC will examine the licensee's implementation of these plans in a future inspection. The following is a brief description of the control methods and their present status.

The QA Procurement Unit reviews the programmatic aspects of vendor QA programs and their overall technical expertise in the areas specified in their contracts and maintains an Approved Vendors List (AVL) for those vendors that satisfy the TU Electric criteria. The four vendors performing Unit 2 engineering design

activities are on the AVL. In accordance with TU Electric's procedures, a review of Bechtel's engineering design capabilities will be performed by the QA Procurement Unit within 6 months of the initiation of Bechtel's contract, since Bechtel has not performed engineering activities of this type for TU Electric before.

The Quality Construction Unit performs audits to assure that quality-related work is performed in accordance with procedural requirements, and is technically sound. This group will audit the manner in which the engineering contract or organizations follow their own QA programs and the licensee's QA programs. The first audit is planned for September 1990, and the licensee plans to perform 15-16 audits per year covering all areas of engineering activities.

The group reporting to the Unit 2 Engineering Manager will be performing oversight of Unit 2 engineering contractor performance and will also perform technical and programmatic evaluations of the contractors' work. This group will use the 60 day forecast of activities each engineering contractor will prepare to schedule team assessments of engineering activities. These team assessments will be performed on an as needed basis to resolve difficulties in contractor communications or work products.

Other methods of managing contractor performance included the procedures developed by TU Electric and adopted by the contract organizations, the day-to-day monitoring of engineering activities by the cost/schedule organization, and the planned audits by the Quality Program Unit of the TUE forms generated by the engineering groups. Future inspection efforts in these areas will concentrate on the extent of the use and knowledge of the procedures by the engineering staff, and on how well the TUE form process is implemented.

The team concluded that the licensee plans for oversight of the Unit 2 engineering design activities were conceptually sound. Review of the final plans for implementing this management process, and the results of the engineering activities, will be the subject of future inspections.

## 2.8 Permanent Equipment Transfer Program

The inspector reviewed the program requirements for initiation, review, approval, and implementation of permanent equipment transfers (PETs). The requirements for this program were defined in Station Procedure STA-685, Revision 1, and Design Engineering Procedure ECE 3.22, Revision 1, both of which were entitled "Permanent Equipment Transfer." It appeared to the inspector that the current program requirements provided appropriate controls for approval of PETs and assuring maintenance of an accurate Master Equipment List. It was ascertained, however, from discussion with project personnel that recurring problems with lack of completeness of equipment information provided by PET originators had been identified, for which corrective actions were in process. These problems were initially identified in EA Surveillance 88-64 and then again in QA Audit QAA-89-19A and QA Surveillance QAS-90-512.

To resolve these problems the licensee has instituted Unit 2 walkdowns to obtain missing PET information and to validate the status regarding transferred

equipment. These activities were found to be at an advanced stage during the inspection, with completion expected by December 1990. As a result of the recurring nature of the problem a revised response was also made to QA Audit QAA-89-19A. The change to the response committed to revise Station Procedure STA-685 to include a requirement for the PET coordinator to review PETs for completeness and to deny number assignment until all procedural requirements have been met. Review of the revised procedure and its implementation is considered an inspector followup item (446/9035-05).

The inspector additionally performed a limited review of procurement actions for replacement of transferred components. Purchase orders selected for review were S 0003982 7SN, S 0004917 7SA, S 0002449 7SA, S 0001936 7SA, and 665-72556 S. No problems were identified during this review.

No violations or deviations were identified during this inspection.

3. EXIT INTERVIEW

An exit interview was conducted on August 24, 1990, with those personnel denoted in paragraph 1 in which the inspection findings were summarized. The licensee was informed during the meeting that the subject of qualification requirements for Unit 2 engineering walkdown personnel would be discussed with Regional management, and that the licensee may be requested to provide a formal position on the matter. Licensee personnel informed the team leader by telephone subsequent to the inspection that formal qualification requirements would be imposed for Unit 2 engineering walkdown personnel. The licensee was additionally informed during the exit meeting that, because project status was in the early stages of the engineering process, further inspection of onsite design activities was planned to allow a full assessment of the program and its implementation. No information was presented to the inspectors that was identified by the licensee as proprietary.

ATTACHMENT

DOCUMENTS REVIEWED

2EP-2.04, Revision 1, "Evaluation Unit 1 Post-Construction Hardware Validation (PCHVP) Results for Applicability to Unit 2"

PCHVP Commodity/Attribute Matrix

Unit 2 Attribute Analysis Matrix

2FP-5.02, Revision 0, "Preparation and Maintenance of Specifications"

2PP-5.01, Revision 0, "Processing of Design Change Authorizations (DCAs)"

2PP-5.06, Revision 0, "Advance Design Change Program"

ECO-5.01-03, Revision 1, "Design Modifications/Design Change Notices"

2PP-1.02, Revision 0, "Unit 2 Interface with Unit 1"

2PP-9.01, Revision 0, "Evaluating and Reporting of Advance Conditions Under 10 CFR 50.55(e) and 10 CFR 21"

2PP-3.05, Revision 0, "Procedure for Processing of TU Evaluation Forms (TUE) and Conditional Release Requests (CRRs)"

CPPP-7, "Design Criteria for Pipe Stress and Pipe Supports"

2SW-000, Revision 0, "SWEC Management Plan for Project Quality"

SWEC QA Manual No. 346, Revision E, dated February 21, 1986

SWEC Procedure Applicability Matrix, Revision 1

ECO 5.01-01, Revision 0, "Design Basis Documents"

2SW3.00, Revision 0, "Design Confirmation"

2-EAP-001, Revision 0, "Electrical Separation"

2-EAP-011, Revision 0, "Commodity Clearance"

2-EAP-017, Revision 0, "Procedure for Gathering Input for Design of New Seismic Category I HVAC Duct and Duct Hangers in Unit 2"

2-EAP-028, Revision 1, "Electrical Device Walkdown and Verification"

CPSES-M-2003, Revision 1, "Fabrication and Erection of Piping (ASME III Code Classes 1, 2, and 3 - ANSI B31.1, Class 5 and 6)"

CPSES-I-2002, Revision 1, "Installation of Piping/Tubing and Instrumentation"

NEO-3.01, Revision 5, "Corrective Actions"

STA-685, Revision 1, "Permanent Equipment Transfer"

ECE-3.22, Revision 1, "Permanent Equipment Transfer"

QA Audit QAA-89-19A

QA Surveillance QAS-90-512

SDAR-CP-85-35, "Cable Tray Hanger Design," Books 1 and 2

AQP-11.3, "Fabrication, Installation, Repair, Replacement and Modification Inspection of Component Supports"

CAR-87-052, Revision 0, "Hilti-Bolt Inadequacies"

CAR-87-015, Revision 1, "Pipe Whip Bolt Joints/Pins"

CAR-111, Revision 2, "Bahnson QA Program Inadequacies"

TU Electric letter dated April 14, 1988 (TXX-88373)

Procedure 2EP-3.23, Revision 0, "Engineering Activities Overview and Evaluation Procedure"

Procedure 2PP-1.01, Revision 0, "Organization and Responsibilities of the Unit 2 Project Organization"

Procedure NEO 3.07, Revision 3, "Quality Assurance Audit Program"

Procedure NEO 3.14, Revision 2, "Evaluation and Verification of Vendor Activities"