



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

October 29, 1987

Docket Nos. 50-445  
and 50-446

APPLICANT: Texas Utilities Electric Company (TU Electric)  
FACILITY: Comanche Peak Steam Electric Station (CPSES),  
Units 1 and 2  
SUBJECT: SUMMARY OF AUDIT ON AUGUST 12-14, 1987 -  
HVAC AS-BUILT VERIFICATION PROGRAM

On August 12-14, 1987, the NRC staff and its consultants performed an audit of the as-built field verification program for seismic Category I heating, ventilation, and air conditioning (HVAC) duct and duct hangers at the Comanche Peak Steam Electric Station. The HVAC as-built program is being conducted by Ebasco Services, Incorporated (Ebasco) as part of the TU Electric Corrective Action Program for design validation. The purposes of the NRC audit were (1) to verify the comprehensiveness and completeness of the walkdown procedures in their ability to record the as-built condition of the HVAC components for design verification and (2) to verify the adequacy of the Ebasco walkdowns and transfer of data into preliminary as-built drawings for compliance with the written procedure. A list of persons involved with the audit is provided in Enclosure 1.

The scope of the audit included (1) a review of the Ebasco procedure CPE-EB-FVM-CS-029 for performing the field verification, (2) a review of a sample of the Ebasco walkdown (as-built) packages for both duct segments and duct hangers, and (3) a walkdown of 19 HVAC hangers and 16 duct segments.

As-Built Verification Procedure

The audit team reviewed the Ebasco field (as-built) verification procedure CPE-EB-FVM-CS-029, Revision 2 (referred to later as "FVM-CS-029"), and interviewed the Ebasco walkdown group supervisor on the details of the procedure. The Ebasco walkdown effort of the HVAC ducts and hangers is essentially complete with the exception of responding to questions and inquiries from the Ebasco design verification group (DVG) in New York. The audit team found the procedure for the HVAC hanger as-built verification to be sufficiently comprehensive and complete to identify the major deficiencies and attributes that could affect the design qualification of the HVAC hangers. The procedure was also found by the audit team to provide the necessary data to develop the as-built drawings and to perform a detailed structural evaluation. The procedure incorporates the appropriate steps to ensure accurate recording of the attributes.

The HVAC duct segment walkdown procedure outlined in Section 3.6.2 of FVM-CS-029 addresses only gross dimensional attributes such as changes in direction and size of ducts, duct cross section linear dimensions, HVAC in-line items, and distance between hangers and companion flanges. The FVM-CS-029 procedure specifies that certain local dimensional attributes, such as duct thickness, flange sizes, and flange bolt spacing, as well as qualitative attributes, are to be verified and inspected by TU Electric QC in accordance with the QC procedure QI-QP-11.14-14. This aspect and procedure in the HVAC verification procedure was not addressed in this site audit but was the subject of a subsequent audit performed during September 8-11, 1987.

The audit team identified a concern in the FVM-CS-029 procedure (Sections 3.1.2.B.13 and 3.6.2.B) related to clearances. A minimum clearance of 1" is required between the duct or duct hanger and adjacent piping components and pipe insulation. For all other items, only a visible air gap is required. For the latter, "go or no go" criteria is used, i.e., the duct or hanger could essentially be in imminent contact with another component but as long as positive contact does not exist, no violation would be noted. No justification or rationale for this clearance criteria was given. TU Electric did indicate that Stone and Webster Engineering Corporation has initiated a commodity clearance program which is described in CPE-FVM-CS-068. There are definitive clearances in the latter procedure for HVAC ducts and hangers. However, this issue is considered to be unresolved and the staff will perform a followup audit of this issue during review of the HVAC design verification activities. The results will be reported in a future audit summary or safety evaluation upon completion of review.

#### Review of Walkdown Verification Documentation

The audit team reviewed the documentation for several HVAC hanger and duct segment packages (see Enclosure 2) to determine whether the field verification (as-building) procedures relative to flow of documents were correctly implemented. The packages reviewed contained the required documentation as listed in Section 3.4 of FVM-CS-029. The required documentation included the red-line drawings, the red-line drawing cover sheet with signatures, the required modification forms, signed off checklists, inputs from field engineering and the site design verification group, and the field checked computer aided drafting detail drawing. The audit team found that the field verification process and documentation requirements have been implemented properly in accordance with the applicable procedures.

#### Walkdown of HVAC Hangers and Duct Segments

The audit team randomly selected a sample of HVAC hangers and duct segments for a walkdown review. The purpose of this walkdown was to provide an independent assessment on the completeness and accuracy of the Ebasco field verification team work. The audit walkdown covered 19 HVAC hangers and 16 duct segments. This walkdown audit identified two findings:



1. A segment hanger DH-1-854-2N-C36 on the control building air conditioning system had been mistagged as hanger DH-1-2N-1EC. As a result of this mistagging, the portion of the hanger was mislabeled on duct segment drawings B-1-758-203 and B-1-758-205 as well as on the HVAC layout drawing SI-0758C.
2. Required modifications for missing bolts were not indicated in Detail 3 of Hanger Drawing DH-1-854-2N-C36, Sheet 7 of 8.

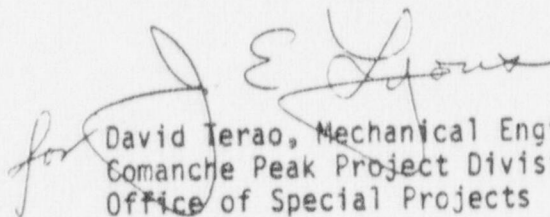
In the case of the first finding, TU Electric committed to correcting the hanger tag identification and the affected drawings. The mistagging was deemed to be an isolated error.

In the case of the second finding, a further examination of the walkdown documentation revealed that the Ebasco field walkdown team had actually identified the deficiency in the red-line drawings but the correct information was not transferred to Revision 0 of the hanger detail drawing. It should also be noted that the Ebasco design validation group in New York had discovered the deficiency subsequent to the release of the preliminary as-built drawing. Thus, the audit team found the deviation to be an isolated error in data transfer rather than an overlooked attribute.

#### Audit Team Findings

Based on a review of the Ebasco procedures and a sample of the as-built documentation and drawings and the walkdown, the audit team concluded that contingent upon resolution of the above deficiency related to clearances and a review of the QC portion of the field verification program, the Ebasco as-built verification program and procedures appear to be adequate (1) to record and document the as-built configuration in sufficient detail to perform a design verification analysis and (2) to identify any major design and fabrication deficiencies which could impact the structural integrity of the HVAC duct and duct supports. The audit team also concluded that the "as-builting" process as defined in the Ebasco procedure was implemented correctly. The review of the work packages for a sample of components indicated the as-built data appeared to be well documented and properly recorded. The walkdown, with the exception of the two findings above, found no significant deviations from the recorded as-built data. As noted above, the staff has determined the findings to be isolated errors.

This site audit of the field verification program for HVAC hangers and ducts involved 48 staff hours.

  
for David Terao, Mechanical Engineer  
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#### Enclosures:

1. List of Personnel Involved with Audit
2. List of Documents and Drawings Reviewed

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AUGUST 12-14, 1987

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Personnel Interviewed

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M. Strehlow	Ebasco
J. Aaen	Ebasco

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List of Documents and Drawings ReviewedA. Procedures

1. Ebasco Procedure CPE-EB-FVM-CS-029, Revision 2, Procedure for Seismic HVAC Duct and Duct Hanger As-Built Verification in Unit 1 and Common Areas.

B. Duct Segment Drawings

B-1-758-203	B-1-756-030
B-1-758-205	B-1-751-089
B-1-756-031	B-1-751-090
B-1-756-032	B-1-751-091
B-1-756-131	B-1-751-160
B-1-756-132	B-1-751-158
B-1-756-014	B-1-751-159
B-1-756-299	B-1-758-032

C. Duct Hanger Drawings

DH-1-854-1N-C7	DH-1-830-1N-1AW	DH-1-854-1N-1AK
DH-1-854-2N-C36	DH-1-830-1N-C18	
DH-1-830-1N-1AT	DH-1-792-1N-1A	
DH-1-830-1N-1AU	DH-1-792-1N-1B	
DH-1-830-1N-1AV	DH-1-792-1N-1C	
DH-1-830-1N-1AY	DH-1-792-1N-4A	
DH-1-830-1N-1AZ	DH-1-792-1N-WP9	
DH-1-830-1N-1AS	DH-1-792-1N-1H	
DH-1-830-1N-C2	DH-1-792-1N-1G	



TU Electric  
Audit Summary of 8/12-14/87

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