July 3, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-445 and 50-446
TEXAS UTILITIES ELECTRIC COMPANY, ET AL.	)	
	)	(Application for Operating Licenses)
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	

AFFIDAVIT OF D.N. CHAPMAN, J.C. FINNERAN, JR., D.E. POWERS, R.P. DEUBLER, R.E. BALLARD, JR. AND A.T. PARKER REGARDING QUALITY ASSURANCE PROGRAM FOR DESIGN OF PIPING AND PIPE SUPPORTS FOR COMANCHE PEAK STEAM ELECTRIC STATION

We, D.N. Chapman, John C. Finneran, Jr., David E. Powers, R. Peter Deubler, Robert E. Ballard, Jr. and A. Thomas Parker, hereby depose and state, as follows:[1]

(Chapman) My name is David N. Chapman. I am the Quality Assurance Manager for Texas Utilities Generating Company. A statement of my educational and professional qualifications was received into evidence with Applicants' Exhibit No. 9.

1 Each affiant adopts those portions of this affidavit to which the questions are directed. Questions to the "Panel" are directed to the representatives of each design organization, viz., Finneran, Powers, Deubler, Ballard and Parker (answers designated by "All," include Mr. Chapman).

(Finneran) My name is John C. Finneran, Jr. I am the Project Pipe Support Engineer for Texas Utilities Generating Company. My business address is P.O. Box 1002, Glen Rose, Texas, 76043. A statement of my educational and professional qualifications was admitted into evidence as Applicants' Exhibit 142B.

(Powers) My name is David E. Powers. I am the Engineering Manager for ITT-Grinnell Corporation. My business address is 260 West Exchange Street, Providence, Rhode Island, 02901. A statement of my educational and professional qualifications is attached hereto as Attachment A.

(Deubler) My name is R. Peter Deubler. I am the Project Manager for NPS Industries, Inc. My business address is 300 Harmon Meadow Boulevard, Secaucus, New Jersey, 07094. A statement of my educational and professional qualifications was attached as Attachment G to the Affidavit of Mr. Finneran, Dr. Robert C. Iotti and myself regarding the design of Richmond Inserts and their Application to support design, filed June 1, 1984.

(Ballard) My name is Robert E. Ballard, Jr. I am the Project Manager for Gibbs & Hill, Inc. My business address is 11 Penn Plaza, New York, New York, 10001. A statement of my educational and professional qualifications is attached hereto as Attachment B.

(Parker) My name is A. Thomas Parker. I am the Manager, Structural Engineering, Plant Engineering Division, for Westinghouse Electric Corporation. My business address is P.O.

Box 355, Pittsburgh, Pennsylvania, 15230. A statement of my educational and professional qualifications is attached hereto as Attachment C.

I. PURPOSE

Q. Gentlemen, what is the purpose of your affidavit?

A. In this affidavit we will respond to the questions the Board posed in its December 28, 1983, Memorandum and Order (Quality Assurance for Design) and its February 8, 1984, Memorandum and Order (Reconsideration Concerning Quality Assurance for Design) regarding the existence and implementation of procedures applicable to Applicants' design process for piping and supports which satisfy provisions of 10 C.F.R. Part 50, Appendix B. These questions may be summarized, as follows:

(1) whether Applicants have implemented quality assurance measures for identifying, documenting and correcting design errors as part of the pipe support iterative design process, and not just a QA inspection of construction,

(2) whether Applicants "wait until the end of the design process to locate and correct design errors,"

(3) whether Applicants have implemented measures to assure that the cause of significant conditions adverse to quality is determined and corrective action taken to preclude repetition,

(4) whether there was a mechanism by which individuals' concerns regarding possible design errors could be brought to Applicants' attention, and

> (5) whether Applicants' QA program satisfies the requirement of 10 C.F.R. Part 50, Appendix B, Criterion I that persons performing quality assurance functions [for design] have the necessary authority and organizational freedom, including independence from cost and schedule.

In response to the Board's questions, Applicants proposed, on February 3, 1984, a plan that would provide the Board with the information necessary to satisfy the questions presented in its Memorandum and Order.[2] Applicants supplemented their plan on March 13, 1984.[3] This affidavit provides Applicants' response to the first task of the plan. The task, as stated in the Applicants' plan, is to

> Provide a detailed description of the iterative design process for piping and pipe supports, including a discussion of the design control process during all stages of design, with reference to written procedures that govern and control the design and design control process, and a discussion of the various documents employed as a part of the QA/QC process (including CMCs, NCRs and DCAs) and justification for the use of these documents in the quality program (*e.g.*, trending, document retention).[4]

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2 Applicants' Plan to Respond to Memorandum and Order (Quality Assurance for Design), February 3, 1983. ("Applicants' Plan").

3 Supplement to Applicants' Plan to Respond to Memorandum and Order (Quality Assurance for Design), March 13, 1984. ("Supplement to Applicants' Plan")

4 Applicants' Plan at 5.

Comments and suggestions regarding the plan were received both from the Board[5] and the NRC Staff.[6] Specifically, the Board requested that Applicants demonstrate not only that procedures exist for the design and design control process, but that Appendix B criteria were satisfied in the implementation of the design QA process. Similarly, the NRC Staff indicated it believed that "a discussion limited only to a general discussion of how the process was intended to work would be insufficient . . ." .[7]

Having considered these comments and suggestions, we are providing in this affidavit a detailed description of the design process for piping and pipe supports and of the QA program as it applies to this piping and support design

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5 Telephone Conference, February 10, 1984 (Tr. 9257-98).

6 NRC Staff Comments on Applicants' Plan to Respond to Memorandum and Order (Quality Assurance for Design), March 9, 1984.

7 The Staff also recommended that Applicants address any design control process issues which arise in connection with any of the specific technical issues of Applicants' Plan. To the extent appropriate, Applicants have provided this information in connection with their affidavits on the respective plan items. However, as Applicants have demonstrated in those affidavits, the assertions by CASE that certain design practices were inadequate are generally incorrect. In these cases, there is no "design control process issue" to address. To the extent there was a possibly valid question as to whether certain effects should have been considered (i.e., certain potentially unstable supports, and certain floor-to-ceiling supports), as Applicants indicate in their affidavits on these topics, Applicants had identified these conditions during their normal design process prior to CASE's concern with the issue. Accordingly, Applicants believe they have responded to the Staff's suggestions in this regard.

process. In Section II we demonstrate that Applicants have been committed to the implementation of a QA program for design activities since the inception of the Comanche Peak project. We also describe, in Section III, the process for the design of piping and supports at Comanche Peak. There we demonstrate that each of the organizations involved in the design of piping and pipe supports has implemented a program applicable to all stages of the design process that provides assurance that errors or deficiencies in design will be identified and corrected. In Section IV, we provide, in tabular form, a cross-reference between the procedures of each organization (discussed in Section III), and the provisions of 10 C.F.R. Part 50, Appendix B and ANSI N45.2.11 applicable to the activities within each organization's work scope on piping and support design. Finally, in Section V we provide a detailed discussion of particular examples of the implementation of the QA program for design to illustrate satisfaction of the criteria of 10 C.F.R. Part 50, Appendix B, ANSI N45.2-1971 and ANSI N45.2.11 Draft 2, Rev. 2, May 1973, pertinent to the identification and correction of errors or deficiencies in design.[8]

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8 (Parker) Westinghouse is committed to the 1974 version of ANSI N45.2.11.

In sum, we will demonstrate that the commitment to quality assurance for design activities at Comanche Peak has been in place from the initial stages of the design process. We will also demonstrate that this design QA program is much more extensive than the program perceived to exist by the Board. In particular, we will demonstrate that design control and verification measures as well as procedures which provide for corrective action with respect to identified design deficiencies have been established by each piping and support design organization from the inception of the design process, and that similar measures, commensurate with those applicable to initial designs, are established by each organization for design changes as they occur throughout the design process. In this manner, we demonstrate that Applicants' QA Program contains measures to locate and correct design errors at all stages of the design process.

We also address in this affidavit Applicants' Plan Item 6, regarding weld design. This Plan Item provides, as follows:

> Provide a description of the modifications of procedures that were made in response to the NRC audit regarding weld design, and a description of the review of weld design that was conducted during the code certification (N-5) process.

II. APPLICANTS' COMMITMENT TO QUALITY ASSURANCE FOR DESIGN

Q. Mr. Chapman, would you please describe Applicants' commitment regarding the establishment of quality assurance measures applicable to design activities?

A. Since the inception of the project, Applicants have been committed to the implementation of a comprehensive quality assurance program that requires that nuclear safety-related activities performed by the Applicants, its contractors, subcontractors and vendors comply with 10 C.F.R. Part 50, Appendix B, including quality assurance for design. See FSAR Section 17.1.[9] To this end, a quality assurance program for the design of structures, systems and components has been an integral part of the quality assurance program for Comanche Peak. Specifically, the QA Plan for Comanche Peak requires the implementation of procedures to assure, inter alia, design verification of nuclear safety related designs.

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[9] As noted above, design activities performed by contractors, subcontractors and vendors are also to comply with 10 C.F.R. Part 50, Appendix B. Applicants verify that those activities are conducted in accordance with Appendix B requirements through regular audit and inspection. (See, e.g., Applicants' Exhibit 43 (Testimony of Antonio Vega) at 5-6, 19-20.)

Indeed, the Quality Assurance Plan for Comanche Peak recognizes the importance and requires the establishment of quality assurance controls for design activities affecting safety-related activities at Comanche Peak. The Statement of Authority of that Plan provides, as follows:

> This Quality Assurance Plan establishes the Comanche Peak Steam Electric Station (CPSES) quality assurance system to be used by Texas Utilities Generating Company in performing design, engineering, procurement, fabrication and construction activities in conformance with the United States Code of Federal Regulations, the ASME Boiler and Pressure Vessel Code and other applicable industry codes and standards. (Comanche Peak Steam Electric Station Quality Assurance Plan, Statement of Authority (Applicants' Exhibit 43, Attachment 1) (emphasis added).)

From the beginning of the project, Applicants were committed to assure that design verification procedures were implemented to require that:

> drawings, specifications, procedures and instructions accurately reflect the design bases, conform to the representations in the license application, meet stipulations of related codes and standards, fulfill applicable regulatory agency requirements and implement the provisions of the TUSI Quality Assurance Program.
> (PSAR Section 17.1, page 17.1.2.)

Further, measures to implement the design control function of 10 C.F.R. Part 50, Appendix B, Criterion III were established to assure, *inter alia*;

> the review and approval of initial design, including changes or revisions, and that personnel performing design reviews are thoroughly familiar with the regulatory

IMAGE EVALUATION
TEST TARGET (MT-3)

150mm

6″

IMAGE EVALUATION TEST TARGET (MT-3)

150mm

6"

> requirements and design basis described in the PSAR/FSAR and independent of those originating the design.
> (PSAR Section 17.1.1.2, p. 17.1-18.)

These same commitments to a thorough program of quality as :ance for design are reflected in the FSAR for Comanche P. . (See FSAR Section 17.1.) The FSAR provides that methods of design review and verification for safety-related activities to be performed for Comanche Peak include:

> 1. Checks to compare information presented on a drawing or other document with a definite figure, criterion, or design base.
>
> 2. Supervisory reviews of design work, conducted by a supervisor in a given discipline.
>
> 3. Interface reviews, by personnel of one discipline, of work performed by another discipline to determine that the reviewer's discipline requirements and commitments are satisfied.
>
> 4. Review by QA to determine that QA requirements are included as appropriate for the item being reviewed.
>
> Design verification to review, confirm or substantiate the design is performed to provide assurance that the design meets the specified inputs. Methods of verification include but [are] not limited to Design Review, Alternate Calculations and Qualification Testing.
> (FSAR § 17.1.3.5, p. 17.1-19.)

In addition to the above, Applicants have committed to the standards set forth in ANSI N45.2.11 (Draft 2, Rev. 2) (May, 1973), "Quality Assurance Requirements for the Design of Nuclear Power Plants," See FSAR Section 1A(B), pp. 1A(B)-26 to 1A(B)-26a. This standard sets forth requirements and guidance for a quality assurance program for the design of nuclear power plant structures, systems and components.

In sum, Applicants are and have been fully committed to the establishment and implementation of a thorough and effective quality assurance program for design activities, in full compliance with the requirements of 10 C.F.R. Part 50, Appendix B. This commitment was made prior to the commencement of construction at Comanche Peak and has been implemented throughout the design and construction phases of the project.

III. APPLICANTS' DESIGN QUALITY ASSURANCE PROCESS FOR PIPING AND PIPE SUPPORTS

A. Piping and Support Design Organizations

Q. Panel, which organizations are responsible for the design of safety-related piping and pipe supports at Comanche Peak?

A. The design process for safety-related piping and pipe supports at Comanche Peak involves several organizations and groups within those organizations. The organizations involved are Gibbs & Hill, Westinghouse, ITT Grinnell (ITTG), NPS Industries (NPSI)[10] and Texas Utilities Generating Company (TUGCO).

Gibbs & Hill is responsible for piping design with the exception of Class 1 piping, the responsibility for which rests with Westinghouse, and some small bore piping which is within the responsibility of TUGCO Pipe Support Engineering (PSE) Analysis Group.[11]

Responsibility for pipe support[12] design is assigned to three organizations: ITT Grinnell, NPS Industries (NPSI) and the Pipe Support Engineering (PSE) Group of Comanche Peak Project Engineering.

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10 There are two NPS group companies working on the Comanche Peak Project. TUGCO has a contract with NPS Industries (NPSI) for the design and fabrication of pipe supports, and NPSI maintains overall responsibility relative to this contract. NPSI subcontracts the pipe support design portion to Nuclear Power Services (NPS). Each company maintains its individual QA program. NPS is a vendor to NPSI in accordance with NPSI's QA program and thus NPS' QA program implementation is monitored by NPSI.

11 Applicants provided information regarding the iterative design process for piping in response to a Board Inquiry on June 6, 1983. At that time Applicants submitted that the record in the proceedings is replete with evidence concerning the iterative design process for piping and supports (see Applicants' Response to Board Inquiry Regarding Iterative Design Process for Piping, at 2), but that because the evidence for piping alone was not easily compiled from the record, that evidence was consolidated for the Board. The focus of that document was more on the description of the iterative design process for piping than on the associated quality assurance program effort. The design process for piping is, therefore, described in more detail in this affidavit.

12 Design of moment restraints (there are 51 in Comanche Peak, Unit 1), is performed by Gibbs & Hill.

Q. Mr. Finneran, please summarize the evolution of the assignment of responsibilities for pipe support design.

A. The assignment of pipe support design responsibilities to various organizations occurred over several years as Applicants determined that additional design and fabrication resources were required for pipe supports. Initially, total responsibility for pipe support design rested with ITT Grinnell. That effort was subsequently divided into large and small bore (2 inch and under) piping support design efforts, the PSE group having been established principally to provide designs for small bore piping supports. In 1978, responsibility for large bore piping support design was subdivided between ITT Grinnell and NPSI. PSE also assumed some responsibility for large bore support design.

Q. Panel, please describe the organizational responsibilities for the piping support design process?

A. The present organizational responsibilities for the piping and pipe support iterative design process is depicted in Chart 1. The chart clearly shows the role played by each organization and group within individual organizations. It also illustrates that the evolution of the pipe support design effort has resulted in the assignment to each of the above organizations separate and distinct responsibilities for the design of pipe supports.

Generally, ITT Grinnell is responsible for the design of pipe supports in buildings associated with Unit 1 and common areas. The pipe supports in the containment building itself are the responsibility of NPSI (although a few containment supports were assigned to ITT Grinnell). The PSE Group is responsible for small bore piping supports and a limited number of large bore supports. (Applicants' Exhibit 142 at 9; NRC Exhibit 207 at 12; Tr. 5277-78.)

B. Piping and Support Design Process

Q. Panel, what are the concerns which have been expressed regarding the piping and support design process at Comanche Peak?

A. The principal concern is one raised by the Board in its December 28, 1983, Memorandum and Order. Therein, the Board construed the evidence of record to indicate that Applicants "wait until the end of [their] design process to attempt to locate and correct design errors" (Memorandum and Order at 20-21.) However, as we discuss below, the quality assurance program for the design process includes design control and verification measures, as well as corrective action. These activities are conducted in all phases of the design process, from its inception through the final certification of design. Accordingly, we describe below in detail that design process, defining the activities of each design organization in that process.

Q. Before describing the quality assurance program for the piping and support design process, would you comment on the nature of the iterative design process for piping and supports.

A. Yes. We have observed some apparent misconceptions regarding the need for an iterative design process, including questions as to whether the process is unusual in the design of piping and support systems in power plants, including nuclear facilities. It is important to understand, when considering the quality assurance program applied to the design of piping and supports, that this process is used and is necessary for designing these systems at virtually any power plant. Rather than present a lengthy discussion of this process, however, we have attached an article from "Power" magazine, titled "Standardization and computers cut costs of pipe-hanger and support system design" (February 1979) (Attachment D), which describes the nature of and the need for the process. We adopt the statement in the article (at 119-20), that:

> The hanger-design process is not simple. It is complex and tedious, involving many disciplines at the A/E firm, at the hanger manufacturing plant, and at the site. The process is iterative, continuing until the plant goes operational. (Emphasis added).

In sum, the iterative process Applicants have employed in the design of piping and supports at Comanche Peak is not only common but is necessary for designing adequate piping and support systems.

1. Gibbs & Hill

a. initial designs

Q. Mr. Ballard, what is the design process employed by Gibbs & Hill for the design of Class 2 & 3 piping and supports?

A. (Ballard) The process of Class 2 & 3 piping and support design begins with the generation of design specifications by Gibbs & Hill. Separate design specifications are prepared for piping (MS-200) and for supports (MS-46A) and are transmitted to the responsible design organizations. The Gibbs & Hill Applied Mechanics Discipline functions as the piping stress analysis organization. Its responsibilities are summarized below and illustrated in Chart 1.

In performing its function as a stress analysis organization, Applied Mechanics first establishes the pipe routing based upon a conceptual piping flexibility analysis. This is accomplished in cooperation with the Gibbs & Hill Mechanical Department. That Department generates composite piping drawings from the system descriptions and general arrangement drawings. Piping layout drawings showing the routing of systems from equipment to equipment are then generated and supplied to Applied Mechanics. It is Applied Mechanics' responsibility to locate anchors along the piping system, to assign "stress analysis problem" numbers and to perform a free thermal analysis to verify that each "stress analysis problem" routing contains sufficient flexibility.[13] Also, if the stress problem contains equipment, thermal loads imparted onto equipment nozzles from the pipe routing are verified to be within established allowables.[14] Those allowables are incorporated into equipment specifications by the G&H Mechanical Department.

Recommendations by Applied Mechanics to improve the piping flexibility and/or decrease the equipment nozzle loads are supplied to the Mechanical Department. Such recommendations may include the addition of expansion loops, expansion joints or flexible connectors and pipe routing changes. Completed pipe routing drawings, resulting from acceptable flexibility analyses, are then transmitted to the pipe support vendor.

Q. Messrs. Deubler and Powers, what do NPSI and ITT Grinnell,[15] as the pipe support designers, do with the pipe routing

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[13] A piping "stress problem" consists of a designated length of pipe for which a pipe support is an accessory that cannot be designed separately from the overall length of pipe, <u>i.e.</u>, the design must interface with the stress analysis of the pipe.

[14] The method for performing the thermal stress analysis is set forth in Gibbs & Hill Analytical Engineering Guide AEG-501.

[15] (Finneran) The PSE Group had not been formed at the time these activities were undertaken.

drawings received from Gibbs & Hill?

A. (Deubler and Powers) NPSI and ITT-Grinnell utilize these drawings to locate deadweight and seismic pipe supports. NPSI and ITT Grinnell design engineers prepare preliminary drawings locating deadweight and seismic supports. Support location feasibility is based upon an interference check utilizing piping, structural, electrical and HVAC drawings. Pipe routing drawings indicating preliminary deadweight and seismic support locations are then transmitted to Gibbs & Hill Applied Mechanics.

Q. Mr. Ballard, what does Gibbs & Hill do upon receipt of the preliminary support locations?

A. (Ballard) Applied Mechanics uses this information to perform an "as-designed"[16] deadweight, thermal and seismic analysis of the piping systems. Direction and guidelines for performing these analyses are set forth in Gibbs & Hill's Analytical Engineering Guides, AEG-501, 502 and 503, entitled "Thermal Stress Analysis for ASME Code Section III Class 2 and 3, ANSI B31.1 Piping Systems", "Seismic Analysis of Piping Systems in Nuclear Power Plants" and "Pressure and Deadweight Analysis," respectively.[17] Upon completion of

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16 The term "as-designed" is used here to distinguish this phase of the design process from the later "as-built" phase. At this stage of the process, the analyses utilize <u>design</u> information as input rather than <u>as-built</u> information.

17 Further, direction is supplied by the following AM internal memoranda, as follows:

(footnote continued)

these analyses, support loads and corresponding support locations are released to the support vendor for design and fabrication. The support vendors proceed with the design and fabrication of the supports, as will be described later in this affidavit. If changes to support types or locations are necessary, Gibbs & Hill is requested to approve the changes before pipe support design proceeds. If piping reanalysis is required, the process previously described is utilized to generate a new "as-designed" stress analysis with new support loads. Upon satisfactory completion of that reanalysis, pertinent support information is transmitted to the support vendor for design and fabrication.

Q. Mr. Ballard, what is the role of the Site Stress Analysis Group?

(footnote continued from previous page)

1. Memorandum dated January 17, 1979, titled "Stress Analysis Procedures"

2. Memorandum AM-M-2179, dated November 14, 1979, titled "Hand Inputted Stress Intensification Factors"

3. Memorandum dated, January 10, 1979, titled "Coding of Valves for Stress Analysis"

4. Memorandum AM-M-694, dated March 3, 1979, titled "Procedure for Analyzing Seismic Anchor Movements"

5. Memorandum, dated June 7, 1979, titled "Moment Restraint Modelling Procedure"

The aforementioned documents establish mechanisms in accordance with 10 C.F.R. Part 50, Appendix B, Criteria III, pertaining to the establishment of measures to assure that applicable regulatory requirements are correctly translated into procedures and instructions.

A. The Site Stress Analysis Group (SSAG) is administratively part of the Site Technical Services Group but reports to Gibbs & Hill. SSAG was established to evaluate and approve proposed changes and modifications to pipe routing, pipe support locations and/or pipe support type, as requested by site engineering groups. The evaluations are made employing the latest as-designed piping stress analysis. SSAG provides revised design information to the applicable site organizations. All these activities are conducted in accordance with CPSES Engineering Instruction CP-EI-4.6-9, Rev. 1, entitled "Performance Instruction for Piping Analysis by SSAG" and Gibbs & Hill Applied Mechanics procedures previously cited. These documents have been established to assure that the SSAG activities are accomplished in a manner commensurate with the original as-designed analyses.

b. design checking and verification

Q. Mr. Ballard, how is the design checking and verification process implemented by Gibbs & Hill?

A. In accordance with Analytical Engineering Guide ("AEG")-501, calculations are checked and verified.[18] This procedure

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[18] For Gibbs & Hill, "verification," or design review, is an independent assessment of the acceptability of piping analysis in accordance with specifications and regulatory criteria. It can consist of a spot check of critical parts of an analysis, line-by-line review or performance of separate proof calculations or testing. Personnel assigned the role of design reviewers are chosen by the chief engineer for their experience and knowledge of the appli-
(footnote continued)

establishes the interface between analyst, checker, job engineer and design verifier. Each calculation must first receive a checker's comments on a check copy, which along with the original, is submitted to the job engineer. The job engineer assures that all the checker's comments have been resolved prior to design review.[19] As I will discuss later, if a significant or recurring error is detected during this process, an internal memorandum is issued to correct this deficiency. Once checking is completed to the satisfaction of the checker and job engineer the stress analysis is examined to determine whether equipment nozzle loads exceed those contained in equipment specifications. As discussed previously, further adjustments in the piping and support system may be made in accordance with memorandum procedure AM-M-702. When the system is totally in balance, then the analysis may proceed to design review.

To accomplish these tasks, Applied Mechanics' "as-designed" calculation documentation is prepared in accordance with Gibbs & Hill procedure "Seismic and Thermal

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(footnote continued from previous page)
cable criteria. These reviewers report to the chief engineer in a separate reporting path from the analyst. "Checking" is performed by a senior member of the staff analyst's group and consists of a line-by-line review of all assumptions, input and results presented by the analyst.

19 Drawings that are required during this phase and subsequent phases of the analysis are governed by G&H Project Control Procedure, PC-2, entitled, "Drawing Control Procedure" and Design Control Procedure, DC-3, entitled, "Drawing Preparation, Checking and Approval Procedure".

Restraints - Release for Design and Fabrication," dated December 1977, and is based upon the requirements contained in Design Control Procedure, DC-7, titled "Technical Calculation Procedure" which establishes guidelines to ensure that technical calculations are prepared, checked, reviewed, approved and maintained in a controlled manner.

Q. Mr. Ballard, what are the criteria which govern persons performing independent verifications?

A. Independent verifiers are persons who may be within the same engineering organization, but who are not the individuals who performed the initial analyses, in accordance with the requirements of ANSI N45.2.11, Section 6.1, and 10 C.F.R. Part 50, Appendix B, Criterion III.

c. Audits

Q. Mr. Ballard, what mechanisms exist to provide assurance that the design and design verification process is being properly implemented?

A. In accordance with the requirements of 10 C.F.R. Part 50, Appendix B, Criterion XVIII and ANSI N45.2, Section 19, Gibbs & Hill has established a comprehensive audit program. This program requires that audits of the design process be performed on a regular basis by independent, i.e., not having direct responsibility in the audited area, appropriately trained audit personnel. The audits verify that the design program satisfies applicable regulatory requirements and that the procedures are properly implemented.

These audits are governed by Gibbs & Hill Quality Assurance Procedure, QA-4, titled "CPSES-Internal Audit Procedure" and the Gibbs & Hill Quality Assurance Department Instruction, QAI-7, titled "Audit Performance, Reporting and Follow-up." These procedures implement the requirements of 10 C.F.R. Part 50, Appendix B, Criterion XVIII. Follow-up action by the Gibbs & Hill Quality Assurance Department is also governed by Instruction QAI-7. In accordance with QAI-7, the audit results are reported to the manager of the audited area. In short, this auditing process assures an independent evaluation of the design control program.

In addition, although not mandated by NRC regulations, Gibbs & Hill has established a procedure (QAI-3) which provides for the QA Manager or Project Manager to request that unscheduled surveillances or technical audits be performed under the direction of the QA department. Technical expertise may be provided from other departments, or outside consultants may be utilized. Independence is maintained as with internal audits, and a written report is presented to the QA Manager for further action, if required. These technical audits provide an additional mechanism by which the need for corrective action in the design process may be identified.

Q. Mr. Ballard, is the Gibbs & Hill organization which performs the piping stress analyses subject to audit?

A. Yes. In fact, during the design process (including the as-built stress analysis) Applied Mechanics has been audited by Gibbs & Hill Quality Assurance 14 times. Nine (9) of the 14 internal audits were performed on "as-designed" piping stress analysis process. The remaining audits focused on "as-built" piping stress analyses.[20]

In addition, external audits of Applied Mechanics' activities have also been performed by the NRC (Region IV and NRR) and TUGCO. No deficiencies or required action items were identified in the NRC audits. TUGCO QA has audited Gibbs & Hill Applied Mechanics twice. Findings requiring corrective action have been addressed and resolved in those audits. Further, TUGCO audits the Gibbs & Hill Quality Assurance Department to assure proper implementation of the Gibbs & Hill audit program. Also, two internal audits have been performed on the Gibbs & Hill Site Stress Analysis Group within the past year by Gibbs & Hill Quality Assurance. Prior to those audits, TUGCO Quality Assurance had also audited the SSAG. One of these audits was a joint Gibbs & Hill and TUGCO QA effort.

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20 In addition to these internal audits, the Gibbs & Hill QA Department periodically conducts seminars to indoctrinate Applied Mechanics engineers in the requirements and importance of DC-7, DC-8, 10 C.F.R. Part 50, Appendix B and ANSI N45.2.11. The channels for resolving technical issues (e.g., comments by the checker, questions by the design reviewer or generic memoranda by the Chief or Job Engineer) were reemphasized.

Finally, five technical audits, described above, have been performed of the Applied Mechanics discipline piping analysis functions. Findings requiring corrective action have been addressed and follow-up reviews have confirmed problem resolution.

2. Westinghouse

a. Initial Designs

Q. Mr. Parker, please describe Westinghouse's responsibility for piping design and analysis at Comanche Peak.

A. Westinghouse is responsible for piping design and analysis of the reactor coolant loop and for analysis of Class 1 auxiliary piping. In addition, Westinghouse has the responsibility for analysis of some non-Class 1 auxiliary piping. The geometric layout (i.e., routing), sizing and support design was performed by others. Two specifications are used by Westinghouse in the piping and support design process. Westinghouse is responsible for the development of one specification (Westinghouse specification 955125, Rev. 1 (5/17/83), and attachments). This design specification applies to ANS Safety Class 1 and ANS Safety Non-Class 1 extensions. The other specification is developed by Gibbs & Hill. It pertains to all ASME Code Class 2 and 3 piping. These specifications are incorporated into our design process as indicated in Chart 1.

It is important to understand that Westinghouse is functionally organized in its engineering disciplines. This means that the same people, computer codes, quality assurance program and practices, and procedures used on the Comanche Peak Project are utilized on other Westinghouse nuclear power plant projects. Another benefit of being functionally organized is that the process is monitored continually. Westinghouse, as an NSSS supplier, is subject to review and audit by diverse organizations including the ASME, utilities, architect/engineers, and government agencies. The NRC has audited Westinghouse 30 times from 1975 to 1984, inclusive. Nineteen of these audits focused specifically on design control. TUGCO QA has audited Westinghouse eleven times from 1976 to 1983 inclusive. Ten of these audits included design control, two specifically in the piping area.

Q. Mr. Parker, describe the process Westinghouse uses to implement these responsibilities.

A. The Westinghouse design process is essentially the same for Class 1 and non-Class 1 piping except that the analysis for Class 1 piping includes a fatigue analysis and concludes with the issuance of an ASME Class 1 Stress Report, neither of which are required for non-Class 1 piping. In addition, actual support stiffnesses based on values computed by the support design organizations are used in the evaluation of Class 1 piping. Support stiffnesses provided by TUGCO in a generic format as a function of pipe size, based on information provided by Gibbs & Hill, were used in the analysis of non-Class 1 piping. Chart 1 illustrates the Westinghouse/TUGCO interface and the design process for the scope of activity for which Westinghouse is responsible as defined in Westinghouse/TUGCO interface procedures.

The Westinghouse/TUGCO interface is controlled by agreed interface procedures. These interface procedures detail functional responsibilities of each organization relative to scope assignments, work locations, applicable quality assurance programs, project correspondence methods, and record retention requirements. Detailed interface matrices define specific activity responsibilities for interfacing parties relative to Class 1 and non-Class 1 piping and also define specific design document responsibilities.

The design process is initiated by TUGCO when it provides Westinghouse with input data in the form of response spectra, seismic displacements, operational characteristics, stress isometric drawings, support locations, and support stiffnesses. The process is completed when Westinghouse transmits the final as-built project piping documentation. Analysis, verification, reanalysis and reverification are all considered part of the design process.

Upon receipt of the design input data, Westinghouse performs a detailed computer analysis of the piping system to establish that the piping stresses satisfy applicable design criteria. Implicit in this portion of the analysis is the determination that the support locations and types (i.e., snubbers, springs, rigids) are acceptable. In the process of performing these evaluations, it is sometimes necessary to go back through the design process several times, i.e., iterations, to arrive at a piping system configuration where the input parameters accommodate acceptable results.

Q. Mr. Parker, please explain Westinghouse's role in the remaining aspects of the iterative process.

A. After the analysis is completed and verified, Westinghouse transmits support design information to TUGCO. This information includes the calculated loads acting on each support and the piping displacements at support locations. In addition, if the analysis results in changes to the support locations and/or types, these changes are also provided to TUGCO. If these changes are accepted by the support design organizations, Westinghouse is notified that the analysis is acceptable. Correspondence is made using agreed controlled interface procedures as previously discussed. Should the support design organizations' review indicate that the suggested changes are not acceptable, as would be the case if a recommended change in location of a support results in interference with other equipment or structures, then TUGCO informs Westinghouse. A new piping evaluation, and piping analysis if deemed necessary, is performed and the process outlined above is repeated until acceptable results are obtained.

When an acceptable piping analysis is completed, Westinghouse performs fatigue analyses for Class 1 lines and evaluates the impact of postulated pipe breaks and associated jet impingement loads on the qualification of the piping. TUGCO also provides to Westinghouse for review the locations of potential interferences with piping for which Westinghouse has responsibility. If the results of the reviews are acceptable, Westinghouse transmits to TUGCO deflections at branch piping connections, anchor loads, and increases in support loads. If they are unacceptable, the design process is reinitiated.

Following the support design organizations' evaluation of the Westinghouse transmittal, these organizations confirm the adequacy of the existing support configuration, or redefine the support locations, stiffness characteristics, or support types to Westinghouse. If any support changes are proposed by TUGCO, Westinghouse performs a reevaluation. If support changes are not required, the piping and support design is released for construction by TUGCO.

b. Design Checking and Verification

Q. Mr. Parker, please describe the verification process Westinghouse uses as part of its design process.

A. The verification process employed to reduce the likelihood of errors in the calculations and design approaches is an important part of performing the piping analysis. Piping system analysis verification is accomplished in accordance with a procedure that requires independent qualified engineering review and documented verification of each analysis package. The verification process requires the reviewing engineer to ascertain such information as: (1) is work properly documented; (2) are the purposes and assumptions stated; (3) is reference material appropriately described; (4) are the assumptions and engineering evaluations used in the work clearly defined and justified; (5) are the correct equations utilized; (6) does the derivation of the work follow a logical sequence and is it organized; and (7) are the results clearly marked and do they accomplish the stated purpose. Only after the verifier is satisfied that the work is correct does he document his review and approval. The procedures governing this process are identified in Section IV, Table IV.1 and Chart 1.

In addition, I would note that with respect to the analytical tools used by Westinghouse on which designs are based, e.g., computer codes, Westinghouse reviews and verifies those to assure their validity prior to their use.

c. Audits

Q. Mr. Parker, what mechanisms exist to provide assurance that the design and design verification process is being properly implemented?

A. It is Westinghouse policy that audits be carried out and documented in accordance with established schedules and procedures to verify the compliance and effectiveness of ongoing safety-related activities such as design and design verification with applicable areas of the Westinghouse quality assurance program.

Audits are carried out by qualified auditing personnel under the direction of a lead auditor responsible for reviewing the results of prior audits, developing a written audit plan, notifying the involved organizations and conducting the audit, preparing and issuing the audit report, and performing the follow-up required to close out open action items. Members of audit teams do not have direct responsibilities in the areas being audited. Management of the audited organization is responsible for reviewing and investigating audit nonconformances, taking appropriate corrective action including action to prevent recurrence, and documenting such action.

A typical audit includes interviews with key personnel, review of procedures for adequacy and content, review of work and records to verify implementation of the quality assurance program, and an assessment of the effectiveness of that program in accomplishing its intended purpose. Audit findings are presented in a post-audit conference and in the audit report in detail sufficient to assure that corrective action can be taken effectively by the audited organization. Follow-up activities include recording and tracking action items, reporting to management the status of open items and the progress being made to resolve them, verifying that corrective action has been accomplished, and maintaining the documentation of follow-up, evaluation, and resolution of open items in the audit files. Such audits of safety-related activities are functional in nature. They generally cover a number of projects being worked on.

3. Pipe Support Design Organizations

a. <u>NPSI</u>

(1) initial designs

Q. Mr. Deubler, what design specifications and requirements govern the NPSI support design process?

A. NPSI pipe support design activities are governed by Gibbs & Hill Design Specification MS-46A, "Nuclear Safety Class Pipe Hangers and Supports." This document establishes the criteria for pipe support design, and was subject to NPSI review prior to its being utilized for design, pursuant to NPS Work Procedure No. 3.0.1, "Owner's Design Specification Review." After review the specification requirements are incorporated in the project procedures and instructions. Revisions to the specification are similarly reviewed and incorporated into the design requirements. Similarly, design requirements generated internally at NPSI are reviewed prior to implementation, in accordance with Work Procedure No. 3.0.2, "Design Requirements Review."

Q. Mr. Deubler, please describe the design control and design review process of NPSI for preparation of new support designs for Comanche Peak.

A. New pipe support designs for the Comanche Peak Project are controlled by NPS Work Procedure 3.0.5 "Pipe Support Design Control New Design." The design and review process established by this procedure is illustrated in Chart 1, and described below. Additional procedures applicable to these activities are identified in Chart 1 and Table IV.1.

The first step in the design process is the accumulation of necessary data (e.g., piping analysis summary, piping isometric, applicable equipment drawings) regarding the design. Upon receipt of incoming design information, the Design Project Engineer reviews the information to ensure that all necessary design information is contained in the design package and forwards the design package to the Design Team Leader. The Design Team Leader also checks to assure himself that necessary information is in the design package, affixes a support design/review checklist to it, and assigns the package to a designer.

Upon receipt of the design package, the designer produces a conceptual drawing of the support. If the designer finds that a support cannot be designed at the location indicated by Gibbs & Hill (e.g., due to interference or the absence of an accessible attachment to the supporting structures), the following action is undertaken:

1. The Design Project Engineer notifies Gibbs & Hill Applied Mechanics and proposes a solution.

2. Gibbs & Hill, after reviewing the proposed solution, notifies the NPS Design Project Engineer and indicates their concurrence or alternative recommendation.

3. Based on the resolution of the particular problem the design will proceed as outlined.

When the designer completes the design of all supports in the design package, the package is returned to the Design Team Leader. A checker assigned by the Team Leader performs preliminary checks of the conceptual design by verifying the design information (e.g., support loads, location, type and interferences). Any errors disclosed are corrected by the designer and rechecked by the checker.

Upon completion of this checking phase, the Team Leader sends a copy of each Class 1 (and Class 2 & 3 if deemed necessary) conceptual design to the site for field verification. Any information that will affect the installation of the support is noted on the copy of the conceptual drawing. This copy is signed by the field engineer and sent back to the Design Team Leader. A designer incorporates all field comments on the original conceptual drawings.

Upon incorporation of field comments, a copy of the complete design package, along with a pipe support calculation transmittal form is forwarded to the Structural Team Leader. The design package is then assigned to a structural engineer who performs the structural calculations for the support. Any modification to the conceptual design as a result of these calculations is coordinated between the Structural Team Leader and the Design Team Leader.

In addition to the above process, another iteration cycle is involved in the design of Class 1 supports. This cycle consists of providing support stiffness values for inclusion by Westinghouse in the piping analysis. After inclusion of the stiffness values, revised support loads are received. The supports are modified, if necessary, for the revised loads and any revised stiffness values are provided for use by Westinghouse in reevaluation. This cycle continues until the support stiffnesses generated in the support design are consistent with those used in that piping analysis which provided the loads for the support design. The initial support design is then finalized and transmitted to TUGCO.

(2) design checking and verification

Q. Mr. Deubler, please describe the design verification process NPSI employs as part of its design process.

A. When the design activities described above are complete, a Structural Designer Checker (who is not the same individual who performed the calculation) performs a complete check[21] of the calculations. After modifications, if necessary, have been made by the Structural Engineer and rechecked by the Structural Design Checker the design package is returned to the Structural Team Leader.

The completed structural calculations and design package are sent to the Pipe Support Design Team Leader for assignment to a Draftsman. A Checker assigned by the Design Team Leader performs a final check of the pipe support detail, utilizing the checklist for design and final checking. Any drafting errors disclosed are corrected by the Draftsman and rechecked by the Checker. If design errors are disclosed the design is returned to the original designer for correction and rechecking as described above. Once the design package is accepted, the Design Team Leader forwards the original detail drawings and calculations to the Project Engineer for his review, approval and sign off. If the Project Engineer determines that additional work should be performed, the package is returned to the Design Team Leader. Upon completion of the additional work, the support

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21 In addition to checking the data utilized and the mathematics of the calculations, the checker verifies the following: (1) the proper design inputs were utilized, (2) assumptions, where required, are reasonable, (3) an appropriate design method was used, and (4) the support design conforms to the applicable code and specifications.

drawings and calculations are again reviewed by the Project Engineer for final approval. After the Project Engineer's approval, the design package is forwarded to the QA department, which reviews the design packages on a sample basis for inclusion of quality requirements as defined by the contract specification and internal procedural requirements, i.e., appropriate approvals, references, etc.

After the above activities have been completed the original pipe support drawings are forwarded to the Project Manager for transmittal to TUGCO for construction of the supports.

(3) audits

Q. Mr. Deubler, what mechanisms exist to provide assurance that the design and design verification process is being properly implemented?

A. NPS has established a comprehensive system of planned and periodic audits in accordance with 10 C.F.R Part 50, Appendix B, Criterion XVIII. Section 18.0 of the NPS Quality Assurance Manual and Work Procedure 18.0.1, "QA Program Audit Control" establish the requirements for the conduct of audits. The audits are the responsibility of the QA department, which reports to the Executive Vice President. This reporting level gives QA the required authority and organizational freedom, including sufficient independence from cost and schedule. A QA Lead Auditor, who does not have direct responsibility for the area being audited, is responsible for supervising and/or performing audits. Audits are performed by qualified individuals, but who have no direct responsibility for the activities being audited. Internal audits by the NPS QA Department are performed utilizing written checklists, and results are documented in a written report to the QA Manager and the manager of the audited department or discipline. Follow-up action, as appropriate, including reaudits conducted in the same manner as the original audit, is taken with respect to audit findings. For example, over the last five years eleven (11) internal audits were performed with respect to design activities associated with Comanche Peak. During this same time period, five audits of NPS by NPSI, three audits by TUGCO and two audits by the NRC have been conducted.

Finally, in addition to the audit program established pursuant to 10 C.F.R. Part 50, Appendix B, NPS management has instituted a program of technical audits. This program began in 1981 and is designed to provide a review of the technical aspects of design activities, rather than the programmatic aspects reviewed in the normal audit process. This review is performed by engineers who were not involved in the original design. The review is performed on a sample basis, to assure: (a) design conformance with applicable codes, design specification and standards and (b) adequacy of the design analysis. The results of the review are documented in a written report to the Engineering Manager who initiates corrective action, as necessary.

b. ITT Grinnell

(1) Initial Designs

Q. Mr. Powers, what design specifications and requirements govern the ITTG support design process?

A. Gibbs & Hill design specification MS-46A "Nuclear Safety Class Pipe Hangers and Supports" is the controlling project design specification for pipe support design activities by ITTG. This specification is reviewed, accepted, and implemented in accordance with Section QCH-2.0 of "ITT Grinnell Corp. QA Manual - Pipe Hanger Division" ("PHDQAM") and Section QCES-2.3.0 of "ITT Grinnell Corp. Engineering Services Quality Assurance Manual" ("ESQAM").

Q. Mr. Powers, please describe the design control and design review process of ITT Grinnell for preparation of new pipe support designs for Comanche Peak.

A. The manuals described above, PHDQAM and ESQAM, are the principal quality assurance documents through which ITTG procedures governing the design activities for the Comanche Peak Project are established. Chart 1 and Table IV.1 list the procedures employed at each step of the design control process. The discussion below summarizes that process.

The design and design control process employed by ITT Grinnell is very similar to that of NPS described by Mr. Deubler. Similar information which is provided to NPS by Gibbs & Hill (e.g., piping analysis summaries, piping isometrics) is transmitted to the ITTG Project Manager for his review. He will forward the data to the Engineering Manager who in turn assigns the material to the Engineering Supervisor. Once document review and control activities are accomplished, the Engineering Supervisor assigns the pertinent data to a Design Engineer to develop the design. The Design Engineer returns the work package, which includes all calculations, to the Supervisor for assignment to a design checker. When checking is completed, the work package is again returned to the supervisor who forwards the package to drafting. At this point the support detail is prepared by a draftsman (and checked by a drafting checker).

(2) Design Checking and Verification

Q. Mr. Powers, please describe the design verification process ITT-Grinnell employs as part of its design process.

A. Errors or deficiencies identified during the design review process can be identified by any individual including the design checker, drafter or by a drafting checker. The design checker is responsible for the "verifying or checking process" described in 10 C.F.R. Part 50, Appendix B, Criterion III. The design checker assures the accuracy and completeness of the calculation, assures that the support will perform its intended function and that the design methodology is acceptable, and that all codes, standards and specifications are satisfied. This individual is not the person who performed the original design, although he is part of the ITTG organization. In all cases, the work is returned to the Engineering Supervisor who reviews the work and determines appropriate action. In each instance the original Design Engineer must concur with, and sign off, the change made to the original design.

Finally, the Design Engineer reviews the final detail prepared by the draftsman and, if satisfied, signs it and forwards it to the design checker for his review and sign-off. The work package is finally approved by the Engineering Supervisor provided he determines that all work has been satisfactorily completed. At this point the package is transmitted to TUGCO by the Project Manager. If the Engineering Supervisor had not approved the package, he would reassign it to the Design Engineer with his comments, and the design process repeats as outlined above, until a satisfactory work package is obtained.

(3) Audits

Q. Mr. Powers, what mechanisms exist to assure that the design and design verification processes are being properly implemented?

A. The principal means by which this is accomplished is through audits. Internal and management audits are the responsibility of the Vice President and Director of Quality Assurance and are performed by trained and qualified auditors assigned by him, who have no direct responsibilities in the audited area. Procedures QAM 12.1 of PHDQAM and QCES 2.18 of ESQAM cover the monitoring of these Quality Assurance Program Audits. Audit results are transmitted to the appropriate department manager. Audit findings are resolved and corrective action taken, as necessary, in accordance with QCH 10.1 of PHDQAM and QCES 2.16 of ESQAM. The design process at ITTG has been routinely audited by both internal as well as external organizations. Fifteen ITTG internal audits have been conducted with respect to design activities associated with Comanche Peak. During the same time frame, the ITTG Engineering Departments underwent an average of ten additional internal audits per year. There have also been three external audits (and one surveillance) conducted by TUGCO and about twenty audits conducted by other customers. Also, two ASME and six NRC audits were performed.

In addition, beginning in 1978 ITT Grinnell's resident Quality Assurance engineers were not only trained and qualified (pursuant to QCES 2.18) as Quality Assurance Systems Auditors, but were selected on the basis of expertise as pipe support engineers. (In some cases these individuals are Registered Professional Engineers). Accordingly, these auditors are responsible not only for reviewing the implementation of the PHDQAM and ESQAM procedures, but also for auditing technical activities for compliance with the ASME Code, technical specifications, and other applicable codes and standards.

c. Pipe Support Engineering

(1) Initial Designs

Q. Mr. Finneran, what procedures are employed by PSE to review design specifications and requirements for incorporation into the support design process?

A. When the PSE Group was organized, Specification MS-46A was a well-established document and had already been used extensively on the project by ITT and NPSI for several years. Thus, there was no need for PSE independently to review and comment on MS-46A. MS-46A was adopted as a required reference for PSE in Section I of the PSE Engineering Guidelines. In addition, information set forth in MS-46A is included in the Guidelines, as appropriate, and drawings are prepared in accordance with the requirements of MS-46A.

Further, MS-46A is required indoctrination for all PSE design engineers under the CPSES "Indoctrination Program," CP-EP-2.0. As such, whenever MS-46A is revised, all design engineers are re-indoctrinated. Finally, proposed changes to the specification are evaluated and appropriate action (e.g. modification) is taken with respect to affected procedures and guidelines.

Q. Mr. Finneran, please describe the design control and design review process of PSE for the preparation of new support designs.

A. To implement Applicants' commitments regarding design activities performed by Comanche Peak Project Engineering (CPPE)[22] engineering procedures have been established to assure that quality assurance measures are imposed for all design, design control and verification, and design change activities. These procedures set forth requirements that govern all design activities performed by CPPE. The principal implementing procedure for these activities is CP-EP-4.0, "Design Control" the purpose of which is, as follows:

> to outline general requirements for the site design control program to ensure that activities that affect the design of safety-related or other designated items will be adequately defined, developed, verified and documented . . . . (CP-EP-4.0, Section 2.1)

The procedure further specifies that engineering managers are to ensure that engineering design activities for which they are responsible are identified, planned and controlled

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22 Comanche Peak Project Engineering is a multi-discipline organization of TUGCO, which provides various engineering services to the project. PSE (formerly called PSDG - Pipe Support Design Group) provides pipe support design services.

in accordance with procedures governing design verification and design change control. Consequently, CPPE design activities are also performed in accordance with the procedures CP-EP-4.5, "Design Verification," and CP-EP-4.6, "Design Change Control" (or in later revisions "Field Design Change Control").

The basic design document governing PSE design activities is instruction CP-EI-4.0-1, "Design and Design Verification Control for Pipe Support Engineering". PSE support engineers use load and support location information provided by the appropriate piping analysis group for their support designs. Gibbs & Hill, Westinghouse and PSE Engineering (for a limited quantity of small bore piping) each serve as piping analysts and provide load information to PSE support designers. If proposed support locations are determined not to be feasible, PSE resolves the matter with Gibbs & Hill or Westinghouse, as appropriate. Subsequent reanalysis and reissue of support loads on a particular stress problem may be required.

CP-EI-4.0-1 specifies that guidance for support design is set forth in the "Pipe Support Engineering Guidelines". This guideline serves as a basic support design manual. All design engineers receive indoctrination in the guidelines before beginning any design work at CPSES. Support design documentation is also created in accordance with that instruction, which provides:

> Design documents generated by PSE shall have sufficient design input documentation (criteria, data, calculations, etc.) to allow a consistent basis for making design decisions, accomplishing design verification and evaluating design changes.

Upon completion of a support design, taking into account the load information from the piping analysis groups, the engineer forwards the completed design to another engineer for design verification. Check copies of the finished sketches and calculations are made and the package forwarded to an engineer with authorization to perform design verification.

(2) Design Checking and Verification

Q. Mr. Finneran, please describe the design control and verification PSE employs as part of its design process.

A. The CPPE procedure governing design verification (CP-EP-4.5) requires that new or revised designs be subjected to one or more methods of reviewing, confirming or substantiating the design to provide assurance that the design meets the specified inputs and will perform its intended function. With respect to design change controls, CP-EP-4.6 requires that each engineering discipline establish control measures in accordance with this procedure, supplemented by specific procedures and instructions for each engineering discipline if necessary, to document and obtain approval of changes or deviations to approved engineering documents. Consistent with the above procedures, Comanche Peak Project Engineering groups have established implementing instructions applicable to their respective activities.

PSE has implemented the general procedure applicable to design verification (CP-EP-4.5) through Engineering Instruction CP-EI-4.0-1, "Design and Design Verification Control for Pipe Support Engineering." Specifically, CP-EI-4.0-1 provides that

> The engineer performing this task [design verification] may or may not be in the same group as the engineer who performed the original design. The engineer shall not, however, have been involved in the original design process or be in a supervisory position relative to the individual designated by "Engineered" on the cover sheet, DHE-3.

The design is reviewed by the design verifier employing a form (DHE-6), which includes the questions suggested by ANSI N45.2.11, Section 6.3.1. The package is returned to the original engineer for resolution of changes identified in the verification process. Following drafting of the construction drawing from the engineering data, the design verifier finalizes his activities by completing form DHE-6 and transmitting the entire package to the lead engineer for final approval. The lead engineer reviews the complete package and, if everything is in order, he will sign and release the drawing for construction.

As I will discuss in more detail later, any subsequent revision to the design will be subjected to design and design verification procedures commensurate with those applicable to the original design.

(3) Audits

Q. Messrs. Chapman and Finneran, what mechanism exists to assure that the design and design verification process is being properly implemented?

A. (Chapman) Section 17.1.3 of the FSAR provides that "the verification of engineering design control measures is performed by TUGCO through review or audit." TUGCO QA's audit function is further specified in FSAR Section 17.1.3.6, "Design and Engineering Surveillance." There it is noted that engineering activities "are reviewed by Quality Assurance through surveillance or audit." In accordance with these provisions, the TUGCO Engineering Division, of which PSE is a part, has been routinely audited by TUGCO QA. From December 1979 to December 1983 TUGCO QA has audited PSE 11 times. In addition to the SIT review, two full technical audits have been performed by the NRC. Findings from those audits requiring corrective action have been addressed and followup reviews have confirmed resolution.

(Finneran) In addition, I established in November, 1981, a surveillance group within PSE to conduct "audits" of PSE activities. Although such "audits" are not required by 10

C.F.R. Part 50, Appendix B, I initiated this practice to provide me with an additional independent assessment of the technical merits of our design activities. Accordingly, this group is to conduct design package review, engineering procedure "audits," maintain training records and distribute revised instructions and procedures. I receive each report prepared by this group directly, and prescribe appropriate follow-up action.

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C. Design Change Control

Q. Messrs. Deubler, Finneran and Powers, having completed the initial design process, what is the next step in the piping and support design process?

A. All three support vendors have now completed their initial designs and are ready to release supports for construction. The release is accomplished as follows: NPSI, ITTG and PSE (large bore) forward their approved drawings to Technical Services Mechanical Drafting, which transforms the vendor drawings into Brown & Root Hanger drawings (BRH) (see Applicants' Exhibit 147). The completed BRH drawings are sent to the Document Control Center (DCC) which distributes controlled copies to Welding Engineering. Welding Engineering creates weld data cards and construction traveler packages. For small bore supports, PSE releases their approved drawings directly to the Document Control Center. DCC then distributes controlled copies of these drawings to Welding Engineering.

Q. Messrs. Deubler, Finneran and Powers, please describe the initiation, control and review of field design changes.

A. During the course of construction of the pipe supports, changes in design are virtually unavoidable. The majority of these changes are, however, of a minor nature. Changes may be required, for example, due to interferences or changes in specifications or regulations. The PSE Field Engineering Group, which is a subgroup of PSE, has been established to initiate and control field changes in support designs. Although a subgroup of PSE, it also includes personnel from ITT Grinnell and NPSI, and is responsible for documenting field modifications and drawing changes.

Issuance of these modifications and changes is governed by CP-EP-4.6, "Field Design Change Control." This general procedure is applicable to all disciplines. A more detailed daughter procedure (instruction), CP-EI-4.6-8, "Design Change Control for Large Bore Pipe Supports" (CP-EI-4.6-10 is the equivalent procedure for small bore pipe supports), provides specific guidance for processing and controlling field-initiated changes on pipe supports. The most commonly used method is Component Modification Cards ("CMCs"). CMCs may be used to document any field modification. As discussed below, CMC's are subject to design review, verification and approval by the responsible design organization.[23] We will discuss below the review process for CMCs.

CMCs require approval by authorized field engineers before release for further action, <u>i.e.</u>, construction and submittal for design review. Authority for approving these

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23 A method of drawing revision, commonly referred to as the "blueline process," involves a markup by the Field Engineer in blue pencil on a BRH to create a Field Modified Hanger Sketch (FMHS). The FMHS is incorporated into a revision of the BRH drawing. Also, Design Change Authorization ("DCA") forms are used for identifying proposed changes such as to specifications. Both of these changes are subject to design review, verification and approval by the responsible design organization.

changes is granted to individual Field Engineers by the PSE Chief Engineer, and is based on each person's work performance and experience. It is common practice for the field engineers to perform calculations, request STRUDL analyses or consult with Design Engineers in PSE to obtain reasonable assurance that the change made will be acceptable when it is design reviewed.

It is important to note that the CMC process was intentionally devised to provide a means to permit the craft to proceed with necessary modifications of the support without awaiting incorporation of the CMC into the design and design review. Thus, when a CMC is issued, it is recognized that the proposed design change may itself be subsequently revised. In short, approval of the CMC by the authorized field engineer does not constitute approval of the change as a design change, only a release to make the field change, subject to revision at any point by the support design organizations during the process of incorporating the CMC into the design and design review.

The CPPE requirement that CMCs initiated by any discipline be design reviewed either prior to or after release for implementation, is delineated in Section 3.2.5 of CP-EP-4.6, "Field Design Change Control." CMCs initiated by field engineers against PSE support designs are design reviewed in accordance with CP-EI-4.5-10, "Control of Approval and Design Verification of Large Bore Field Design

Changes". (The equivalent procedure for small bore supports is CP-EI-4.5-11.) Section 3.4 of this procedure provides that review and design verification of the CMC is to be performed and documented in accordance with the same process used in the original design of the support.

CMC's written against ITTG and NPSI pipe supports are design reviewed in accordance with CP-EI-4.5-4, "Technical Services Engineering Instruction for Pipe Hanger Design Review and Certification," and each organization's verification procedures (QCES-2.3.0 for ITTG and NPS W.P. 3.1.5 for NPS1). As part of the review process, the CMC will be incorporated into the support drawing. If, however, the responsible design organization determines that the modification set forth in the CMC would result in an unacceptable condition, the design will be modified (again via CMC) in accordance with that organization's direction and will also be subject to design review.

Q. Messrs. Deubler, Finneran and Powers, what assurance is there that field design changes are tracked and accounted for in the design process?

A. Field design changes are tracked via an independent tracking group to provide assurance that CMCs are properly accounted for. This group is called the Design Change Tracking Group. Their work is controlled by Procedure CP-EP-4.7, "Control of

Engineering/Design Review of Field Design Changes," which provides for the tracking of field design changes by means of a Field Design Change and Review Status Log.

Q. Mr. Chapman, have any procedures been established to provide for trending of design changes resulting from CMCs?

A. Yes. Applicants have established a procedure, CP-QP-17.0, "Corrective Action," to review documented conditions adverse to quality for the purpose of providing corrective action to preclude repetition of significant conditions adverse to quality. This procedure provides for Quality Engineering Staff to review design changes documented on CMCs. The results of these reviews are tracked using trend analysis techniques as an objective method of ascertaining the need for corrective action to preclude repetition of significant conditions adverse to quality. Periodic reports summarize the results of the reviews, including trends, and provide recommendations, where appropriate, for corrective action with respect to identified conditions which are considered to be significant. Examples of trending reports for CMCs are in the record of this proceeding as CASE Exhibits 48, 49A and 50.

Q. Messrs. Deubler, Finneran and Powers, please describe the process by which design changes not initiated by field modifications are controlled and reviewed.

A. (Deubler) Work Procedure 3.0.9(b) "Design Control Procedures - Revisions," establishes the method for reviewing the new or revised Plant Drawings, e.g., piping drawings from Gibbs & Hill, upon receipt by NPSI and the incorporation of the new or revised drawings into the pipe support design group activities. The procedure includes provisions whereby existing support designs are reviewed to determine if the design is impacted by the new or revised Plant Drawings. Impacted support designs which require revisions are redesigned and reviewed in a manner commensurate with the procedure for new designs.

(Finneran) When PSE was formed, most plant drawings were already complete. Thus, there were virtually no plant drawing changes which could affect PSE designs. If field structural or mechanical changes were made that did affect PSE support designs, these changes were identified in the field and CMC's could have been issued against the support design. Other causes (revised piping stress analysis, etc.) may also require design changes in previously approved and released designs. When these revisions are required they are processed in the same manner as the original design as indicated in section 3.7.1 of CP-EI-4.0-1. All revisions are reviewed to ensure compatability with the entire design package.

A. (Powers) ESQAM - QCES-2.3.0 "Design Control" defines the criteria to process design changes not resulting from field modifications. As with NPS, the engineering supervisor is responsible for evaluating the impact on support designs resulting from changes to contract specifications, drawings, approved designs, internal and external documentation, etc. When it is determined that a change is required, the Engineering Supervisor will process the support design in the same manner as new support designs, discussed previously.

D. As-Built Certification

Q. Panel, please describe the as-built certification process for piping and support design.

1. Gibbs & Hill

A. (Ballard) The as-built certification of Class 2 and 3 piping for Gibbs & Hill is controlled by two principal procedures; CP-EI-4.5-1, entitled "General Program for As-Built Verification," and Gibbs & Hill procedure AB-1, entitled "As-Built Verification Instruction". Procedure AB-1 is also based on the requirements contained in Design Control Procedure DC-7, which I discussed previously.

The first stage of the as-built analysis involves the assembly and distribution of the surveyed as-built stress analysis piping problem package to Gibbs & Hill Applied Mechanics by the Technical Services As-built Coordinator

(TSABC). This package includes surveyed piping drawings reflecting the as-built routing and location of supports and individual pipe support detail drawings. The Gibbs & Hill as-built coordinator reviews the package for completeness, resolves discrepancies and requests and obtains additional information, if required, to perform the as-built stress verification.

The Gibbs & Hill Design Specification MS-200, titled "Design Specification for All ASME Section III, Code Class 2 and 3 Piping" is the standard to which as-built analyses are performed. This specification establishes the functional and design requirements which form the basis for the design, procurement, fabrication, erection, examination, testing, inspection and certification of all ASME Code, Section III, Class 2 and 3 piping systems for Comanche Peak.

In accordance with procedure AB-1, the stress analysis input package is assigned to an Applied Mechanics Lead Engineer for review of the as-built information and comparison with the latest as-designed stress analysis. This comparison is a detailed criteria review where each input to the stress analysis is dispositioned as to the effect of any variation on the overall results of the analysis. A checklist is completed and signed by the Lead Engineer and the Job Engineer before it is determined that additional stress analysis on the as-built configuration is necessary, based upon the degree of change in analysis input. If this review concludes that reanalysis is not required, an as-built calculation book, as described by AB-1 , is developed based upon the as-designed analysis. The as-built calculation book is checked and design verified, as described below.

If as-built analysis is required, the analysis is performed reflecting the as-built configuration of the pipe routing, support locations, types and orientations and equipment location. Direction and guidelines for performing the as-built analysis are provided in Gibbs & Hill Analytical Engineering Guides AEG-501, 502 and 503 and also the memoranda previously discussed. In addition, Gibbs & Hill Procedure AB-1, mentioned above, provides administrative guidance.

Upon completion of the as-built analysis, checking is performed utilizing a standard as-built analysis checklist, provided as part of AB-1, which will assure that analyses satisfy the requirements of the ASME Code and FSAR criteria. This checklist is attached to each completed as-built calculation. Once checking is completed, design review is performed according to the guidelines of Design Control Procedure, DC-8, titled "Design Review Procedure-Calculations, Drawings, Specifications".

Upon completion of the as-built design review, the Applied Mechanics job engineer approves the as-built stress analysis package and transmits it to the TSABC. This package contains the as-built analysis support loads, equipment nozzle loads (when required), the calculation book, a listing of future actions that may be required by site and/or Gibbs & Hill, and the statement of as-built verification.

Summary sheets based on the as-built stress analysis are submitted to the original design organization for review of any changes in support loads. If the as-built analysis support loads cannot be accommodated by the supports; if the support cannot be modified for the loads; or if the as-built analysis results exceed equipment nozzle allowables, the TSABC advises Gibbs & Hill Applied Mechanics and requests additional review and possible reanalysis. The equipment vendor nozzle load interfacing is performed by the TSABC who advises Gibbs & Hill, accordingly. Design changes, if required, are reviewed in the same manner discussed previously.

2. Westinghouse

A. (Parker) The as-built evaluation performed by Westinghouse is in accordance with the same verification process undertaken for the as-designed conditions. The input parameters used in the as-built evaluation are the installed conditions as determined by TUGCO in a walkdown of the piping system. The walkdown results in the transmittal to Westinghouse of as-built piping drawings, hanger location and orientation drawings, and support stiffnesses.

Westinghouse evaluates this information to determine if changes that warrant reanalysis have occurred. If reanalysis is required because, for example, supports were relocated or support stiffnesses were changed, the design process is repeated. At the completion of the final as-built evaluation, Westinghouse generates the final project piping design documentation which includes the ASME Code Stress Report for Class 1 lines prepared in accordance with the requirements of the applicable provisions of the ASME Code.

3. <u>NPSI and ITT-Grinnell</u>

A. (Deubler and Powers) The as-built certification processes performed by NPSI and ITT Grinnell for ASME Class 2 and 3 supports are very similar. The as-built certification process is conducted in accordance with CP-EI-4.5-4 "Technical Services Engineering Instruction for Pipe Hanger Design Review and Certification" and in accordance with each organization's procedures. The NPSI work procedures governing this work effort are 3.1.6 "As-Built Design Review Procedure (ASME Class 2 & 3), 3.1.7 "As-Built Design Review Procedure (ASME Class 1), and 3.1.8 "Procedure for Final Approval", which establish the methods for the review of the as-built support to the piping as-built analysis loads, and final certification of the support design by an authorized engineer. For ITT, the procedures employed for this purpose are those used for the original design, discussed previously.

The management for each organization is responsible for appointing an as-built design review Team Leader, both in the home office and at the site. For activities performed at the home office, the Project Manager receives the as-built package from TUGCO. For work done on site the as-built package is given to the TUGCO Technical Services Design Review Engineering (TSDRE) Supervisor. These packages are forwarded to the NPSI or ITT as-built Team Leaders at their respective locations. The Team Leader is responsible for assuring that in the review of these packages the comparison of the loads and displacements from the piping reanalysis is performed to the latest BRH pipe support drawing. This review is performed utilizing established criteria to verify the design for the as-built condition. After checking, the completed package is returned to the Group Leader for review, and transmitted to a TSDRE Supervisor. Within TSDRE, representatives of each vendor (appointed by their organization's project management) perform the actual as-built certification.

If the reviewer is satisfied, he indicates his approval on the BRH drawing by stamping the drawing "Vendor Certified" and signing the drawing. If the reviewer is not satisfied, he returns the package to TSDRE for correction of the unsatisfactory condition. TSDRE will send a memorandum to PSE Field Engineering noting the corrective action required. Field Engineering will initiate corrective action via CMCs. This process of review and certification is repeated until the support is vendor certified.

(4) PSE

A. (Finneran) PSE final review and certification of a support to as-built loads proceeds in accordance with CP-EI-4.0-37, "Control of Final Review of Pipe Support Engineering Design." This work includes a review of the support design and any outstanding changes by a design engineer and verification of that review. This certification process includes a review and update of all previous calculations for the support to incorporate the as-built analysis loads. Any unacceptable conditions are resolved generally by further modification to the support by CMC. The process continues, including design review in a manner commensurate with the procedures applicable to original designs, until the support and all changes are acceptable. Final certification is achieved by a complete review of the support design package by a PSE engineer authorized to perform certification.

Q. Messers. Deubler and Finneran, please describe the difference between the as-built certification process for Class 1 supports and the process for Class 2 and 3 supports.

A. The as-built certification process for Class 1 is essentially the same as for Class 2 and 3 with two exceptions. The Stress Report prepared for Class 1 supports is revised to include the as-built loads and as-built design changes (if any). The final Stress Report must be reviewed and approved by a Registered Professional Engineer. A copy of the final approved Stress Report is transmitted to TUGCO. In addition, as-built stiffness values are calculated and transmitted to Westinghouse for reconciliation with the piping analysis.

IV. APPLICANTS' DESIGN QA PROGRAM: PROCEDURES IMPLEMENTING APPLICABLE PROVISIONS OF 10 C.F.R. PART 50, APPLNDIX B AND ANSI N45.2.11

Q. Panel, what is the purpose of this portion of your affidavit?

A. We recognize that it may be difficult, because of the complexity of the iterative process, to associate each of the procedural controls described above with a specific regulatory requirement or commitment. To ease this task, we have prepared a matrix comparison of the QA program procedures for design, design control (including review and verification), corrective action and reporting, utilized by each organization involved in the piping and pipe support design of Comanche Peak. This matrix graphically illustrates the controlling documents by which each organization satisfies the applicable requirements of 10 C.F.R. Part 50, Appendix B, and the provisions of ANSI N45.2.11 in their design process for piping and supports. Our discussion in the other portions of this affidavit describe the activities which carry out most of these procedures.[24]

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24 As with any QA program, the procedures and instructions for the piping and support design activities discussed herein have evolved over the years. Accordingly, the attached matrix includes, as appropriate, references to previous procedures or the effective time frame of existing procedures.

SECTION IV TABLE IV.1

CROSS REFERENCE OF 10 C.F.R. PART 50, APPENDIX B AND ANSI N45.2.11 PROVISIONS TO DESIGN RELATED QUALITY ASSURANCE PROCEDURES OF ITT GRINNELL, NPSI, PSE, GIBBS & HILL, AND WESTINGHOUSE

List of Abbreviations:

ITTG

PHDQAM - Quality Assurance Manual-Pipe Hanger Division
ESQAM - Engineering Services Quality Assurance Manual
QAP - QA/QC Procedures Manual
ENG3 - Engineering Quality Assurance Procedures #3

NPS

QAM - Quality Assurance Manual
WP - Work Procedure

PSE

TQAP - CPSES Quality Assurance Plan
DQP - Dallas Quality Procedures
CP-EP - Comanche Peak Engineering Procedure
CP-EI - Comanche Peak Engineering Instructions

WESTINGHOUSE[25]

WCAP - 9550 NSSS WRD Policies and Procedures
WCAP - 9565 NTD/SOD Design Control Manual
WCAP - 9805 Structural and Equipment Engineering Department Instruction and Guidance Manual
WCAP - 9625 NTD ASME Quality Assurance Program Manual
Westinghouse Specification 955125, Rev. 1 (5/17/83 and Attachments

GIBBS & HILL

QA - Quality Assurance Instructions, PPM
DC - Design Control Instructions, PPM
PC - Procedure Control Instructions, PPM
PMT - Purchasing Dept. Instructions, PPM
PG - Project Guide
PA - Project Administration Instructions, PPM
PPM - Project Procedure Manual

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25 These documents are Westinghouse proprietary documents.

10 C.F.R. APPENDIX B QUALITY ASSURANCE CRITERIA	ANSI N45.2.11* (DRAFT 2 REV. 2), May 1973	ITT GRINNELL PIPE HANGER DIVISION QA PROGRAM EFFECTIVE TIME FRAME: 1976 thru 1977	1978 thru 1980	1981 thru 1983	NPS QA PROGRAM EFFECTIVE TIME FRAME: PRIOR TO 5/82	PRESENT	PSE QA PROGRAM EFFECTIVE TIME FRAME***	WESTINGHOUSE QA PROGRAM EFFECTIVE TIME FRAME**	GIBBS & HILL QA PROGRAM EFFECTIVE TIME FRAME***
I. Organization									
A. Responsibility and authority for verifying quality.	1.? Responsibility	PHDQAM QCM1.1.1, 1.1.2 BNG? P.2	PHDQAM QAM 1.1 QCM 1.1.1, QAP ED2H001	PHDQAM QAM 1.1, QCM 1.1.1 ESQAM QCES 1.2; 1.3	QA Man. Sect. 1.0 CP-PF-1, 3 & 4	QA Man. Policy QA Man. Sect 1.0 WP 1.0.1/1.0.2/1.0.3	QAP 1.0, 1.1 CP-EP-1.0, CP-EI-4.0.1	9550, WRD-CPR-0.0/[illegible]	QA-1, QA-7
B. Independence of QA Personnel.		PHDQAM QCM 1.1.1, 1.1.2	PHDQAM QCM 1.1.1, QAM 1.1, 1.2 QAP ED2H001	PHDQAM 1.1, 1.2 & QCM 1.1.1 ESQAM QCES 1.2, 1.3	QA Man. Sect. 1.0 CP-PF-3	QA Man. Policy QA Man. Sect. 1.0 W.P. 1.0.2	QAP 1.1 Stat., QA Man., Sect. 1.0	9550, WRD-CPR-1.0	PG-9.2a
II. Quality Assurance Program									
A. Documented QA Program	2.1 Establishment & Documentation	PHDQAM QCM 1.2 BNG3 P.2	QAM 1.1 PHDQAM 1.2 QAP ED2H002	PHDQAM QAM 1.1, 1.7 ESQAM QCES 1.7, 2.2	QA Man. Sects. 2.0/5.0	QA Man. Sects. 2.0/5.0 WP 5.0.1	QAP 2.0	9530, WRD-CPR-[illegible]	DO-1
B. Items & Services Covered by the QA Program.	1.3 Responsibility	PHDQAM QCM 1.2 BNG3 P.2	QAM 1.2 PHDQAM QAP ED2H002	PHDQAM QAM 1.2 ESQAM QCES 1.5	QA Man. Sect. 2.0	QA Man. Policy Stat., QA Man., Sec. 2.0	QAP 2.0 CP-EP-1.0, CP-EP-3.0, CP-EP-2.1	9550, WRD-CPR-2.0	PSAR/FSAR Sect. 17 Project Guide Section III
C. Organization covered by the QA Program.	2.1 Establishment & Documentation	PHDQAM QCM 1.4 BNG3 P.1	QAM 1.4 PHDQAM QCM 1.4 QAP ED2H001	PHDQAM QAM 1.4., QCM 2.1 ESQAM QCES 2.1	QA Man. Sect. 1.0/1.1	QA Man. Sect. 1.0/1.1/2.0	QAP 1.0, 2.0 CP-EP-1.0, CP-EP-3.0, CP-EP-2.1	9550, WRD-CPR-2.0	PA-3
D. Indoctrination and Training.	2.2 Program Procedures	PHDQAM QCM 1.5	PHDQAM QAM 1.5	PHDQAM QAM 1.5	QA Man. Sect. 2.0	QA Man. Sect. 2.0 WP 2.01/2.02	QAP 1.1, 2.0	9550, WRD-CPR-2.0/9805, SAEED 1.2	QA-5, QAI-4
E. Management Review of QA Program.	2.2 Program Procedures	PHDQAM QCM 12.1 BNG3 P.11	PHDQAM QAM 12.1 QAP ED2H002	PHDQAM QAM 12.1 ESQAM 2.2.0	QA Man. Sect. 16.0	QA Man. Sect. 18.0 WP 18.01	QAP 2.1 CP-EP-2.0	9550, WRD-CPR-2.3, 9565, NTD-OPP-6A	QAI-7
III. Design Control									
A. Translation of design and quality requirements into design documents.	4.1 General	PHDQAM QCM 2.1, 2.2, 2.3 BNG3 P.4	PHDQAM QCM 2.0, 2.2, 2.3 QAP ED2H003, ED2H001	PHDQAM QCM 2.0, 2.2, 2.3 ESQAM QCES 2.3.2	QA Man. Sect. 3.0 CP-PF-10	QA Man. 3.0 WP 3.0.1/3.0.2/3.0.3	QAP 3.0 CP-EP-4.0, CP-EI-4.0-1	955125, Rev. 1 and attachments 9625 and G&H Spec. 2323-MS 200, Rev. 3, 9805, SAEED 1.3; 9550, WRD-CPR-3.0 9565, NTD-OPP-2B	Section 3, Design Control PPM PC-8
B. Control of design and quality deviations.	4.1 General	PHDQAM QCM 2.2,2.3 BNG3 P.9	PHDQAM QCM 2.0, 2.2, 2.3 QAP ED2H003	PHDQAM QCM 2.0, 2.2, 2.3 QCES 2.6.6	QA Man. Sect. 3.0 CP-PF-4/ CP-PF-4/11	QA Man. Sect. 3.0 WP3.1.1/3.0.9 a & b	QAP 3.0 CP-EP-4.0, CP-EI-4.0-1	9550, WRD-CPR-3.0 9565, NTD-OPP-3B/5B, 9805, SAEED 1.3	PC-9, GPD-1
C. Suitability of materials and processes.	3.2 Requirements	PHDQAM QCM 2.2,2.3 BNG3 P.5	PHDQAM QCM, 2.2, 2.3 QAP ED2H003	PHDQAM QCM 2.2, 2.3 QCES 2.3.2	QA Man. Sect. 3.0 CP-PF-4/ CP-PF-10	QAM Man. Sect. 3.0 WP1.0.3/3.0.1/ 3.0.2/3.0.5/3.0.6	N/A N/A	9550, WRD-CPR-3.0; 9565, NTD-OPP-2B, 9805, SAEED 1.3	DO-9, PPM

* Westinghouse is committed to the 1974 Version of ANSI N45.2.11.

** The effective time frame for these procedures is consistent with the time frame during which work was carried out, i.e., from mid 1979 to date. The effective dates of the reports cited are: WCAP-9550, July, 1979; WCAP-9565, February 1980; WCAP-9805, December, 1980. Prior to these dates, comparable procedures of predecessor organizations were in effect.

*** The effective time frame for these procedures is consistent with the time frame during which work was carried out. These procedures or comparable procedures were in effect for all the subject work.

10 C.F.R. APPENDIX B QUALITY ASSURANCE CRITERIA	ANSI N45.2.11* (DRAFT 2 REV. 2), May 1973	ITT GRINNELL PIPE HANGER DIVISION QA PROGRAM EFFECTIVE TIME FRAME			NPS QA PROGRAM EFFECTIVE TIME FRAME		PSE QA PROGRAM EFFECTIVE TIME FRAME***	WESTINGHOUSE QA PROGRAM EFFECTIVE TIME FRAME**	GIBBS & HILL QA PROGRAM EFFECTIVE TIME FRAME***
		1976 thru 1977	1978 thru 1980	1981 thru 1983	PRIOR TO 5/82	PRESENT			
III. Design Control (cont'd.)									
D. Control of Design Documents	4.1 General	PROGRAM QCM 2.1, 2.2, 2.3	PROGRAM QCM 2.2, 2.3	PROGRAM QCM 2.2, 2.3	QAM 3.0	QA Manual 3.0	QAP 3.0	9550, 1RD-OPR 3.0/6.0 9805-S & EED 1.3	PC-2, PC-4, PC-6, DC-3, DC-5, DC-7, PPM
		BHG3 P.10, P.11	QAP E07001	QCES 2.6.0	CP-PP-10	WP 3.0.5/3.0.6/3.0.7	CP-EP-4.0, CP-EP-7.1, CP-EI-4.0-1		
E. Identification and control of design interfaces.	5.1.1 Identification of Interface	PROGRAM QCM 2.2,2.3	PROGRAM QCM 1.4, 2.2, 2.3	PROGRAM QCM 1.4, 2.2, 2.3	QAM 3.0	QAM 3.0	CP-EI-4.0-1, CP-EI-4.0-37, CP-EI-4.0-22, CP-EI-4.5-4, CP-EI-4.5-1	W/TUGCO Interface Agreements, dated 1/28/82 & 10/30/83, 9550-WRD-OPR-3.0	DC-13
		BHG3 P.2 - P.5	QAP E05N001	QCES 2.3.8	CP-PP-9/10/11	[illegible] 3.0.5/3.0.6/3.0.7 9/3.1.1	CP-EP-1.0, CP-EP-4.0, CP-EP-2.1 CP-EP-4.7		
F. Independent design verification.	6.1 General	PROGRAM QCM 2.2,2.3	PROGRAM QCM 2.2, 2.3	PROGRAM QCM 2.2, 2.3	QAM 3.0	Q[illegible]	QAP 3.0	9550-WRD-OPR-3.0, 9565-NTD-OPP-30, 9805-S&EED-1.3	DC-8
		BHG3 P.6	QAP E08N001	ESQAM QCES 2.3.6	CP-FP-1	WP 3.0.6	CP-EP-4.0, CP-EP-4.5, CP-EI-4.0-1, CP-EI-4.0-37, CP-EI-4.5-4		
G. Control of Design Changes.	8. Design Change Control	PROGRAM QCM 2.2,2.3	PROGRAM QCM 2.0, 2.2, 2.3	PROGRAM QCM 2.0, 2.2, 2.3	QAM 3.0	QA Manual 3.0	QAP 3.0		PC-4,PPM, PG-24 & 29
		BHG3 P.4	QAP E08N001	ESQAM QCES 2.3.7	CP-PP-4/11, CP-FP-1	WP 3.1.5/3.1.6/3.1.7 3.0.9 a & b	CP-EP-4.0, CP-EP-4.5, CP-EP-4.6, CP-EI-4.7, CP-EI-4.6-8, CP-EI-4.6-10, CP-EI-4.0-1, CP-EI-4.5-10, CP-EI-4.5-11	9550-WRD-OPR-3.0/3.11/3.4 9565-NTD-OPP-5A	PMT-1, PPM (cancelled (May, 1980)
IV. Procurement Document Control	NA for Design								
V. Instructions, Procedures and Drawings									
A. Documented Description of Quality Activities	4.3-4.5 Drawings, Specs; Other Documents	PROGRAM QCM 2.2,2.3	PROGRAM QCM 2.2, 2.3	PROGRAM QCM 2.2, 2.3	QAM 5.0	QAM 5.0	QAP 5.0	9550-WRD-OPR-5.0	PC-2, DC-3, PC-3, DC-5, DC-7, DC-2, QA-9, PC-9 of PPM
				ESQAM QCES 2.5		WP 5.01/5.02	CP-EP-6.0, CP-EP-7.0, CP-EP-1.0	9550-WRD-OPR-5.0	PC-2, DC-3
VI. Document Control									
A. Control of Documents	7. Document Control	PROGRAM QCM 2.1, 2.2, 2.3	PROGRAM QCM 2.0, 2.2, 2.3	PROGRAM QCM 2.0, 2.2, 1.3 2.3	QAM 6.0	QA Manual 6.0	QAP 6.0	9550-WRD-OPR-6.0/6.1/6.2/6.3	
		BHG3 P.3,P.4,P.13	QAP E03N001	ESQAM QCES 2.6.0	CP-PP-1/3	WP 6.0.1/6.0.2	CP-EP-4.0		PC-2, DC-3
B. Review & Approval of Documents and Revisions	8.2 Review of Changes	PROGRAM QCM 2.1, 2.2, 2.3	PROGRAM QCM 2.0, 2.2, 2.3	PROGRAM QCM 2.0, 2.2, 2.3	QAM 3.0	QAM 3.0	QAP 6.0 CP-EP-4.5, CP-EI-4.5-10	9550-WRD-OPR-6.0	PC-9, PC-24, PC-29
		BHG3 P.3,P.4,P.13	QAP E03N001	ESQAM QCES 2.6.0	CP-PP-11 CP-FP-1	WP 3.0.9a, b/3.1.5/3.1.6/ 3.1.7/3.0.5	CP-EP-4.0, CP-EP-4.6, CP-EI-4.5-11, CP-EI-4.5-4, CP-EI-4.0-37, CP-EP-4.0-1		

10 C.F.R. APPENDIX B QUALITY ASSURANCE CRITERIA	ANSI N45.2.11* (DRAFT 2 REV. 2), May 1973	ITT GRINNELL PIPE HANGER DIVISION QA PROGRAM EFFECTIVE TIME FRAME			NPS QA PROGRAM EFFECTIVE TIME FRAME		PSE QA PROGRAM EFFECTIVE TIME FRAME***	WESTINGHOUSE QA PROGRAM EFFECTIVE TIME FRAME**	GIBBS & HILL QA PROGRAM EFFECTIVE TIME FRAME***
		1976 thru 1977	1978 thru 1980	1981 thru 1983	PRIOR TO 1/8[illegible]	PRESENT			
VII. Control of Purchased Material Equipment and Services									
A. Conformance of Purchased Items and Services		PROGRAM QCM 3.3, 3.4	PROGRAM QAM 3.3 QCM 3.4	PROGRAM QAM 3.7, QCM 3.4 ESQAM QCES 2.7.0	QAM Sect. 4/7/16	QAM Sect. 4/ 7/16	TQAP 7.0	N/A	PMT-1, PPM (cancelled May, 1980)
B. Evaluation of Vendors and Purchased Items	11.3 External Audits	PROGRAM 3.2, 3.4	PROGRAM QAM 3.2 QCM 3.4	PROGRAM QAM 3.2, QCM 3.4 ESQAM QCES 2.7.6	QAM 7.0	QAM 7.0	TQAP 7.0	N/A	PMT-1, PPM
VIII. Identification and Control of Material, Parts and Components	NA for Design								
IX. Control of Special Processes	NA for Design								
X. Inspection	NA for Design								
XI. Test Control									
A. Test Program	6.3.3 Qualification Testing	PROGRAM QCM 4.2	PROGRAM QCM 4.2	PROGRAM QCM 4.2 ESQAM QCES 2.11	N/A	N/A	QAP 12 CP-EP-4.5, CP-EP-13.0	N/A	N/A
XII. Control of Measuring & Test Equipment									
A. Calibration & Control	6.3.3 Qualification Testing	PROGRAM QCM 7.1	PROGRAM QCM 7.1	PROGRAM QCM 7.1 ESQAM QCES 2.12	N/A	N/A	QP 11	N/A	N/A
XIII. Handling, Storage and Shipping									
A. Control		PROGRAM QCM 4.2	PROGRAM QCM 4.2	PROGRAM QCM 4.2	N/A	N/A	N/A	N/A	N/A
XIV. Inspection, Test and Operating Status	NA for Design								

10 C.F.R. APPENDIX B QUALITY ASSURANCE CRITERIA	ANSI N45.2.11* (DRAFT 2 REV. 2), May 1973	ITT GRINNELL PIPE HANGER DIVISION QA PROGRAM EFFECTIVE TIME FRAME 1976 thru 1977	1978 thru 1980	1981 thru 1983	NPS QA PROGRAM EFFECTIVE TIME FRAME PRIOR TO 5/82	PRESENT	PSE QA PROGRAM EFFECTIVE TIME FRAME***	WESTINGHOUSE QA PROGRAM EFFECTIVE TIME FRAME**	GIBBS & HILL QA PROGRAM EFFECTIVE TIME FRAME***
XV. <u>Nonconforming Material, Parts or Components</u>	Not a function of design organizations							9565 NTD-OPP-5B,	
XVI. <u>Corrective Action</u>									
A. Identification and Correction of Adverse Condition	2.1 <u>Establishment & Documentation</u>	PHDQAM QCH 10.1	PHDQAM QCH 10.2 QAP EDRN001	PHDQAM QCH 10.2 ESQAM QCES 2.16	QAM 15.0/16.0/18.0	QAM 15.0/16.0/18.0. WP 15.0.1/15.0.2/15.0.3/16.0.1 18.0.1	QAP 16.0 CP-EP-4.0, CP-EP-16.3, CP-EP-9.0	9550-WRD-OPR-16.0	OPD-1
B. Causes of Adverse Condition	9. <u>Corrective Action</u>	PHDQAM QCH 10.1	PHDQAM QCH 10.2 QAP EDRN001	PHDQAM QCH 10.2 ESQAM QCES 2.16	QAM 15.0/16.0	QAM 15.0/16.0/18.0 WP 15.0.1/15.0.3/16.0.1	QAP 16.0 CP-EP-4.0, CP-EP-16.3, CP-EP-9.0	9550-WRD-OPR-3.0/16.0	
C. Documentation & Reporting of Corrective Action	9. <u>Corrective Action</u>	PHDQAM QCH 10.1	PHDQAM QCH 10.2 QAP EDRN001	PHDQAM QCH 10.2 ESQAM QCES 2.16	QAM 15.0/16.0/18.0	QAM 15.0/16.0/18.0 WP 15.0.1/15.0.2/15.0.3/16.0.1/18.0.1	QAP 16.0 CP-EP-4.0, CP-EP-16.3, CP-EP-9.0	9550-WRD-OPR-16.0 9565-NTD-OPP-5B	QAI-3, QAI-7 QAI-3, QAI-7, PC-9, QAI-8
XVII. <u>Quality Assurance Records</u>									
A. Maintenance of Records	2.4.2 <u>Quality Records</u>	PHDQAM QCH 9.1	PHDQAM QCH 9.1 QAP EIGN001	PHDQAM QCH 9.1 ESQAM QCES 2.17	QAM 17.0	QAM 17.0 WP 17.0.1	QAP 17.0, 17.1, 17.2 CP-EP-18.0	9550-WRD-OPR-17.0, 9565-NTD-OPP-2E	QA-9
B. Types of Records	2.4.2 <u>Quality Records</u>	PHDQAM QCH 9.1	PHDQAM QCH 9.1 QAP EIGN001	PHDQAM QCH 9.1 ESQAM QCES 2.17	QAM 17.0	QAM 17.0 WP 17.0.1	QAP 17.0, 17.1, 17.2 CP-EP-18.0	9550-WRD-OPR-17.0 9565-NTD-OPP-2E	QA-9
XVIII. <u>Audits</u>									
A. Documented Quality Audit Program	11. <u>Audits</u>	PHDQAM QCH 12.1 BHG3 P.11	PHDQAM QAM 12.1 QAP EIRN001	PHDQAM QAM 12.1 ESQAM QCES 2.18	QAM 18.0	QAM 18.0 WP 18.0.1	QAP 18.0 DQP-CS-4	9550-WRD-OPR-18.0 9565-NTD-OPP-6A	QA-1, QA-4, QAI-3, QAI-7
B. Audit Checklists and Responsibility	11.1 <u>Personnel</u>	PHDQAM QCH 12.1	PHDQAM QAM 12.1 QAP EIRN001	PHDQAM QAM 12.1 ESQAM QCES 2.18	QAM 18.0	QAM 18.0 QAM 18.0.1	QAP 18.0 DQP-CS-4	9550-WRD-OPR-18.0 9565-NTD-OPP-6A	QA-1, QA-4, QAI-3, QAI-7, QAI-4
C. Documentation and Rep'rting	11.6 <u>Results</u>	PHDQAM QCH 12.1 BHG3 P.11	PHDQAM QAM 12.1 QAP EIRN001	PHDQAM QAM 12.1 ESQAM QCES 2.18	QAM 18.0	QAM 18.0 QAM 18.0.1	QAP 18.0 DQP-CS-4	9550-WRD-OPR-18.0 9565-NTD-OPP-6A	QA-1, QA-4, QAI-3, QAI-7
D. Follow-up Action	11.7 <u>Follow-Up</u>	PHDQAM QCH 12.1	PHDQAM QAM 12.1 QAP EIRN001	PHDQAM QAM 12.1 ESQAM QCCS 2.18	QAM 18.0	QAM 18.0 QAM 18.0.1	QAP 18.0 DQP-CS-4	9550-WRD-OPR-18.0 9565-NTD-OPP-6A	QA-1, QA-4, QAI-3, QAI-7

V. IMPLEMENTATION OF PROVISIONS OF THE DESIGN QA PROGRAM FOR PIPING AND PIPE SUPPORTS AT COMANCHE PEAK FOR THE IDENTIFICATION, DOCUMENTATION AND CORRECTION OF ERRORS OR DEFICIENCIES IN DESIGN

A. Introduction

Q. Panel, what is the purpose of this portion of your affidavit?

A. This portion of our affidavit illustrates the implementation of the various measures discussed above regarding the identification, documentation and correction of errors or deficiencies in piping and support design. To accomplish this task, we have provided examples of instances in which design errors or deficiencies were routinely identified as part of the design process, in accordance with established procedures.

B. Governing Requirements and Standards

Q. Panel, what are the governing regulations regarding corrective action for errors or deficiencies in design?

A. (All) Criterion XVI of 10 C.F.R. Part 50, Appendix B, "Corrective Action" establishes dual criteria for corrective action regarding conditions adverse to quality, including those regarding design. This criterion requires that measures be established to assure that conditions adverse to quality, such as deficiencies, "are promptly identified and corrected." With respect to significant conditions adverse to quality, Criterion XVI also requires that measures be taken to "assure that the cause of the condition is determined and corrective action taken to preclude repetition." The duality of the corrective action scheme established by Criterion XVI is also reflected in the governing industry standard implementing quality assurance provisions for the design of nuclear power plants. Specifically, ANSI N45.2.11,[26] Section 9.0, provides with regard to corrective action for design, as follows:

> In addition to correcting a discovered error or deficiency, corrective action also includes for significant and recurring errors or deficiencies, determining the cause and instituting appropriate changes in the design process and the quality assurance program for design, intended to prevent similar types of errors or deficiencies from recurring.

As we describe below, each of our organizations has implemented procedures which satisfy the provisions of Criterion XVI and ANSI N45.2.11.

Q. Panel, what methods may be utilized to identify design conditions adverse to quality pursuant to 10 C.F.R. Part 50, Appendix B, Criterion XVI, and ANSI N45.2.11?

A. Although Criterion XVI requires that conditions adverse to quality be promptly identified and corrected, it does not require that any specific method or document be employed for this purpose. Section 9.0 of ANSI N45.2.11, however, does identify means by which deficiencies or errors in design may

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26 ANSI N45.2.11 "Quality Assurance Requirements for the Design of Nuclear Power Plants", May, 1973 (Draft 2, Rev. 2) (Applicants' Exhibit 148). The 1974 version of ANSI N45.2.11, provides similar guidance for corrective action.

be detected. Specifically, that standard provides that deficiencies or errors may be detected by (1) design verification, (2) personnel using design documents, (3) audits, (4) tests or (5) actual failure during operation. Each of our organizations has established and implemented measures, as appropriate, that provide for the detection of design errors through any of these means. However, we will focus on the first three aspects of the deficiency identification process because of the Board's expressed interest in Applicants' program for identifying deficiencies prior to completion of the design process.

In addition, as we discuss below, pursuant to Criterion XV of 10 C.F.R. Part 50, Appendix B, deficiencies in materials, parts or components identified by QC personnel through inspections which may have resulted from inadequate designs are documented on Nonconformance Reports ("NCRs") and dispositioned in accordance with established procedures.

Q. Panel, what is the purpose of Criterion XV of 10 C.F.R. Part 50, Appendix B?

A. (All) Criterion XV requires that materials, parts or components which do not conform to requirements be identified, documented, segregated and dispositioned. These nonconforming conditions are those in materials, parts or components which when manufactured, constructed, delivered or installed are not in accordance with design documents. To identify such nonconforming conditions, inspections are performed by QC inspectors by visual examination or measurement against acceptance criteria established by others (using applicable specifications and design documents).

Q. Panel, may deficiencies or errors in design be detected by inspections performed in accordance with the provisions of Criterion XV?

A. Yes. As we just mentioned, materials, parts or components which do not conform to requirements are to be identified pursuant to Criterion XV. Lack of conformance to requirements may result from an inadequate design. For instance, two components may be designed to fit together in a certain manner to enable them to perform their intended functions. When constructed and/or installed, however, these components may not fit together. Thus, the cause of the deficiency could be an error inherent in the design of one or both components. Such a deficiency would be identified by a QC inspector during routine inspection of the components, using established inspection criteria. It is important to note, however, that the inspector is not expected nor is he required to recognize that the cause of the deficiency is a design error. He accepts or rejects the item based on applicable acceptance criteria. The inspector is to identify the deficiency on appropriate documentation and submit that documentation for evaluation and corrective action as necessary.

Q. Panel, how does the identification of errors or deficiencies in design pursuant to Criterion XV differ from the identification of errors or deficiencies in design pursuant to Criterion III?

A. (All) As already indicated, errors or deficiencies in design which could be identified in accordance with Criterion XV are those capable of identification by QC inspection utilizing established acceptance criteria. However, QC inspectors are not required to be trained in engineering. Accordingly, they are not expected or relied upon to recognize deficiencies inherent in a design which are not manifested in a manner susceptible to detection by comparison of installed and/or fabricated materials, parts or components to inspection criteria. In contrast, in accordance with Criterion III, design deficiencies such as incorrect design assumptions or errors in calculations would be detected through design verification or checking of design documentation. Such verification or checking is performed by persons with appropriate engineering knowledge.

Q. Panel, does each of your organizations have in place procedures for identifying, documenting and correcting errors or deficiencies in design as part of the piping and support iterative design process?

A. Yes. We have already described the design verification process for each of our organizations. As indicated in Section 9.0 of ANSI N45.2.11, and as we discussed above, this process is one of the ways by which errors or deficiencies in design may be identified and corrected. As we indicated, this is an ongoing process performed from the initial stages of the design process through the implementation of design changes and the as-built certification process. Thus, prompt identification and correction of such errors or deficiencies is achieved.

In addition, each of our organizations has implemented procedures by which any person using design documents may identify errors or deficiencies. We will discuss these measures below with respect to each of our organizations.

Also, as we have already discussed, each of our organizations has in place a comprehensive audit program by which the design process is regularly audited for compliance with the quality assurance program. Further, each organization performs review and/or verification of design and analysis methods in addition to the formal audit and design review process to assure the technical adequacy of that work.

Q. Panel, what means exist in your organizations to detect recurring errors in the design process?

A. As previously discussed, numerous methods exist for the detection of design errors in the design process. These errors are evaluated for the possibility of recurrence as a matter of practice.

In fact, identification of recurring errors is inherent to the design process. First, each supervisor and design reviewer is aware of the importance of identifying recurring errors. In addition, a limited number of engineers are designated as checkers to perform design review and therefore, can readily identify either on their own or in discussions with each other any recurrence of errors made by both individuals and the group as a whole. Further, the Supervisors of each group are responsible for the review of all work performed by that group. Communication with the checkers and actual review of the design packages enable the Supervisors to promptly identify recurring errors. In view of these factors, there is reasonable assurance that recurring errors or deficiencies in designs will be detected. Of course, corrective action with respect to such errors or deficiencies includes a determination of the cause of the error and action to preclude its repetition.

Finally, it is important to note that for each of our design organizations there are factors which provide a strong motive for identifying recurring errors. Specifically, errors made by the design organizations have a negative impact on both schedules and financial considerations. It is, therefore, advantageous from a business standpoint for each organization to promptly identify and correct design errors, and in particular recurring design errors, to prevent their recurrence.

C. Implementation of Measures for Identifying, Documenting and Correcting Errors or Deficiencies in Design

1. Pipe Support Engineering

Q. Mr. Finneran, what procedures have been established by which PSE identifies and corrects design deficiencies in the design verification process? Can you provide an example to illustrate such corrective action?

A. (Finneran) As I have already discussed, the design verification process for PSE support designs assures prompt corrective action is taken with respect to errors detected at any stage of the design process, including those contained in original designs. This design verification process is described in CP-EI-4.0-1 "Design and Design Verification Control for Pipe Support Engineering." By performing design review prior to the release of the drawing to construction, PSE achieves prompt identification and correction of errors detected in the verification process.

The design verification process is implemented from the initial stage of the design process for PSE and is implemented with respect to all design and design change activities. Accordingly, examples of this process are generated continuously. I discuss below two illustrations of this process.

In PSE Attachment 1 an example of corrective action through the design verification process is provided. There the design verifier identified certain deficiencies in the original design calculations, which he noted on a calculation check copy. The calculation was then corrected by the original designer and the design verifier completed the design verification checklist form after assuring the corrections had been made.

The next example involves the design verification of a CMC. PSE Attachment 2 includes documentation of the design verifier's review of a member stress calculation, the original designer's corrections and the design verifier's completed checklist after assuring the calculations were corrected.

The examples both illustrate the timely identification and correction of design deficiencies through the design verification process.

Q. Mr. Finneran, what procedures does PSE have in place to assure that significant conditions adverse to quality are identified and measures taken to assure that the cause of the condition is determined and corrective action taken to preclude repetition?

A. (Finneran) The principal procedure by which significant conditions adverse to quality are addressed is CP-EP-16.3, "Control of Reportable Deficiencies."[27] This procedure

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27 Procedure CP-EP-16.3 has been in effect since March, 1982. Prior to that time, engineering personnel employed CP-QP-16.1, "Significant Construction Deficiencies," for the identification and disposition of potentially significant deficiencies.

requires that all personnel involved in design and procurement activities at Comanche Peak inform their manager of a potentially significant deficiency, who in turn is either to review or direct the completion of a review of the potential deficiency within 24 hours. This review includes the documentation of the deficiency on a Deficiency Review Report (DRR), which serves as a tracking mechanism for its resolution. The review includes an assessment for possible generic implications. This procedure provides for management involvement in the resolution and reporting of the deficiency to the NRC if necessary.

An example of the use of the CP-EP-16.3 procedure is provided by DRR-018 (PSE Attachment 3). This deficiency involved certain Class 1 bolting and rod materials provided by NPSI which had not received all the nondestructive examination required by ASME Code Section NF-2500. The deficiency had been identified by NPSI and reported to TUSI by letters dated May 16, 1983, and May 19, 1983. (Both letters were received on May 25.) In accordance with procedure CP-EP-16.3, PSE prepared a DRR identifying this as a potentially reportable deficiency. Following review it was determined that none of the materials were used under highly stressed conditions. Thus, there would have been no adverse safety implication had the condition gone undetected. Accordingly, the matter was not reportable pursuant to 10 C.F.R. § 50.55(e). Nonetheless, as further corrective action, all suspect material was replaced. The matter was closed out on June 15, 1983.

Q. Mr. Finneran, what procedures provide for the identification of design errors or deficiencies by persons utilizing design documents?

A. (Finneran) All personnel using design documents are authorized to identify any potential error or deficiency in those documents. Procedure CP-EP-2.0, "Indoctrination Program" provides that all personnel whose activities affect quality are to receive indoctrination and training in procedures concerning corrective action. For PSE, this training includes CP-EP-16.3 and ANSI N45.2.11 which require, in part, that corrective action be taken with respect to any errors detected.

Two examples of corrective action being initiated as a result of action by persons using design documents are CMC No. 97241, Rev. 0 (against drawing CS-2-309-701-S33R) (PSE Attachment 4) and CMC No. 97423, Rev. I (against drawing CH-2-215-709-S23R) (PSE Attachment 5). The first CMC was initiated by a PSE field engineer in order to identify and correct a drawing on which no NF number had been given for the weld symbol. Another example involves an instance in which it was noted, again, by a PSE field engineer, that the site engineering organization had used an incorrect weld symbol on a drawing calling for a fillet weld where a fillet weld could not have been performed because of the roundness of the bracket. Upon review, the drawing was revised to reflect the approved change.

Another area in which errors or deficiencies in design documents may be identified by persons using those documents is with regard to design guidelines. In this regard, PSE engineers are authorized and encouraged to identify errors or deficiencies in the PSE Guidelines or associated design criteria. Section i of the Guidelines establishes a procedure for the design engineers to follow in proposing modifications to the Guidelines. (PSE Attachment 5.) Evaluation of any proposed modification includes an assessment of the impact of the modification on prior designs, and an assessment for reportability pursuant to CP-EP-16.3.

To illustrate this method of corrective action, I have included an example in which the PSE Guideline for weld design (Section XI of PSE Guidelines) was modified to reflect the concern of a design engineer (PSE Attachment 7.) The design engineer had noted that application of the rules of AWS 10.12.1.5 for fillet welds in tube steel stepped joints could result in a smaller than assumed effective throat of welds for certain tube steel dimensions. To correct this condition, the guidelines were modified by adding a table of reduced effective throat areas, which the designers now use in their calculation of weld allowable loads. In addition, because of the possible generic implications of this finding, PSE also reverified the adequacy of designs completed prior to this modification. PSE evaluated welds that could have been affected by the change and determined that no modifications were required.

Q. Messrs. Chapman and Finneran, what measures have been established for audits of the design process?

A. Pursuant to 10 C.F.R. Part 50, Appendix B, Criterion XVIII, the TUGCO Quality Assurance audit program includes audits of Comanche Peak Project Engineering activities. These audits include examination of the design processes of CPPE to verify that appropriate controls and procedures have been established and are being implemented. There have been 37 audits by TUGCO QA of CPPE activities in the last five years, including 11 audits specifically of PSE.

To illustrate the implementation of this audit function, we have attached an example (PSE Attachment 8) in which TUGCO QA identified, as a result of an audit, a deficiency in the manner in which certain design control requirements were being addressed. This example represents the audit process by which TUGCO QA verifies program adequacy and implementation and illustrates the corrective action taken in response to audit findings.

Q. Mr. Finneran, would you provide an example of the technical "audits" of the PSE Group you previously discussed?

A. To illustrate the activities of this group, I have attached audit package CC-1-RB-047 (PSE Attachment 9), in which an instance where the designer had not properly considered Hilti bolt separations was identified. Corrective action with respect to this finding was to have the original designer make the necessary corrections to the calculations. Thus, this deficiency was corrected in a manner which would preclude its repetition.

2. ITT-Grinnell

Q. Mr. Powers, what provisions has ITT-Grinnell made with respect to the identification and correction of design deficiencies?

A. The design review process previously described and controlled by PHDQAM & ESQAM assures that design deficiencies that are detected in this cycle are promptly addressed and corrected. QCES 2.16, "Corrective Action," provides means by which deficiencies identified may be corrected and evaluated for significance. Potentially significant conditions adverse to quality are evaluated and resolved by the initiation of a Corrective Action Request, evaluation and resolution of which requires management involvement for determination of necessary corrective action, including the assessment of generic implications and the need to take action to preclude repetition.

In addition, ITT-Grinnell conducts routine, internal audits of its engineering groups. These audits, which are conducted in accordance with Criterion XVIII of Appendix B, are designed to verify that the design process is functioning in accordance with established quality procedures. Further, although not required by Appendix B, ITT-Grinnell also performs technical reviews of its design groups' activities. These reviews are designed to assess whether design specifications, codes, standards and internal technical procedures are being followed.

In addition to the corrective action outlined above, other forms of corrective action may take place after the completed sketches or drawings are released to the client or at any time during the design process. Errors, deficiencies or questions regarding generic concerns or particular designs can be brought to the attention of and evaluated by the Engineering Manager by any member of the engineering organization, or as a result of internal and management audits.

Corrective Action Plans are developed by the Engineering Manager and implemented by the Engineering Supervisor. The normal design process is followed for resolution of the corrective action. The Engineering Manager is informed of satisfactory completion of the corrective action.

Further, any employee of ITT Grinnell may submit questions regarding the need for corrective action. Questions which arise in this manner may be asked via a Request for Information form or by other means to the Engineering Manager. The Engineering Manager either responds directly or forwards the request to the appropriate department for resolution. If corrective action is necessary, the Engineering Manager may, based on his evaluation, forward the request to management for an evaluation pursuant to the requirements of 10 C.F.R. Part 21. Upper management dispositions the Part 21 evaluation. If action is taken, the Engineering Manager is charged with implementation of the action. A Request for Information form need not be sent to the Engineering Manager but can be forwarded directly to upper management for a Part 21 evaluation.

Q. Mr. Powers, please provide examples of corrective action initiated by each of the procedures you describe above.

A. (Powers) The initial stage of the design process at which corrective action may be taken is at the design and drafting stages with respect to design errors or deficiencies identified by the design or drafting checkers. In these instances, the checkers will identify the necessary changes to the design or drawing for the Supervisor who in turn transmits the changes to the original engineer for correction. In the case of design changes, the original engineer will initial the change and the checker will initial the corrected calculation sheet (ITT-Grinnell Attachment 1). For drafting errors, the changes will be submitted to the original drafter for correction and redrafting (ITT-Grinnell Attachment 2).

An example of how the request for information form is used to pose a question with respect to a matter believed to be a potential design error is seen in ITT-Grinnel Attachment 3. In this instance, a question related to maximum edge distance was asked by the quality assurance engineer to the manager of piping and structural analysis. A copy was also transmitted to the Engineering Manager (myself). A response to the question was provided and the concern of the engineer was resolved.

Two examples of corrective action originating from internal audit activities are presented in ITT-Grinnell Attachment 4. The first example, CAR3030, deals with a deviation from the ESQAM procedure, QCE-2.3.6.C.1.b, which provides "Errors in design documents noted during design verification shall be reconciled, corrected and documented. . . ." The second example, CAR3034, deals with a technical error identified during an audit. Both deficiencies were documented on the "Corrective Action Request" form for assessment of significance and transmitted to the Engineering Manager. Action taken is addressed on the form, signed and dated by the Lead Engineer assigned by the Engineering Manager.

Finally, ITT instituted in September, 1978 a policy of formally "auditing" the design calculations and design approach of each engineer on at least a monthly basis. These "audits" are used to identify potential problems with individual engineers as well as recurring errors by one or more individuals. The memorandum directing the implementation of this procedure, with examples of the reviews, is attached as ITT-Grinnell Attachment A.

3. NPSI

Q. Mr. Deubler, what mechanisms has NPSI established for correcting design errors or deficiencies?

A. (Deubler) NPS has established procedures which assure the prompt identification and resolution of design deficiencies and potentially significant deficiencies. Routine design errors, i.e. those errors resulting from dimensional or mathematical errors, errors in transposing information or other errors of a random nature, are identified in the checking and verification process and are corrected in accordance with NPS Work Procedure 15.0.3, "Control of Design Errors." More significant design deficiencies, such as the use of superceded design input, use of incorrect or inadequate design criteria or incorrect interpretation or application of design criteria, are controlled by the use of design nonconformance reports, in accordance with NPS Work Procedure 15.0.1, "Identification and Control of

Nonconformances," which provides for the documentation of such deficiencies for determination of appropriate corrective action. Each nonconforming condition is documented on a Nonconformance Report, reviewed for validity by the Manager of Quality Assurance or the QA Engineer, and submitted to the Project Manager for disposition. The Quality Assurance Manager reviews all dispositions to assure they satisfy quality requirements, including consideration of implications for other work. In addition, where design deficiencies are considered to involve potentially significant conditions adverse to quality, the condition is to be documented on a Corrective Action Request in accordance with NPS Work Procedure 16.0.1, "Corrective Action Request," which initiates the appropriate corrective action. Design errors or deficiencies which may be reportable are evaluated in accordance with NPS Work Procedure 15.0.2, "Control of Issued Nonconformances."

To illustrate the corrective action mechanisms inherent in the design process and to demonstrate their implementation, I set forth below several examples of such measures:

First, errors discovered in checking are noted on the design package, which is returned to the original designer for correction. In this manner, the originator is made aware of his error and learns by the error so that he can correct his practices to avoid repetition. An example of this form of corrective action is set forth in NPS Attachment 1. This attachment includes the check copy of a case where a checker detects a bolt hole size error in revision 2 of support MS-1-01-002-C72S. The issued drawing shows the incorporation of the correction by the designer and recheck by the checker.

NPS Attachment 2 is an example of corrective action resulting from persons using the design documents. In this instance, site personnel noted that several field design changes to supports were necessary because of an interference with the equipment hatch in Unit 1 containment. To correct this condition, the Project Engineer prepared and distributed a memorandum for all designers to remind them of the need to check for such interferences.

Further, as previously described, each supervisor reviews the work of the designers, checkers and verifiers for errors and deficiencies. Because he reviews the work on a continuing basis he can note any trends that may develop. Whenever he detects errors or undesirable trends, he will discuss them with his engineers and instruct them to the proper design practices. Examples of the results of such reviews are set forth in NPS Attachment 3. This attachment contains various memoranda regarding consideration of component weights, inclusion of design information and review cycles. These are supervisory instructions resulting from the supervisory reviews.

Also, as part of design verification, design reviews are conducted of selected design packages to verify the adequacy of the design methods and assumptions used. The packages are selected by the design reviewers to be representative of the project design activities. Significant deficiencies are corrected and their cause determined and resolved to prevent recurrence. Any areas where the design methods could be improved are noted and brought to the attention of the appropriate supervisor. NPS Attachment 4 provides an example of this form of corrective action. This attachment contains a May 14, 1982 report concerning a review of computer programs utilized by NPS. As a result of this review a new procedure was issued to address directly review of procured computer program verification.

An example of an NPS nonconformance report is set forth in NPS Attachment 5. This attachment is NCR-1-1015 which concerns the use of initials which do not appear on the authorized signature list. Also attached are documents setting forth the corrective action that was implemented.

Finally, the Manager of Quality Assurance will also initiate an evaluation when a defect or nonconformance is thought to be a potentially reportable deviation, as defined by 10 C.F.R. Part 21. Such conditions normally are brought to his attention through an NCR, in accordance with Section 4.1 of WP 15.0.1 and WP 15.0.2. The disposition of a reportable deviation includes notification of the client.

An example of this process is set forth in NPSI Attachment 6. These meeting minutes from a 10 C.F.R. Part 21 evaluation illustrate the evaluation of a nonconformance concerning the NPS stiffplate computer program. As seen in this attachment, it was determined that this matter was not reportable under 10 C.F.R. 21.

Q. Mr. Deubler, are there any other methods by which corrective action is implemented?

A. Yes. As I described previously the implementation of the QA Program is monitored through the use of audits. When these audits reveal a deficiency, an audit finding is issued to correct the deficiency. NPS Attachment 7 presents examples of the corrective actions resulting from NPS Internal Audit Findings. The various corrective actions resulting from this audit finding are set forth in the attachment.

In addition, as previously discussed technical audits to evaluate the technical adequacy of design activities are also performed. An example of these audits is included in NPS Attachment 8. These audits, although not required by 10 C.F.R. Part 50, Appendix B, illustrate the overall commitment to quality in NPS design activities.

Finally, findings in audits of NPS conducted by NPSI, by TUGCO and by the NRC also result in similar corrective action. An example of this is included in NPS Attachment 9. This attachment describes the corrective action resulting from an NRC inspection of NPS on November 17-20, 1981. This inspection revealed that several supports did not meet the minimum weld size criteria of the ASME Code. The identification of this deficiency prompted NPSI to issue Nonconformance Reports, Corrective Action Requests and perform a 10 C.F.R. Part 21 evaluation. The evalution revealed that the deficiencies did not constitute a substantial safety hazard. The corrective actions which resulted from this deficiency included additional training of design personnel, correction of all previously issued designs, and the performance of a comprehensive design review to determine that design activities satisfied the code and client specifications. In addition, because the inspection revealed programmatic deficiencies, a comprehensive corrective action plan was established. This plan involved the complete review of the procedures confronting the design activities and revisions were implemented where improvement could be made. Also, the audit checklists were revised to address more specifically the various areas of design activities. The NRC closed this finding through an inspection conducted on September 12-16, 1983. Further, in this same time frame, the technical audits described earlier were implemented. These corrective actions provided increased assurance that design deficiencies would be detected.

Q. Mr. Chapman, in addition to the review of welds performed in response to the NPS findings regarding weld designs, what assurance is there that welds on ASME component supports satisfy applicable code and design requirements?

A. The principal means by which this assurance is provided is through the inspection of ASME welds culminating in the N-5 certification of piping, components and component supports.

Q. Mr. Chapman, please describe the inspection of welds on ASME component supports and how that inspection relates to the ASME N-5 certification process?

A. The ASME N-5 certification process entails a detailed inspection of ASME piping, components and component supports to verify compliance with the drawings and requirements of the ASME Code and the design specifications. Both the ASME Certificate Holder, Brown & Root, and the Authorized Inspection Agency, Hartford Steam Boiler Inspection Company, certify such compliance. Records of this certification are retained which contain documentation to substantiate the material acceptability, fabrication, installation, examination and testing of the ASME systems.

With respect to the inspection of welds on ASME component supports, the ASME inspection process requires the inspection of all Brown & Root welds for size and conformance to ASME Code and designer's requirements, as the welds are made. As a result of the NPS finding regarding weld design, the applicable welds on NPS designed supports were reinspected and evaluated for acceptability. Additionally, all welds on ASME component supports regardless of the designer, on which unauthorized work could have been performed after installation, were reinspected to assure that compliance with the design requirements had been maintained.

Documentation regarding each weld for a support is prepared and the weld size for each weld is indicated. This documentation is retained in the hanger package for each support and is reviewed as part of the review for the N-5 certification to assure these inspections have been performed.

4. Westinghouse

Q. Mr. Parker, what measures has Westinghouse established to assure that appropriate corrective action will be taken with respect to errors or deficiencies in design.

A. As I previously discussed, Westinghouse has established procedures to assure prompt correction of conditions adverse to quality. These procedures provide for corrective action of design deficiencies or errors identified from any source, including design verification, audits and persons using design documents. Further, Westinghouse procedure WRD-OPR-19.0 established a Safety Review Committee to consider items referred to it for reportability. The procedure requires any person in the organization having an item which may be reportable under the regulations to report that item for evaluation by the Safety Review Committee.

Q. Mr. Parker, what evidence is there that the Westinghouse design process has adequately implemented measures to assure that design deficiencies or errors are promptly identified and corrective action implemented as appropriate?

A. During the course of our design on the Comanche Peak Project, design verification, review of records and audits provided assurance that design deficiencies or errors were promptly identified and corrective action was implemented. Following are examples to illustrate how each of these provide that assurance.

Design verification is an integral part of the design process described above. In fact, design verification is carried out before the analysis is completed. In reviewing a check copy of the analysis, the verifier may identify significant errors such as incorrect material, incorrect placement or orientation of a support, incorrect piping segment length, or incorrect insulation weight which can affect the analysis and advises the analyst who then corrects the calculations as required. After the verifier is satisfied that the work is correct, the review and approval is documented. Westinghouse Attachment 1 provides an example of this activity.

The role that review of design records plays in identifying design deficiencies and in taking corrective action is illustrated in the following example. At the beginning of the final as-built stage of the design process for Comanche Peak, a review of stress problem notebooks for analyses previously performed disclosed inconsistencies relating to the manner in which analysts had performed and documented calculations. In these notebooks which if not corrected, could have introduced errors into the final as-built evaluation. To preclude such errors a procedure was prepared and transmitted to Plant Engineering Division piping analysis management for implementation. This procedure provides a uniform set of acceptance criteria and includes a detailed checklist of the items that must be considered by the analyst in the evaluation. Documentation relating to this matter is provided in Westinghouse Attachment 2.

Finally, Westinghouse Attachment 3 illustrates how our audit program contributes to the identification of design deficiencies and the taking of corrective action. As part of our internal audit program, Westinghouse Nuclear Technology Division QA Systems and Compliance conducted audits in areas relating to work being carried out at the Comanche Peak site by Westinghouse employees. A 1981 audit identified certain non-conformances in the design area which required corrective action. Specifically, this audit disclosed that design interface activities between the Westinghouse Structural Analysis Mobile Unit (SAMU) and TUSI involving drawing and correspondence control were not adequately described. In this instance, an interface control agreement defining these design interface activities was prepared and approved by Westinghouse and TUSI. This audit also disclosed as a nonconformance that training documentation assuring that Westinghouse SAMU personnel were knowledgeable of quality assurance and technical requirements and the pertinent procedures governing their work were not available on-site. To correct this condition, a training program was instituted for Westinghouse SAMU personnel and a file was set up on-site for records which document the training provided and show that personnel meet training requirements.[28]

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28 Finally, I note that further evidence of the adequacy of the Westinghouse QA Program is provided by a recent decision by the Atomic Safety and Licensing Appeal Board in Pacific Gas and Electric Company (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763 (March 20, 1984). In that proceeding, the Appeal Board found to be invalid a claim by the joint intervenors that "there is no meaningful assurance that the Westinghouse design of safety-related equipment at Diablo Canyon meets applicable licensing criteria." In denying this claim, the Appeal Board stated, as follows:

> Contrary to this claim, however, the assurance that the Westinghouse-supplied equipment meets licensing criteria is provided by the Westinghouse quality assurance program. . . . .The Westinghouse quality assurance program has been audited many times by utilities, architect-engineers and profes-

(footnote continued)

5. Gibbs & Hill

Q. Mr. Ballard, what provisions does Gibbs & Hill have for the identification, correction and preventive action of significant or recurring deviations during the design process for piping and pipe supports?

A. The primary design function performed by Gibbs & Hill for piping and pipe supports is the development of drawings and specifications. Throughout the process of development and use of such design criteria documents as specifications MS-200 and MS-46A (referenced previously) deviations to those design documents must be reported on a Design/Engineering Change/Deviation Request form (Gibbs & Hill Attachment 1). This control is specified by procedure PC-9, Design/Engineering Change/Deviation Request Procedure. All

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(footnote continued from previous page)

> sional organizations, as well as the NRC. . . . In addition, Westinghouse has designed the NSSS for some fifteen, four loop nuclear power plants similar to Diablo Canyon which have been licensed by the NRC. [Diablo Canyon, ALAB-763, supra, ___ NRC ___, slip op. at 78-80.]

As I previously noted, the Westinghouse QA program is an integrated program. Thus, the program applied to the activities addressed by the Appeal Board in Diablo Canyon, including the procedures which assure prompt correction of conditions adverse to quality, is the same program being implemented by Westinghouse for Comanche Peak. Accordingly, I believe this decision provides additional assurance that the Westinghouse QA program, including corrective action measures implemented for design activities, satisfies applicable NRC criteria.

deviations submitted via this form must be evaluated by the specification originating discipline, a checker, design reviewer, and affected disciplines and the job engineer. This deviation request form requires that three questions be answered by either the originating engineer, design reviewer or job engineer:

a. Is this a significant deviation or error?

b. Is this a recurring deviation or error? And

c. Is change potentially reportable under 10 C.F.R. 21?

A positive response to any of the three questions requires that a memo be issued identifying to the job engineer, project engineer and project QA supervisor the potential design deficiency, significant design deviations or recurring deviations or errors. These three individuals or their representatives determine if the deficiency is valid, the cause and action to be taken to correct the deficiency. If the deficiency is valid, the Project Manager institutes appropriate corrective changes in the design process and measures to prevent recurrence of the deficiency. And the QA department issues changes to QA program, as necessary, to monitor the deficient area.

There have been no significant deficiencies or recurring deviations reported with reference to specifications MS-200 or MS-46A in accordance with this procedure. Requested deviations are traced via a master index and sorted by affected design document for ready reference.

Q. Mr. Ballard, what provisions has Gibbs & Hill made with respect to the identification and correction of design deficiencies during the design verification process?

A. As I previously discussed, Gibbs & Hill has established procedures which provide for the identification and correction of design deficiencies or errors from the initial stages of the design process, through design checking and verification. Such corrective action is taken in accordance with the procedures discussed above regarding design verification.

An example of corrective action taken during the design verification phase is set forth in Gibbs & Hill Attachment 2. There, during the design review of a stress problem, the design reviewer questioned whether equipment seismic movements were consistent with those established for the building. He documented this concern on the design review record form and returned the stress problem to the original designer. Upon review by the job engineer and discipline chief engineer it was determined that the movements were, in fact, properly accounted for and the analysis was, therefore, approved.

In another instance the design reviewer observed that the movement of a 3-inch branch connection to a 6-inch run of pipe had not been accounted for in the analysis. (Gibbs & Hill Attachment 3.) To correct this deficiency, the original analyst performed a detailed calculation that was added to the analysis book before the reviewer would accept the analysis. It was also determined by the design reviewer that this condition did not raise a generic issue. Thus, no further corrective action was required.

Q. Mr. Ballard, what mechanism has Gibbs & Hill established for the identification of design errors by persons utilizing design documents?

A. Persons utilizing design documents are required to identify any potential error or deficiency in accordance with the specifications referenced earlier. This provides that any inconsistency between the design specification and other criteria referenced by the designer be reported to Gibbs & Hill.

An example of this form of corrective action is set forth in memorandum AM-M-694, dated March 20, 1979, titled "Procedure for Analyzing Seismic Anchor Movements." (Gibbs & Hill Attachment 4) This memorandum was generated by the stress analysis supervisor.

Q. Mr. Ballard, what measures have been established for audits of the design process? Please provide examples of implementation of those measures.

A. As I previously discussed, Gibbs & Hill Applied Mechanics is routinely audited by Gibbs & Hill Quality Assurance. In addition, technical reviews, called surveillances, are conducted of selected as-built stress problems by the Gibbs & Hill Quality Assurance personnel, supplemented as necessary by engineers from the Consulting Department. These technical reviews are performed pursuant to Procedure QAI-3.

An example of corrective action resulting from a technical surveillance of selected as-built stress problems is presented as Gibbs & Hill Attachment 5. There, the Gibbs & Hill Quality Assurance Department reported to project management that an error had been identified in the analysis of minimum pipe wall thickness violations in the as-built analyses of two stress problems. A piping analyst had failed to model minimum wall thickness violations in these problems at the location on the piping with the highest stress for the worst case, required by design procedure AB-4. Instead, the analyst had evaluated the minimum wall violations at the actual locations. Upon review it was determined that, although there had been a technical violation of the procedure, the conclusions of the analyst based on actual conditions were valid and, thus, the additional stresses that would be calculated by assuming the worst case locations need not be considered in this instance. Other instances where minimum wall violations had been evaluated were reviewed and it was concluded that a generic deficiency did not exist. Further corrective action was initited by revision to AB-4 to reemphasize that piping minimum wall violations were to be correctly incorporated in the appropriate analyses.

Q. Panel, do your organizations require employees to bring quality concerns to the attention of appropriate supervisory personnel?

A. Yes. In addition to the design controls established in the review, approval and independent verification cycle, and the provisions to resolve matters identified thereby, all employees working in quality-related jobs are required to bring observed deficiencies to the attention of appropriate supervisory personnel. In particular, all personnel in the procurement and engineering organizations whose activities may affect quality, and who may use design documents, are required to undergo indoctrination and training regarding quality-related requirements.

For PSE, Procedure CP-EP-2.0, "Indoctrination Program," provides for indoctrination and training in the requirements of 10 C.F.R. Part 50, Appendix B, the TUGCO/TUSI CPSES QA Plan, 10 C.F.R. §50.55(e) and ANSI Standards N45.2 and N45.2.11. Similar procedures are in place for ITTG (QCES 2.2.1), NPS (WP 2.0.1), Westinghouse (WCAP-9550, WRD-OPR-2.0 and WRD-OPR-19.0; and WCAP 9805,S&EED 1.2) and Gibbs & Hill (Procedures QA-5, "Procedure for Indoctrination and

Training" and OPD-1 "Reporting Safety Related Defects and Noncompliance Pursuant to 10 C.F.R. 21"). In addition, personnel employed in the Pipe Support Engineering and Technical Services Group (including the STRUDL group), ITT, NPSI, Gibbs & Hill and Westinghouse are indoctrinated with respect to requirements and procedures applicable to reporting potential deficiencies and are held responsible for adherence to those requirements and procedures.[29] Further, all employees are on notice regarding the requirements imposed by 10 C.F.R. Part 21, "Reporting of Defects and Noncompliances", by notices posted in work areas throughout the site and home offices.

In sum, employees engaged in design or design-related activities affecting quality are indoctrinated, trained and held responsible to report deficiencies they may observe. This assures that persons using design documents, even those without any responsibility for design, are procedurally able to promptly identify and initiate corrective action with respect to possible design deficiencies.

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29 We have attached the attendance records for the indoctrination classes in which Messrs. Walsh and Doyle participated, and the course outline for that training course. In addition, copies of the required reading list (part of the indoctrination program) signed by Messrs. Walsh and Doyle are attached (Attachment E).

David N. Chapman

David N. Chapman

Subscribed and sworn to before me this 3rd day of July, 1984

Leota A. [illegible]

Notary - Dallas County

Commission Expires 10-20-85

Robert E. Ballard, Jr.

Robert E. Ballard, Jr.

Subscribed and sworn to before me this 3rd day of July, 1984.

My Commission Expires January 31, 1985

M. Pamela Blake

Notary Public

R. Peter Deubler

John C. Finneran, Jr.

A. Thomas Parker

David E. Powers

Subscri.ed and sworn to before me this 3d day of July, 1984

Notary Public

My Commission Expires February 14, 1988

PROFESSIONAL QUALIFICATIONS

DAVID E. POWERS
ITT GRINNEL CORP.
260 West Exchange Street
Providence, RI 02901

PROFESSIONAL EXPERIENCE

09/80- present — Engineering Manager - Responsible to the customer and ITTG management for overall planning, scheduling and managing of all engineering projects assigned to the section. Develop design concepts and technical procedures in keeping with current technical advances in the industry.

Responsible for the engineering related to a number of assigned major projects within an engineering design group from the quotation through design, manufacturing, and erection phases of the project. The projects involved affect all product lines of the Division.

Assignments (Nuclear): Comanche Peak
Bellefonte
Midland
GE-NSSS (materials)
Davis Besse

11/76- 09/80 — Engineering Supervisor - Supervise an Engineering section to assure the orderly design and processing of assigned projects.

Responsible for design and application of pipe supports in conformity with customer and industry codes and specifications. Responsible for the application of technical expertise effecting decisions concerning complex engineering related to pipe supports.

Assignments (Nuclear): Comanche Peak
Midland
Davis Besse
Cofrentez - Spain
Lemoniz - Spain
ASCO - Spain

02/73- 11/76 Engineer - Planned, scheduled and executed the design of pipe hangers and supports for industrial complexes (i.e., nuclear or fossil fueled power plants). Engineering was performed in accordance with applicable codes and customer specifications.

Assignments (Nuclear): Arkansas I
Davis Besse
Almaraz - Spain

EDUCATION

1973 - B.S.M.E.
Wentworth College
Boston, Massachusetts

1971 - A.S.M.D.
Wentworth Institute of Technology
Boston, Massachusetts

ATTACHMENT B

PROFESSIONAL QUALIFICATIONS

ROBERT E. BALLARD, JR.

1978 to present	Senior Project Manager Mr. Ballard controls the staffing and costing of the firm's efforts on the Comanche Peak Steam Electric Power Station Units 1 and 2 (1150 MW each, PWR) for Texas Utilities Services, Inc. Currently, Mr. Ballard oversees the work of approximately 150 engineers, designers, and support personnel and is the firm's primary representative to the client utility. He reviews all engineering and design work and systems to ensure conformance to regulatory and Gibbs & Hill standards. He monitors work progress and schedules and directs necessary adjustments in manpower and resource allocation to achieve timely completion of interim and long-term objectives. He is in charge of meeting all licensing criteria and preparation, and for defense of the Final Safety Analysis Report (FSAR) on this project.
1966-1978	Senior Engineer, Project Test Engineer, Project Engineer, (Westinghouse Electric Corporation; U.S. Army, Material Test Directorate; Reynolds Metal Company) Mr. Ballard performed quality assurance engineering and surveillance of various components for power generating facilities. He was responsible for confirming that equipment met ASME codes, and quality assurance and regulatory requirements. He negotiated licensing criteria with the Nuclear Regulatory Commission, which in one case resulted in a $40 million savings for the client utility. He was also responsible for $4 million in internally and externally funded development and design procurement programs involving mechanics and materials technology and refueling operations. He was in charge of design, test, and procedures for military projects involving ordinance material.

Education

B.S.M.E., Virginia Polytechnic Institute and State University, 1966

M.B.A., University of Pittsburgh, 1975

ATTACHMENT C

A. Thomas Parker

EDUCATION

B.S.M.E. - University of Dayton, 1963
M.S.M.E. - Pennsylvania State University, 1964

PROFESSIONAL QUALIFICATIONS

1983 - present	Westinghouse Plant Engineering Division - Manager of the Structural Engineering group of sixty engineers and technicians engaged in the design and analysis of piping supports, soil structure interactions, building design and modifcations, and heavy structural configurations.
1978 - 1983	Westinghouse Nuclear Operations Division - Project Management and Engineering for four Nuclear Steam Supply Systems provided for the Comanche Peak and South Texas Nuclear Projects. Prime responsible manager between Westinghouse Water Reactor Divisions and the utility customers. Responsible for all on site and home office personnel required to support these projects on a functional group matrix management basis.
1977 - 1978	Westinghouse Pressurized Water Reactor Division - Development manager for the Westinghouse PWR next generation nuclear steam supply system. Responsible for the design and drawing information provided to customers initially (Standard Model 414 Information Package).
1973 - 1977	Westinghouse Pressurized Water Reactor Division - Project Management and Engineering for the Angra (Brazil) Nuclear Steam Supply Systeam (NSSS). Prime commercial, management and engineering responsibility for all components and systems supplied as the NSSS portion of the turnkey power plant. Provided lead direction in Brazil for subsuppliers selection, establishment of suppliers quality assurance program, design and procurement of selected pressure vessels and heavy structures fabricated by Brazilian firms.

1968 - 1973 Lead engineer engaged in the design, testing, and field construction of Nuclear Power Plant, Engineered Safeguards Systems, designed to protect the containment and Auxiliary Buildings during potential loss of coolant transients. Tasks included basic HVAC and structural design, seismic and environmental qualification, licensing and field work.

Member of the ANSI/N45-8.1.1. Subcommittee for engineered safety features design.

1964 - 1968 Aerospace, aircraft, and missile propulsion systems and design. Mechanical engineer engaged in broad applicable of propulsion systems for space flight and weapon systems. Assignments with Pratt and Whitney Aircraft, General Dynamic, and The Boeing Company.

Westinghouse Electric Corporation, Atomic Power Division, Nuclear Service Department

Standardization and computers cut costs of pipe-hanger and support-system design

Here is how a large engineering firm is increasing efficiency and saving calculation time, while reducing chances of error, in both fossil and nuclear piping systems, where $13,000,000 may be price for support elements

By G T Kitz and S Zidonis, Sargent & Lundy

Depending on design requirements, a typical 600-MW fossil plant will have from 4000 to 7000 pipe-support elements, with an installed cost of about $2-million. An 1100-MW nuclear unit will need about 10,000 support elements, costing about $13-million installed.

Although extensive standardization is possible, each support considered as a system is a unique design, requiring a unique drawing and a separate set of design calculations. This is one of the main contributors to the high cost; revision is another major factor in cost. Every time a piping system is revised, for any reason, every hanger on that system may also require revision.

The hanger-design process is not simple. It is complex and tedious, involving many disciplines at the A/E firm, at the hanger manufacturing plant, and at

Seven elements make up all supports, from simplest to most complicated

Three types of hangers keep pipe in position vertically. The rigid hanger goes into cold-fluid systems or where designers expect only negligible vertical thermal movement. The variable-support hanger can accommodate no more than 3/4 in. vertical thermal movement. A constant-support hanger can be installed to handle larger movement.

Guides and limit stops are elements that are attached to the building structure to prevent all pipe motion in a given direction. A sway brace is a preloaded spring device to reduce or dampen vibration in a system. This element goes predominantly into cool-fluid systems.

The rigid strut will restrain all pipe movement along the axis of the strut. Motion, in this direction, from weight, vibration, and thermal effects is prevented. Cold-fluid systems are the principal application for this type of support.

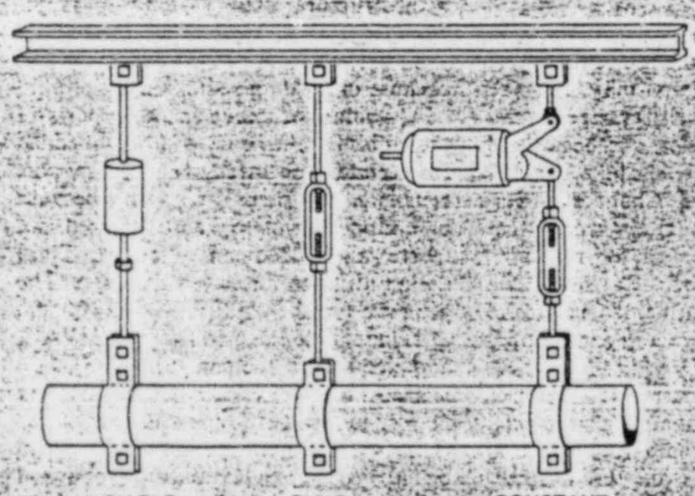
The snubber of either mechanical or hydraulic type is the final basic element. It allows low-velocity motion, under 2 cycles/sec, such as occurs during thermal expansion, but the device locks rigidly under a rapid excitation, such as earthquake-induced vibration.

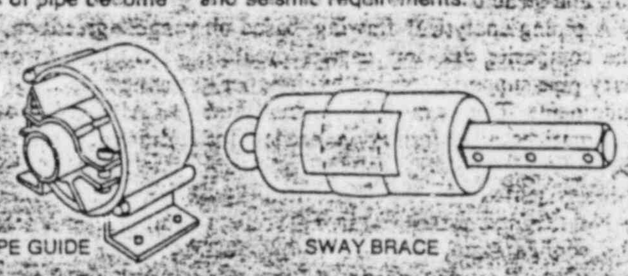
Several different methods of element attachment to the pipe are possible. The methods of attachment to the building structure are almost infinite in number. Fig. 4, at upper left on the next page, shows three support variations possible with a variable-support hanger.

The simplest design in the figure, with a variable support and pipe clamp, often is chosen to support a horizontal run of pipe. Pipe risers or vertical runs of pipe become more complicated, because two variable-support hangers are required in the typical arrangement, along with attachments welded to the pipe itself.

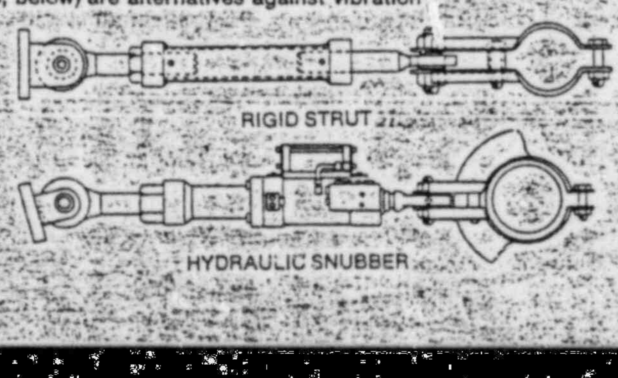
The last example in the figure can serve to support a pipe riser but is less desirable than the previously mentioned arrangement, because it requires a welded lug on the elbow. The high stress concentrations resulting from the lug keep this type of support from service on a critical hot system, although it would be acceptable on a cold low-pressure system.

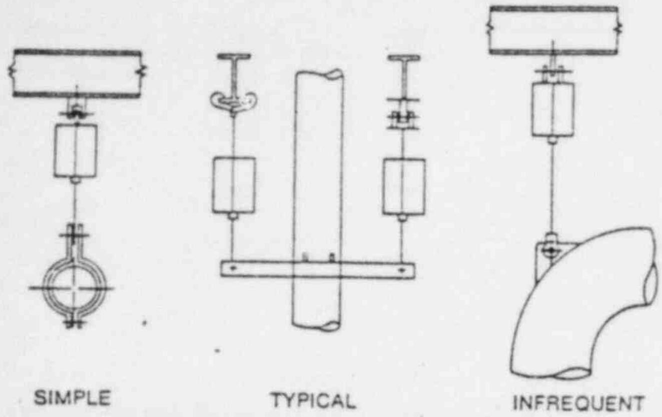
Any of the typical configurations can support pipe in either nuclear or fossil plants. In general, however, fossil plants have more room available and present fewer loading conditions than for nuclear, which have conflicting thermal-expansion and seismic requirements.

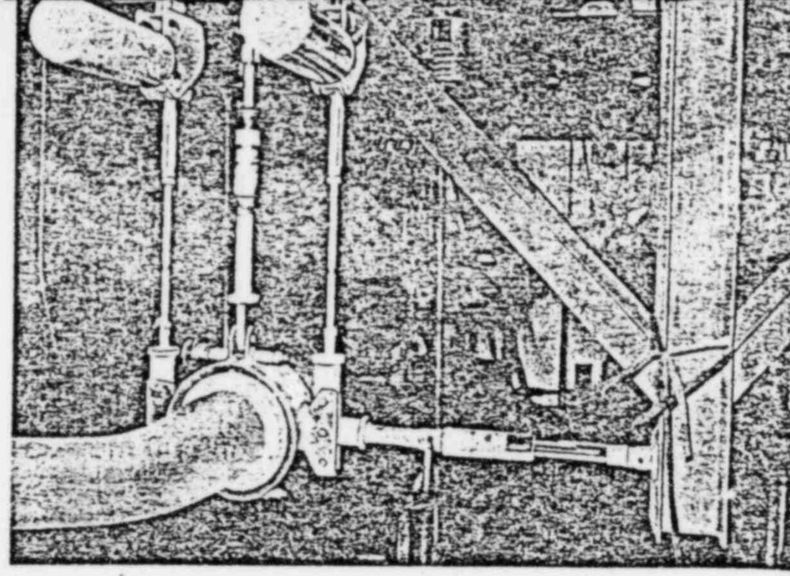




Pipe hangers (1, left) support pipe in vertical direction. Amount of expected thermal movement influences choice of type. Pipe restraints (2, above) counter vibration. Rigid struts and snubbers (3, below) are alternatives against vibration







Variable-support hangers (4, above) take several different configurations. For a nuclear plant, designs are more complex (5, right), because of space limitations and loading conditions

the site. The process is iterative, continuing until the plant goes operational.

Improvements in the process come from reduction of unnecessary interfaces, standardization of designs, and bettering of design procedures. Reduction of engineering cost per hanger and also of operating problems results.

Let's look now at design factors, new requirements imposed in recent years, and man-hour-saving innovations in use.

Support-design process

The piping-support design process (Fig 6) starts with the general arrangement (GA) drawings established for the plant. These drawings determine the lineal footage of pipe, and indicate whether it can be supported conveniently. After the GA drawings and piping and instrument diagrams (P&ID) are available, work begins on composite drawings and piping analysis.

Piping-system layout to avoid physical interferences with the mechanical, electrical, or structural components is done on composite drawings, which must be checked against the mechanical, electrical, and structural drawings.

A piping analytical drawing, based on the composite drawing, carries preliminary pipe supports, located by designer's judgment. This drawing records and summarizes all information needed for piping-system stress analysis to determine system-support configuration.

Next, single-system drawings reflect the configuration, modified as needed. Reanalysis may be needed if analysis assumptions and the final hanger locations differ significantly. When analysis is satisfactory and support locations assured, system drawings are completed and released for fabrication. Support details follow.

Interfaces enter picture

Up to here, the design process seems simple and straightforward, but now interfaces complicate matters (refer to the sequence in Fig 6). When a nuclear steam-supply-system contract is awarded and work starts on plant P&IDs and GAs, data must come from the client, the NSSS vendor, and every major design discipline in the A/E firm.

Once the GAs are settled, work can start on the building analysis, which includes seismic work. Piping layout and composite drawings, start, too. All through this process, continual interfacing deals with interferences as they arise. An example: estimated support loads are needed before structural steel and embedment steel are released for procurement. This information dissemination, occurring as the composite drawings take form, precedes work on the analytical drawings. Also, before piping analysis can start, building seismic analysis must be in, giving the required dynamic input for piping stress analysis.

Modifications during analysis may be necessary to satisfy the system's stress allowables. The designer checks changes to detect interferences with components. He may have to reinforce steel or add new members or embedments to carry the loads. With the final restraint package agreed on, system release occurs, and the hanger designer can complete hanger details.

Although most changes will be in the drawings released for fabrication and erection, modifications may still be needed because of field changes stemming from interferences, and because of field erection tolerances. These changes can be accommodated. Changes in definition of a loading condition are another and more serious reason for modification—more serious because they often affect all systems in a plant. Changes of this type are often regulatory in origin.

Support-design approaches

With all design changes in, the final design loads are released for structural design. Ideally, the structural designer should be able to select proper beams, embedment plates, and so on, on the basis of the final loads, but this is not always possible. To understand why, we must backtrack a little in the design process for a nuclear plant.

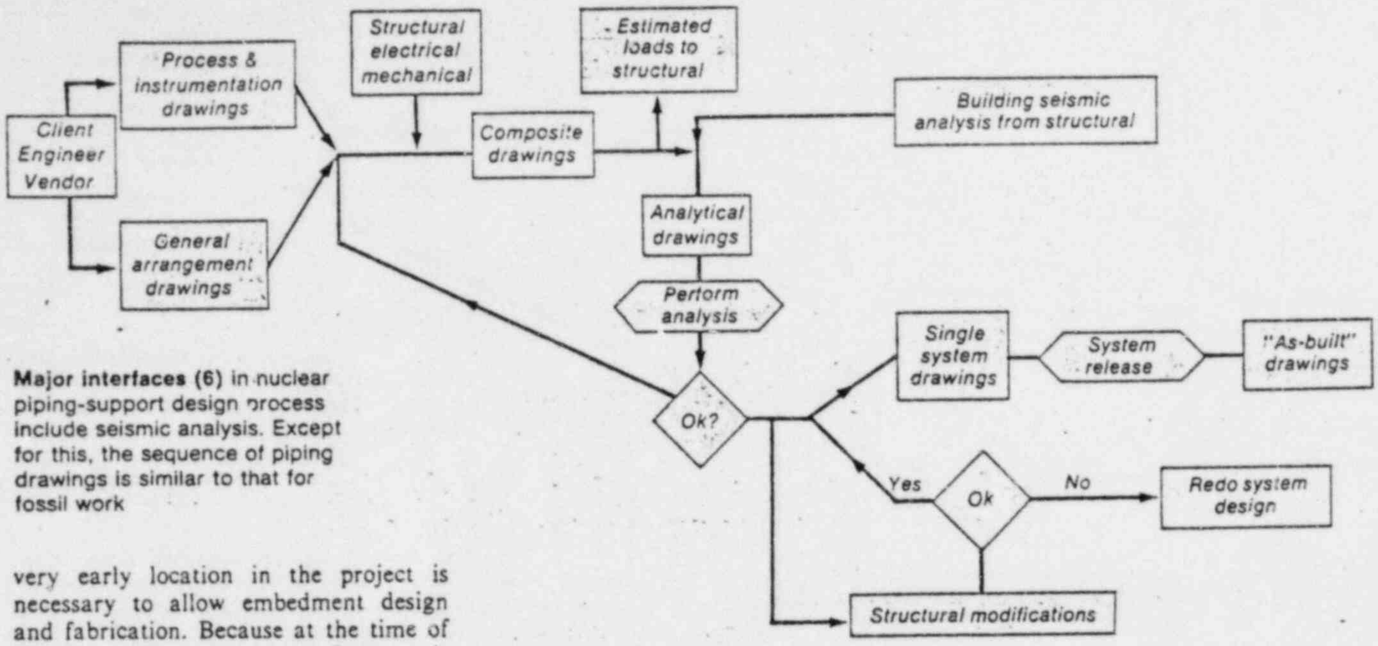
Start of the piping analysis requires information on containment design. For example, when the embedment loads are being estimated, building seismic responses are preliminary or unavailable. Effect of the loads on piping, and the size and location of the resulting support loads, must be estimated.

If significant changes come after load definition or in pipe routing, the design can become a patchwork, as in Fig 7. There the areas outlined by the channels are pipe-load support embedment plates in the containment liner. The channels are leak-test channels to test welds.

One way to reduce this problem is positioning of belly bands—strips of 1/2-in. steel instead of the usual 1/4-in.—in containment areas of possible high support-load density. The designer can place a support anywhere on the band of steel. In Fig 8, belly bands are just above and below the penetrations. Top and bottom of these bands are also heavily reinforced, and designers can bridge between the heavily reinforced areas with structural steel to carry a larger load. Although belly bands require more steel initially, they have cut some costs because of welding reduction.

A similar technique in other parts of the building relies on a grid of embedded steel plates for attachment of support elements. This saves design time because pipe supports will be where required, not where an embedment dictates. Total design time to be saved is large. The estimate for one plant is 75,000-100,000 attachments to the grid for pipe, HVAC, and electrical-cable pan supports.

Pipe-whip restraints are supporting devices to restrain a pipe after postulated failure or rupture. Restraining forces can be up to several hundred thousand pounds. Because the restraints are large,



Major interfaces (6) in nuclear piping-support design process include seismic analysis. Except for this, the sequence of piping drawings is similar to that for fossil work

very early location in the project is necessary to allow embedment design and fabrication. Because at the time of location pipe routing is not firm nor is piping analysis complete, the necessary high margin for error requires many rupture restraints. The restraints take up valuable space ordinarily occupied by other support elements near relief valves or elbows.

Standardizing design

In the past, when an A/E firm was responsible for detailed design of only a few hundred supports, each support could have an individual design. With 10,000 supports, this is no longer feasible. At Sargent & Lundy, approximately 300 configurations, most with detail drawings like Fig 10, meet the need.

A computer program that for certain standard hanger types will select and size the hanger components and print out a bill of material is a recent development at Sargent & Lundy. This program simplifies the design process by completing the design calculations for the majority of the hangers.

The program gives the designer a limited menu of piping attachments or lower subassemblies, as well as structural attachments or upper assemblies. When one of each is picked and the appropriate input specified, the program will size the components, performing design calculations, and print out the bill of material.

This program will design approximately 75% of all hangers in a nuclear plant, but it cannot handle all possible configurations. Interferences are still to be checked by the designer.

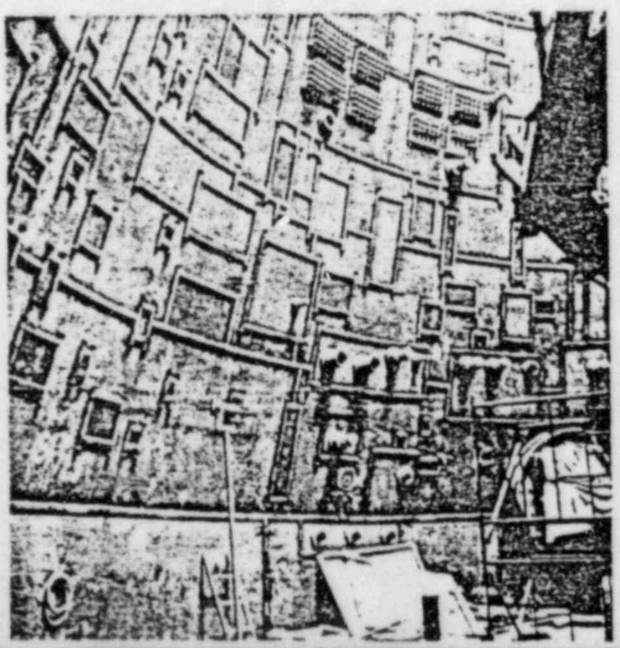
The support-design program has speeded up the hanger-design process considerably, in spite of the extra burden represented by depiction of pipe, HVAC, and electrical support locations and loads on special hanger-load drawings. The program is a "visual" for the support designs of nuclear plants, and provides the documentation to satisfy ASME Section III and NRC requirements. It also eliminates most chances for error in the bill of material and hanger-design calculations.

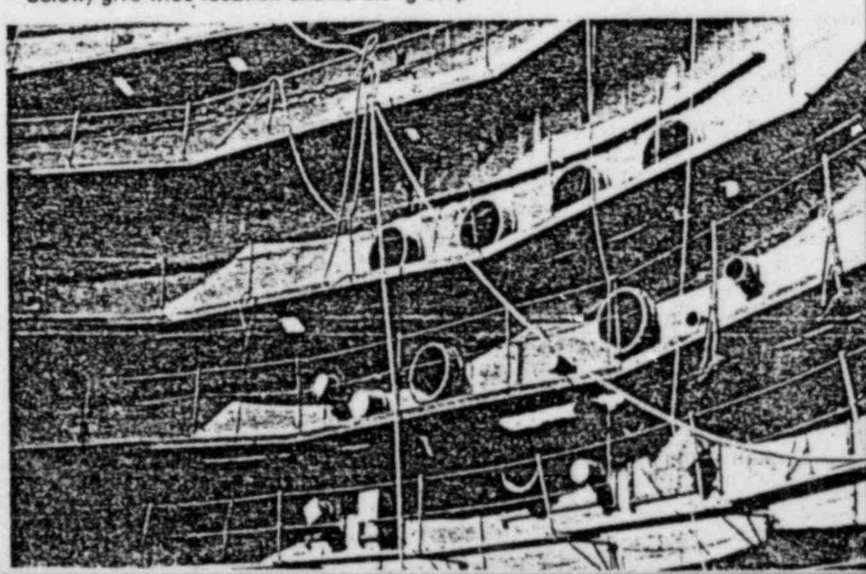
Concurrently with the support-design program, the designer uses "washout drawings" when he draws hanger details. These drawings are transmitted to the hanger vendor, who can "wash out" the Sargent & Lundy title block, add his own information, and then issue the drawings to his shop for fabrication. Previously, checking a vendor drawing for interferences took as long as designing the support.

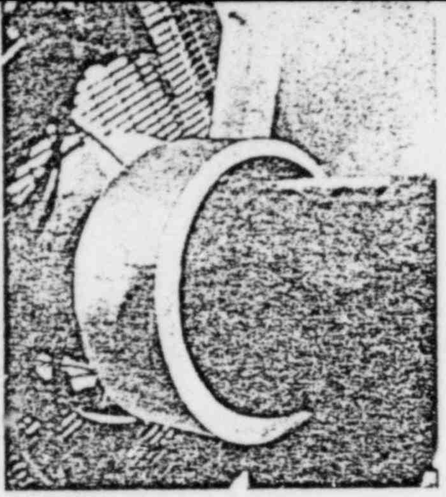
Another advantage is the reduction in time. No longer is the one-to-three month period needed to send a drawing to the vendor, have him design it, and then return a copy for review.

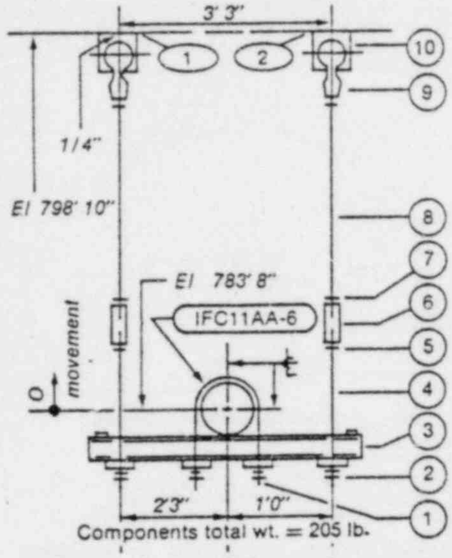
The pipe-support list (PSLIST) is a second major program in use by Sargent & Lundy. This program sorts, accumulates, totals, and lists pipe supports, such as whip restraints, hangers, and snubbers, during design and after release for

Container liner embedment plates (7, left) can be changed after later analysis. Bands of heavier steel just above and below penetrations (8, below) give wide location choice along strip









Pipe-whip restraint (**9**, above) is 1½-in. thick band around a 12-in. feedwater line. Standard hanger drawing (**10**, right) is one of 300 required for computer program

fabrication. Data can be sorted 52 different ways, and the program results will track the design and installation effort.

One typical sort could be by building, status, and hanger type. Alternatively, to determine the hanger-design status relative to the construction of a certain area, the sort could be by area or elevation. PSLIST is a tool to monitor progress and to assess design-manpower allocation.

Impact of ASME/NRC demands

Many of the procedures and programs discussed so far either originated or underwent modification because of NRC and ASME requirements. Although these requirements, escalated greatly from 1967 through 1974, now seem to be stabilizing, there are still a few areas where some expansion of the regulatory requirements is expected.

The NRC mechanical engineering branch (MEB) has issued a draft working paper on snubbers. Although it's currently limited to hydraulic snubbers, there's a good chance it will expand to include mechanical snubbers. If implemented, the paper would affect not only the inspection of snubbers on operating plants but also the analysis.

The MEB document classifies snubbers as active or passive, and implies that a piping system would have to be able to withstand the loss of an active snubber. One implication of this is that the piping-system design would have to take account of a snubber that failed in the rigid mode, because this failure would seriously affect thermal expansion. Industry has commented on the document, and NRC is considering comment.

Similarly, NRC began recently to distinguish between "seismic" snubbers, which are those required for safety category I considerations, and vibration snubbers, those not required to satisfy category I. The impact of the changes is not clear yet. In another area, NRC is beginning to require more-detailed preoperation records for the "as-built" condition of the piping and supports.

In the latest addendum to Section III, an important change concerns the part of the support element that has to be designed to Section-III requirements. In effect, the change requires that everything on the hanger detail drawing be designed per Section-III requirements. Everything else must be designed to some acceptable design code, such as the American Institute for Steel Construction code. This simplified the design and documentation requirements.

A one-year review period was completed in July 1977 for the proposed ANSI B31.1 power-piping addenda. This document, now under committee review, could require as-built documentation and periodic inservice inspection for piping supports. The exact format—whether mandatory or nonmandatory appendix—is not known yet.

Several years ago, the Committee on Operation and Maintenance of Nuclear Plants, a new main committee, began in ASME under the auspices of Nuclear Codes & Standards. One subcommittee, on vibration monitoring, currently is writing an ANSI standard on preoperation and inservice vibration monitoring of piping. The intent is to have this industry standard define requirements for vibration qualification of nuclear piping before NRC does. Both piping and piping supports will be affected by the standard to unknown extent.

The immediate effect of the design innovations described above has been to reduce by 40% the mechanical-design effort that was required for support design in 1970. In addition, many of the newer qualification and documentation requirements also are being satisfied. This was accomplished while the manhours needed by the vendor for design were eliminated or greatly reduced.

Over the past several years, design loads imposed on nuclear plants, such as the operation-basis earthquake, have increased significantly, and the analysis and design process have become more sophisticated. The techniques are now applied to many piping systems that previously were field-supported, using conservative approximations. The changes in the analysis and design process have significantly reduced the number of supports required.

With these fewer supports required, and with resulting loads less conservatively defined, three savings are realized. First, hangers and supporting steel can be smaller. Second, there are fewer operating problems because there are fewer supports. Third, supports are now engineered for all expected loads, so there will be fewer problems in the future.

Edited by William O'Keefe

Further design-process upgrading coming

Better engineered piping systems and supports will help satisfy emerging interests of ASME and NRC in operation and maintenance. In other areas, their requirements appear to be stabilizing. The authors' firm is reviewing the hanger design process with an eye to further reductions in engineering costs to follow the reductions from computerized support-design and the PSLIST program.

The first improvement is to be computer-aided drafting (CADR). In addition, the support-design program is being modified to draw the hanger details and print the bill of material on each drawing. Once this modification is done, the piping-analysis program can be linked to the hanger program to tie the analysis and hanger-design procedures together. This will assure that design information is correct at all times, and will eliminate the possibility of incorrect transfer of design data. CADR and the linkage can be achieved relatively easily, and both will help reduce the design cost.

The next step will occur when the CADR system creates the single-system drawings. CADR will then both define the piping analytical drawing and generate the information required for system analysis. This step will significantly reduce the 40 man hours now needed to code a piping system for analysis. Once the piping system has been analyzed and found acceptable, the single-system drawing may be modified automatically to incorporate any required changes. Although the program would not be able to check for interferences, it would considerably reduce the drafting time involved. The hanger-location plan is another possibility for computer drawing in the future.

CPPE INDOCTRINATION
COURSE OUTLINE

ATTACHMENT E

1. INTRODUCTION. ATTENDANCE SHEET

2. SLIDE SERIES

   A. 10CFR50, APPENDIX B
   B. QA CRITERIA - AFFECTED GROUPS

3. SPECIFIC CPSES REGULATORY COMMITTMENTS:

   A. PSAR
   B. FSAR - "AS-BUILT" PSAR
   C. DRAFTS

4. CPSES ORGANIZATION

   A. TUSI V. TUGCO INTERFACE
   B. QA RESPONSIBILITY
   C. NRC V. OWNER (10CFR50, B)

5. ASME CODE RESPONSIBILITY - BROWN & ROOT

6. EVOLUTION OF THE CODE

   A. CODE UPDATE
      1) ADDENDA
      2) EDITIONS
      3) DIVISION I V. DIVISION II
      4) GENERAL REQUIREMENTS - NA V. NC and NCA (1977)
   B. DATE OF EFFECTIVE EDITION/ADDENDA
      1) DATE OF CONTRACT
      2) ENGINEERING SPEC/SYSTEM
   C. CODE DEVIATIONS
      1) CODE INTERPRETATIONS
      2) CODE CASES - APPLICABILITY
      3) REG. GUIDE 1.84/85
         a. PRE MAY, 1980
         b. CURRENT PROCEDURE

7. DESIGN CONTROL - ANSI N45.2.11

   A. CONTROL OF ORIGINAL DESIGN
   B. CONTROL OF DESIGN CHANGES
   C. CONTROL OF FIELD DESIGN CHANGES

8. RECORD REQUIREMENTS

9. CPSES - SYSTEM UNIQUENESS

   A. N-3 DATA FORM - OWNER
   B. N-5 DATA FORM - INSTALLER (B&R)
   C. IMPACT OF N-5 FOR ENTIRE SYSTEM

10. SAFETY

DATE 9 July 81 PAGE 1 OF 1

COURSE: CPPE INDOCTRINATION PROGRAM

SUBJECTS: INTRODUCTION TO NUCLEAR CODES AND STANDARD
INTRODUCTION TO QA RECORDS
SAFETY ORIENTATION

LOCATION: Classroom

	NAME	ORGANIZATION
1	Mark Walsh	Tech. Serv.
2	Jerri L. Brenner	Field Mech Eng.
3	Ivan Bertsch	Civil
4	SHAILESH DESAI	structural Engr.
5	Roy Nickum	Technical Support
6	Jerry Richards	Special Projects
7	Nancy Lynn Bullington	FIELD MECH Eng.
8		
9		
10		
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12		
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INSTRUCTOR RPBaker
9 July 81

cc: CPP Engineer

- Mechanical Design	✓	Safety	✓
- Civil/Structural	✓	Training	✓
- I&C		Technical Support Group	✓
- Electrical		Special Projects	✓
- Field Mechanical	✓	Procurement	

DATE 2 April 82 PAGE 1 OF 1

COURSE: CPPE INDOCTRINATION PROGRAM

SUBJECTS: INTRODUCTION TO NUCLEAR CODES AND STANDARD
INTRODUCTION TO QA RECORDS
SAFETY ORIENTATION

LOCATION: Classroom 4

	NAME	ORGANIZATION
1	BOGUSLAW BRZUZEK	CIVIL/STRUCTURAL
2	STEVE BOSTIAN	CIVIL/STRUCTURAL
3	MOHAMMAD H. JOODI	TECHNICAL SERVICES
4	JACK DOYLE	TECHNICAL SERVICES
5	Sam Khazzoum	TECHNICAL SERVICES
6	SAMIR CHAKRABARTI	CIVIL/STRUCTURAL
7	Jackie Woody	Purchasing
8	HOWARD NORRIS	DAMAGE STUDY
9	Rick Tillman	DAMAGE STUDY
10	S. M. A. HASAN	TECHNICAL SERVICES
11	Ram Hemrajani	Technical Services
12	Debbie Keeton	TS / Stress Anal. Coord.
13	Billy D. [illegible]	TS / STRESS ANAL. CORD.
14		
15		
16		
17		
18		
19		
20		

INSTRUCTOR
RPBaker 2 April 82

cc:				
CPP Engineer	- Mechanical ~~Design~~	✓	Safety	✓
	- Civil/Structural	✓	Training	✓
	- I&C		Technical Support Group	
	- Electrical		Special Projects	
	~~- Field Mechanical~~		Procurement	✓

CPSES
Project Engineering Indoctrination Program
TECHNICAL SERVICES - FILE

NAME: MARK WALSH

DOCUMENT:

GROUP A

1. 10CFR50, Appendix B
2. TUGCO/TUSI CPSES QA Plan
3. 10CFR50.55(e) and CP-QP-16.1
4. ANSI N45.2
5. ANSI N45.2.11
6. Comanche Peak Engineering Manual (as applicable)
7. FSAR 17.1

GROUP B

1. FSAR (applicable discipline information)
2. ANSI N45.2.9
3. ANSI N45.2.10
4. ANSI N45.2.12
5. Reg. Guide 1.28
6. Reg. Guide 1.29
7. Reg. Guide 1.64

I have read the above documents in accordance with CP-EP-2.0

GROUP A — Signature: Mark Walsh — Date: 7-7-81

GROUP B — Signature: Mark Walsh — Date: 7-7-81

CPSES
Project Engineering Indoctrination Program
TECHNICAL SERVICES - FILE

NAME: JACK DOYLE

DOCUMENT:

GROUP A

1. 10CFR50, Appendix B
2. TUGCO/TUSI CPSES QA Plan
3. 10CFR50.55(e) and CP-QP-16.1
4. ANSI N45.2
5. ANSI N45.2.11
6. Comanche Peak Engineering Manual (as applicable)
7. FSAR 17.1

GROUP B

1. FSAR (applicable discipline information)
2. ANSI N45.2.9
3. ANSI N45.2.10
4. ANSI N45.2.12
5. Reg. Guide 1.28
6. Reg. Guide 1.29
7. Reg. Guide 1.64

I have read the above documents in accordance with CP-EP-2.0

GROUP A — Signature: Jack J Doyle — Date: 12/31/81

GROUP B — Signature: Jack J Doyle — Date: 12/31/81

PIPE SUPPORT ENGINEERING ATTACHMENTS

FORM DHE-5

TEXAS UTILITIES SERVICES INC
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date: 1-12-83
Calc By: JVV
Chk'd/Apprd By: REP
Subject: FW-1-017-714-C52R REV. 0

Filing Code: ______
Sheet No. 27 of ~~44~~ 48
G & H Job No. 2323
Ref. Dwg./Spec. No. ______

REF.

SHEAR CHECK

$\sigma_v = 2\left[\frac{2714}{8.0}\right] = 679$ PSI $\leq$ 14,200 PSI (OKAY) — ENGINEERING GUIDELINES SECT III R. 3 PG. 3/42

AXIAL & BENDING

$Kl/r = 2.1(5.0)/3.0 = 3.5 \leq 200$ (OKAY) — ENGINEERING GUIDELINES SECT. III R3 PG. 35/42

$Kl/r = 3.5 \rightarrow F_A = 22,140$ PSI

$\sigma_{AXIAL} = P/A = 18090/14.4 = 1256$ PSI

$\frac{f_a}{F_A} = \frac{1256}{22,140} = .057 \leq .15$

$\therefore \frac{f_a}{F_A} + \frac{f_{b_x}}{F_{b_x}} + \frac{f_{b_y}}{F_{b_y}} \leq 1.0$

$.057 + \frac{13570/32.9}{22,300} + \frac{13570/32.9}{22,300} \leq 1.0$ — ENGINEERING GUIDELINES SECT III R. 3 PG. 2/42

$.094 \leq 1.0$ (OKAY)

D LEVEL

$\sigma_{AXIAL} = 227,000/14.4 = 15,764$ PSI $\leq 22,140$ PSI (OKAY)

$f_a/F_A = 15,764/22,140 = .71 \leq 1.0$ (OKAY)

UPPER T.S. FRAME

1.) ALREADY QUALIFIED IN SHEAR

2.) BENDING & NORMAL

$\frac{kl}{r} = \frac{2.1(16.9^{"}\text{cons.})}{3.03} = 11.74$

$F_A = 21.72$ ksi

level C (cons.) w/ FRICTION

$M_y = M_z = 16.9375(2714) = 45969$ in#

$f_a/F_A = \frac{18090/14.4}{21,720} = .058 < .15$

1/2" x 8" x 8" T.S. IS SATISFACTORY

$\therefore .058 + \frac{45969/32.9}{29600} + \frac{45969/32.9}{29600} = .15 < 1.0 \therefore$ O

Level D. $227000/14.4 = 15764$ psi < 21720 psi

REF.

SHEAR CHECK

$\sigma_v = 2\left[2714/8.0\right] = 679\ PSI \leq 14{,}800\ PSI$ (OKAY)

ENGINEERING GUIDELINES SECT III R. 3 PG 2/42

AXIAL & BENDING

$Kl/r = 2.1(5.0)/3.03 = 3.5 \leq 200$ (OKAY)

$Kl/r = 3.5 \rightarrow F_A = 22{,}140\ PSI$

ENGINEERING GUIDELINES SECT. III R3 PG 35/42

$\sigma_{AXIAL} = P/A = 18090/14.4 = 1256\ PSI$

$\dfrac{f_a}{F_A} = \dfrac{1256}{22{,}140} = .057 \leq .15$

$\therefore \dfrac{f_a}{F_A} + \dfrac{f_{bx}}{F_{Bx}} + \dfrac{f_{by}}{F_{By}} \leq 1.0$

$.057 + \dfrac{13570/32.9}{22{,}300} + \dfrac{13570/32.9}{22{,}300} \leq 1.0$

ENGINEERING GUIDELINES SECT III R 3 PG 2/42

$.094 \leq 1.0$ (OKAY)

"D" LEVEL

$\sigma_{AXIAL} = 227{,}000/14.4 = 15{,}764\ PSI \leq 22{,}140\ PSI$ (OKAY)

$f_a/F_A = 15{,}764/22{,}140 = .71 \leq 1.0$ (OKAY)

UPPER T.S. FRAME

SHEAR — MEMBER ALREADY QUALIFIED FOR SHEAR STRESS

AXIAL & BENDING

$Kl/r = 2.1(16.9)/3.03 = 11.74$ (CONSERVATIVE) $\rightarrow F_A = 21{,}720\ PSI$

ENGINEERING GUIDELINES SECT III R. 3 PG 35/42

LEVEL "C" W/ FRICTION (CONSERVATIVE)

$M_y = M_z = 16.9375(2714) = 45969$ IN-#

$f_a/F_A = \dfrac{18090/14.4}{21{,}720} = .058 \leq .15$

$\therefore .058 + \dfrac{45969/32.9}{29600} + \dfrac{45969/32.9}{29600} = .15 \leq 1.0$ (OKAY)

ENGINEERING GUIDELINES SECT. III R. 3 PG. 2/42

LEVEL "D"

$\sigma = 227000/14.4 = 15{,}764\ PSI \leq 21{,}720\ PSI$ (OKAY)

FORM DHE-6
REV. 2

JOB NAME T.U.S.I.

PACKAGE TITLE 18" FW-1-17-1303-2

DRAWING NO. FW-1-017-714-CS2R REV 0

PIPE SUPPORT ENGINEERING DESIGN VERIFICATION CHECK LIST

	YES	NO	N/A
1. Were the design inputs correctly selected and are they incorporated into the design	✓		
2. Is the output reasonable compared to inputs	✓		
3. Are the applicable codes, standards, references and/or design guidelines identified and were their requirements met	✓		
4. Are assumptions adequately identified, described and reasonable	✓		
5. Was an appropriate design method used	✓		
6. Was constructability, accessibility & interferences adequately considered	✓		
7. Are the specified components suitable for the required application.	✓		
8. Are the specified materials compatible with each other and the environmental conditions to which they will be exposed	✓		
9. Are material/component identification requirements adequate	✓		
10. Was impact test requirement considered			✓
11. Was inservice inspection requirements considered	✓		
12. Are location plan, co-ordinate system, pipe size, elevation, steel sizes, and dimensional build-up adequate or correct	✓		
13. Are all design loads and movements specified on the drawing	✓		
14. Was proper weld type and sizes specified	✓		
15. Is P.E. sign off required			✓
16. Are general notes adequate for the design	✓		
17. Are coating requirements specified	✓		
18. Are calculation sheets/drawings properly identified and initialed or signed	✓		
19. Were the design interface requirements satisfied	✓		
20. Was insulation thickness considered	✓		
21. Is correct code class and type of support indicated	✓		
22. Have open items been added to the punch list			✓

Checked by: RCP

Date: 1/24/83

The above (Mark Number) design package is in accordance with TUSI design guidelines and applicable codes. Design Verified By:

Print Name: Robert Ruff

Signature: Robert Ruff

Date: 1/24/83

FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3-30-83
Calc By BB
Chk'd/Apprd. By KWA 4/14/83
Filing Code
Sheet No. 26 of 26
G & H Job. No. 2323
Subj [redacted] Ref. Dwg./Spec. No.

[redacted]

Fallow = 22,900 psi > 5544.37 - 5585.2
LEV. 'B'

[redacted]

MEM 11 $(4 \times 8 \times \frac{1}{2})$, $r = 1.39$

$f_a = \frac{\text{Axial}}{A} = \frac{6629}{6.36} = 1042$ psi

$\frac{Kl}{r} = \frac{1(46)}{1.39} = 34 \Rightarrow F_a = 20760$ psi $> f_a$

$\frac{f_a}{F_a} = \frac{1042}{20760} = .05 < .15$ OK

Max shear $F_Y = 6655$# MEM 12 OK since $F_v = 15300$ psi LEV. 'B'

~~HANGER IS OK~~

CHECK PRINT

FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 2-30-83
Calc By [illegible]
Chk'd/Apprd. By KWA 4/14/83
Subject CC-1-041-723-F63R Rev 1 [illegible]

Filing Code
Sheet No. 26 Of 26
G & H Job. No. 2323
Ref. Dwg./Spec. No.

REF PSE GUIDELINES SECT VII p. 3

CHECK MEMBER STRESSES

MAX NORMAL = 5544.3 psi @ MEM 12

MIN. NORMAL = -5585.2 psi @ MEM 12

$F_b = 22900^{psi}$ (LEV.B) > 5544 > 5585 OK

f_a = AXIAL/A = 6629/6.36 = 1042 psi (MEM 10, T.S. 4×4×½ r = 1.39)

$K\ell/r = 1(46)/1.39 = 34$

$\Rightarrow F_a = 20760^{psi}$

$f_a/F_a = \frac{1042}{20760} = .05 < .15$ OK

MAX SHEAR $F_V = 6655^{\#}$ (MEM 12) O.K SINCE F_V = 15300 psi (LEVEL B)

DEFLECTION:

$\Delta_Y = 0.00269$ in (JT 2, LD. CASE 9) < 1/16" OK

$\Delta_X = 0.00478$ in (JT. 13, LD. CASE 8) < 1/16" OK

HANGER IS O.K

FORM DHE-6
REV. 2

JOB NAME COMANCHE PEAK S.E.S.

PACKAGE TITLE CC-1-021-723-E03R REV 1

DRAWING NO. AB-1-062X REV. 1, CALC 46156 REV 3 & VCDI

PIPE SUPPORT ENGINEERING DESIGN VERIFICATION CHECK LIST

	YES	NO	N/A
1. Were the design inputs correctly selected and are they incorporated into the design	✓		
2. Is the output reasonable compared to inputs	✓		
3. Are the applicable codes, standards, references and/or design guidelines identified and were their requirements met	✓		
4. Are assumptions adequately identified, described and reasonable	✓		
5. Was an appropriate design method used			✓
6. Was constructability, accessibility & interferences adequately considered			✓
7. Are the specified components suitable for the required applications			✓
8. Are the specified materials compatible with each other and the environmental conditions to which they will be exposed	✓		
9. Are material/component identification requirements adequate	✓		
10. Was impact test requirement considered			✓
11. Was inservice inspection requirements considered			✓
12. Are location plan, co-ordinate system, pipe size, elevation, steel sizes, and dimensional build-up adequate or correct	✓		
13. Are all design loads and movements specified on the drawing	✓		
14. Was proper weld type and sizes specified	✓		
15. Is P.E. sign off required			✓
16. Are general notes adequate for the design			✓
17. Are coating requirements specified	✓		
18. Are calculation sheets/drawings properly identified and initialed or signed	✓		
19. Were the design interface requirements satisfied			✓
20. Was insulation thickness considered			✓
21. Is correct code class and type of support indicated	✓		
22. Have open items been added to the punch list			✓

Checked by: Kenneth W. Anderson

Date: 4/14/83

The above (Mark Number) design package is in accordance with TUSI design guidelines and applicable codes. Design Verified By:

Print Name: KENNETH W. ANDERSON

Signature: Kenneth W. Anderson

Date: 4/14/83

TEXAS UTILITIES GENERATING COMPANY
2001 BRYAN TOWER DALLAS, TEXAS 75201

R. J. GARY
EXECUTIVE VICE PRESIDENT AND GENERAL MANAGER

June 21, 1983
TXX-3691

RECEIVED
JUN 23 1983
Texas Utilities Services, Inc.
CPSES Const. Office

Mr. G. L. Madsen, Chief
Reactor Project Branch 1
U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76012

Docket Nos.: 50-445
50-446

COMANCHE PEAK STEAM ELECTRIC STATION
CLASS 1 MATERIAL DEFICIENCIES
QA FILE: CP-83-12, SDAR-112
FILE NO.: 10110

Dear Mr. Madsen:

On May 25, 1983 we verbally informed your Mr. R. G. Taylor of a deficiency regarding Class 1 support material which had not received all the NDE required of NF2500.

We have completed our investigation and concluded that the matter is not reportable under 10 CFR 50.55(e). Records supporting this determination are available for your Inspector's review at the CPSES site.

Very truly yours,

R. J. Gary

RJG:ln

cc: NRC Region IV - (O + 1 copy)

Director, Inspection & Enforcement (15 copies)
U. S. Nuclear Regulatory Commission
Washington, DC 20555

George	McBay
Merritt	J. Johnson — 1c
Hall	Popplewell
Hutchinson	Creamer
Calder	Kissinger
C. Wilson	Finneran — 1c
Murray	Norman
N. Smith	Bernier
Schoen	Davis
Hicks	
1c Gentry	R. Baker
	File

bcc: R. J. Gary (2)
B. R. Clements
D. N. Chapman
R. L. Ramsey
J. C. Kuykendall
R. A. Jones
J. T. Merritt
D. Frankum
H. C. Schmidt
B. S. Dacko
R. G. Tolson
R. G. Taylor
D. L. Kelley
F. B. Shants
J. B. George
M. R. McBay
Terri Smart

CPPA-31,240

TEXAS UTILITIES SERVICES INC.

OFFICE MEMORANDUM

To R. G. Tolson Glen Rose, Texas June 15, 1983

Subject COMANCHE PEAK STEAM ELECTRIC STATION
SDAR CP-83-12
CLASS 1 MATERIAL DEFICIENCIES
REF: 1) TUQ-1681

The following is submitted in response to the subject potentially reportable deficiency forwarded per Reference 1. The concern was initiated by vendor (NPSI) notification that certain Class 1 materials supplied to CPSES did not receive all NDE specified per NF-2500 of the ASME Code.

Our evaluation has indicated that none of the referenced material has been used in applications which exceed 55% of the allowable loads indicated in the Load Capacity Data Sheet for emergency conditions. In addition, no material has been installed on more than one pipe support on the same line and restraining direction. In the event the hardware did fail, the failure of a single support would not result in the breach of a pressure boundary.

Even though the material will be replaced, we have concluded the conditions do not constitute a safety issue and is not reportable under the provisions of 10CFR50.55(e).

Please contact this office if additional information or clarification can be provided.

M. R. McBay
M. R. McBay
Engineering Manager

MRM/JCF/RPB/cp

cc: ARMS
J. B. George
J. T. Merritt
J. D. Hicks/R. D. Gentry
R. Wright
D. N. Chapman
G. R. Purdy

George	McBay
Merritt	J. Johnson
Hall	Popplewell
Hutchinson	Creamer
Calder	Kissinger
C. Wilson	Finneran
Murray	Norman
N. Smith	Bernier
Schoen	Davis
Hicks	
Gentry	R. Peter
	File

TXX-1681 MRM

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To J. B. George

Glen Rose, Texas May 26, 1983

Subject Comanche Peak Steam Electric Station
CP-83-12

RECEIVED
JUN 01 1983
Texas Utilities Services, Inc.
CPSES Const. Office

The attached form documents a deficiency recently verbally reported to the NRC. Please assign an engineer to evaluate this deficiency working directly with the undersigned to resolve this problem.

We need to jointly determine by June 15, 1983, if this deficiency is formally reportable under 10CFR50.55(e).

Thank you for your cooperation.

Barbara Lancaster
for R. G. Tolson
TUGCO Site QA Supervisor

RGT/bll
Attachment
cc: D. N. Chapman
B. C. Scott
C. T. Brandt
G. R. Purdy
M. R. McBay
J. D. Hicks

George	McBay
Merritt	J. Johnson
Hall	Popplewell
Hutchinson	Creamer
Calder	Kissinger
C. Wilson	Finneran
Murray	Norman
N. Smith	Bernier
Schoen	Davis
Hicks	
Gentry	R. Baker
	File

DESIGN/CONSTRUCTION
SIGNIFICANT DEFICIENCY ANALYSIS REPORT

I.D. NUMBER 112

UNIT	STRUCTURE	SYSTEM	COMPONENT	SAFETY CLASS
1 & 2	~~Unknown~~	Varies	Support Materia	I

Description of Deficiency:

See DRR # 018 attached

○ Design
○ Construction
⊗ Procurment

Identified by	Time	Date	TUCCO QA Notified	Time	Date	Format
TUSI	—	5/25/83	B.C. Scott	5/25/83	2:30	written

ANALYSIS:

1. Preliminary engineering analysis indicates safety of plant operations adversely affected had deficiency gone undetected. ○ YES ○ NO ⊗ UNKNOWN
   Explain briefly:
   Additional Analysis Required

2. Deficiency considered significant ⊗ YES ○ NO Potential
   a. Generic implications on other plants ○ YES ○ NO Unknown
   b. QA Program Breakdown ○ YES ○ NO Possible
   c. Design per SAR performance criteria ○ YES ⊗ NO
   d. Construction not as specified and extensive evaluation or repair required to meet design criteria. ○ YES ⊗ NO
   e. ~~Construction~~ Deficiency discovered after QC acceptance ⊗ YES ○ NO
   f. Could deficiency have gone undetected ⊗ YES ○ NO
   g. System test meets SAR performance criteria ○ YES ○ NO } N/A
   h. System test results require extensive evaluation and redesign ○ YES ○ NO } N/A
   i. System test failure can be corrected by internal adjustment or replacement with standard component ○ YES ○ NO } N/A
   j. Does deficiency require testing and analysis to answer part 1 above ⊗ YES ○ NO

CONCLUSION:

Deficiency reported ~~under 50.55(e)~~ to NRC ⊗ YES ○ NO

By: B.C. Scott
Date: 5-25-83
Time: 3:30 pm

NRC CONTACT	Date	Time	TUCCO REPRESENTATIVE	I.D. NUMBER
R.G. Taylor	5/25/83	3:30 pm	B.C. Scott	CP-83-12

cc: D.N. Chapman
J.T. Merritt
Functional QA/QC Manager/Supervisor G.R. Purdy, C.T. Brandt

DEFICIENCY REVIEW REPORT

DRR 018

Design ___
Construction ___
Procurement X

I. IDENTIFICATION

A. Description: Class 1 bolting and rod mat'ls have not recieved all NDE req'd per NB-2500

Date Ident. 5-25-83
Date Distr. 5-25-83

B. Basis: Vendor (NPSI) "part 21" notice letters (attached)

II. EVALUATION

	Yes	No	Unknown
A. Deficiency identified in construction process		X	
B. Deficiency violates technical specifications	X		
C. Deficiency requires further testing/evaluation	~~X~~	~~X~~	X
D. Deficiency generic on other plants			X
E. Deficiency warrants extensive rework		X	

III. PRELIMINARY CONCLUSION

	Yes	No	Potentially
Deficiency Reportable			X

IV. EVALUATION PERSONNELL

Identified By:

Name	Organization	NAME	ORGANIZATION
JC Finneran	QDOE - P&E		

V. COMMENTS

VI. APPROVED John C. Finneran Jr. — Organization Manager — Date 5-25-83

APPROVED M.R. McBay — Engineering & Construction Manager — Date 5-25-83

VII. DISTRIBUTION
ORIGINAL - FILE
cc: TUGCO Site QA Supervisor
Engineering & Construction Manager
JC Finneran
JJ Hicks
Roy Wright - Matl/Production Control

nps industries, inc.
one harmon plaza
secaucus, new jersey 07094
201 865-6550 telex 161435

NPSI-12-2240
May 19, 1983

RECEIVED
MAY 25 1983
Texas Utilities Services, Inc.
CPSES Const. Office

Texas Utilities Services, Inc.
P.O. Box 1002
Glen Rose, TX 76043

Attention: J. C. Finneran

Subject: Texas Utilities Gen. Co.
Comanche Peak Stm. Elec. Co.
Units 1 & 2
Purchase Order No. CPO046A.1

Subject: Nonconformance Class I Bolting Materials
Ref: NPSI-12-2239

Gentlemen:

This letter supplements my correspondence of May 16, 1983, NPSI-12-2239 regarding Class 1 bolting materials which required NDE per NF2500.

The panel that was convened for the purposes of determining if the deviation on the materials shipped to you in our previous correspondence was unable to evaluate the following item and therefore has not reported the deviation as part of our report to the NRC.

NA 870 Item 1 FHN-2¼"
Quantity 6 MIC #5640NB
No NDE performed SN #12431/TDA 2/17/83

We therefore request that you evaluate the deviation. Should you evaluate the deviation as a defect and report it to the NRC under provisions of 10CFR 50.55e, please advise us of this fact.

NPSI will arrange replacements for materials in a prompt and expeditious manner.

If you have any questions, or require additional information, please do not hesitate to call this office.

Very truly yours,

NPS INDUSTRIES, INC.

Herman W. D'Errico

Herman W. D'Errico
Project Manager

HWD:ml

cc: J. C. Finneran, TUSI OL, 1L
J. D. Hicks, TUSI, 1L
R. Maurici, NPSI QA, 1L

nps industries, inc.
one harmon plaza
secaucus, new jersey 07094
201-865-6550 telex 14-1035

NPSI-12-2239
May 16, 1983

RECEIVED
MAY 2 5 1983
Texas Utilities Services, Inc.
CPSES Const. Office

Texas Utilities Services, Inc.
P.O. Box 1002
Glen Rose, Texas 76043

Attention: J. C. Finneran

Subject: Texas Utilities Gen. Co.
Comanche Peak Stm. Elec. Sta.
Units 1 & 2
Purchase Order No. CP0046A.1

Subject: Nonconformance Class I Bolting Materials

Gentlemen:

In reference to the 10 CFR 21 telephone conversation with John Finneran of TUSI on May 13, 1983. The following is a listing of Class I bolting and rod materials that did not receive all the NDE required of NF 2500.

Bulk Sale Releases

Mark No.	Item	SN#/Date Shipped
1. NA-1209	ITEM #4 SRS-20-SO-QTY.5 NO NDE performed on 2½" eyerods	14606/TDA 11/11/82
2. NA-1228	ITEM #4 SRS-20-SO QTY.2 NO NDE performed on 2½" eyerods	14611/TDA 11/11/82

Supports

Mark No.	Item	SN#/Date Shipped
1. RC-1-007-001-C41R R.3	Sway Strut No NDE performed on eyerods	12835/TDA 3/24/82
2. RC-1-069-002-C41R R.4	Sway Strut No NDE performed on eyerods	12638/TDA 3/9/82

Supports cont'd

Mark No.	Item	SN#/Date Shipped
3. RC-1-135-009-C51R R.1	Sway Strut No NDE performed on eyerods	12440/TDA 2/22/82
4. RC-1-135-010-C41K R.1	Clamp Bolting No NDE performed	11983/TDA 12/23/81
5. RC-2-135-402-C41K R.0	Clamp Bolting No NDE performed	13957/TDA 8/16/82
6. RH-1-001-013-C41K R.1	Clamp Bolting No NDE performed	12540/TDA 3/3/82
7. RH-1-002-013-C41R R.1	Sway Strut No NDE performed on eyerods	13915/TDA 8/10/82
8. SI-1-091-001-C41R R.2	Sway Strut No NDE performed on eyerods	13161/TDA 3/4/82
9. SI-1-179-006-C41R R.1	Sway Strut No NDE performed on eyerods	11983/TDA 12/23/81
10. SI-1-180-006-C41K R.1	Clamp Bolting No NDE performed	13230/TDA 5/18/82
11. SI-1-180-003-C41R R.2	Sway Strut and Clamp Bolting, Eyerods no NDE performed	12440/TDA 2/22/82

The above material will be resupplied to TUSI at no charge. If you have any question, or require additional information please do not hesitate to call this office.

Very truly yours,

NPS INDUSTRIES, INC.

Herman W. D'Errico

Herman W. D'Errico
Project Manager

HWD:jt
cc: J. C. Finneran, TUSI OL, IL
J. D. Hicks, TUSI, IL
R. Maurici NPSI QA, IL

NPSI-12-224P

NA 870- SN 12431/TDA 2/17/83 2½ Nuts
25 ea | 190 ? 25 6436AJC NA 1820 6 ea
Rod-(MICFF FHN 2½ Mc 5640 NB SA307 GrB

Form No. HP 50

R0

COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)

COMPONENT MODIFICATION CARD (CMC)

SERIAL NO. 97241RO

(1) APPLICATION: PIPE SUPPORT WELD MOD. [N/A] Q [✓] NON-Q [N/A] DESIGN CHANGE/~~DEVIATION~~ [✓]

(2) DWG. NO. BRH. REV.0 CS-2-309-701-S53R

(3) LINE NO./COMPONENT NO. N/A

(4) REASON FOR CHANGE: ENG ERROR NO NF NUMBER GIVEN FOR WELD SYMBOL

(5) INSTRUCTIONS:

REMOVE [N/A]

ADD NF5231 TO WELD SYMBOL SHOWN IN SECTION A-A

ADD [N/A]

(6) SKETCH

(7) ORIGINATOR

EARLE SKINNER
NAME

[✓] CPPE

[N/A] ORIGINAL DESIGNER

(8) APPROVED BY:

Ed Tim Sullivan 2-21-84
DATE

DATE

DATE

DATE

DATE

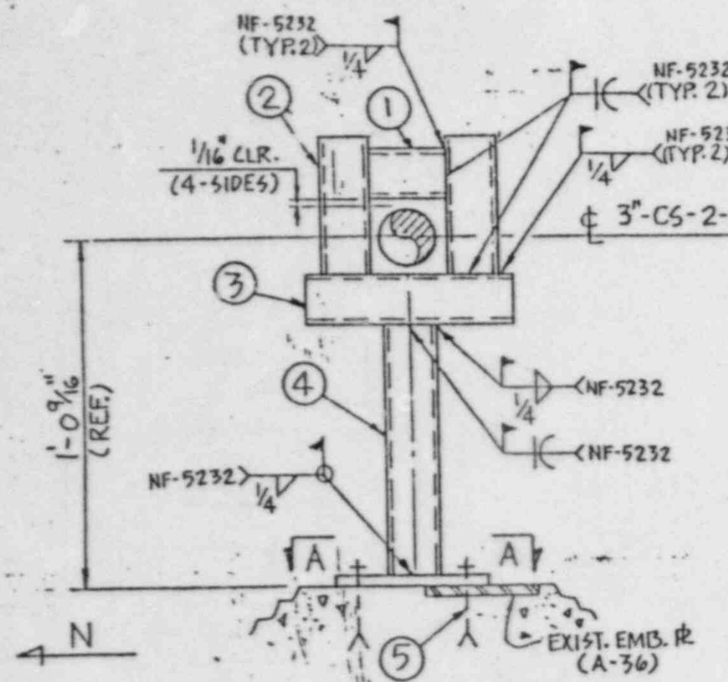
DATE

(9) DISTRIBUTION	DCC CNTL NO.	QTY
TECH SERVICES	INFO	2
SITE DAMAGE STUDY GROUP	INFO	
SYSTEMS PLANNING	INFO	1

FOR OFFICE AND ENGINEERING USE ONLY

PSE Attachment 4

FOR OFFICE AND ENGINEERING USE ONLY



PLAN VIEW @ EL. 837'-1 9/16" (REF.)

ITEM NO.	QTY. REQ'D.	MATERIAL DESCRIPTION	MATERIAL DESIG.
1	1	T.S. 3x3x.250x0'-5½" LG. (CUT TO SUIT)	A500, GR.B
2	2	T.S. 3x3x.250x0'-9½" LG. (CUT TO SUIT)	A500, GR.B
3	1	T.S. 3x3x.250x1'-1½" LG. (CUT TO SUIT)	A500, GR.B
4	1	T.S. 3x3x.250x0'-9" LG. (CUT TO SUIT)	A500, GR.B
5	2	3/4"x10" HILTI-KWIK BOLT (5" MIN. EMB.)	
6	1	℞ 3/4" THK. (SEE SECTION A-A)	SA-36.

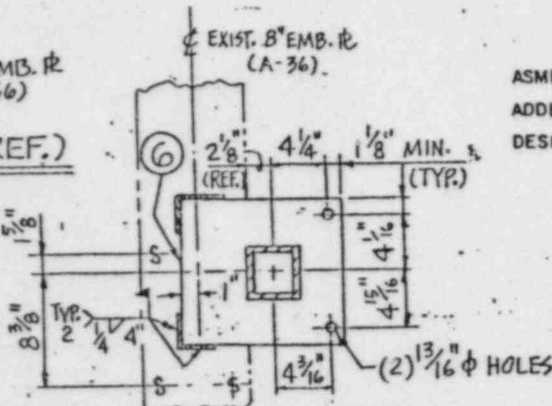
APPLY ONE COAT OF CARBO ZINC #11 TO ABOVE MAT'L EXCEPT THREADS WHICH SHALL BE TREATED WITH A RUST PREVENTATIVE

✳ PROB. 2-N010, REV.0 "C"-D: FA /V: TGT

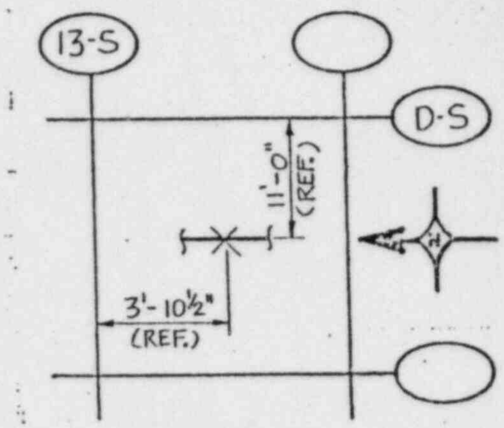
ASME CODE EDITION: ______

ADDENDA: ______

DESIGN SPEC: ______



SECTION A-A



LOCATION PLAN

FOR OFFICE AND ENGINEERING USE ONLY

DATA PT.	SUPPORT LOADS (lbs)					PIPE MVTS (INCHES)
130	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	
VERT.	—				—	0.042
N-S	—	67	164	261	—	
E-W	—	5	63	121	—	0.039

NOTE *H,E,UP -S,W,DN

AUTHORIZED NUCL. INSP. YES ☑ NO ☐

ASME CODE CLASS: 3

REF. DWGS.	STRESS ISO.	REV.	MECHANICAL	REV.	ELECTRICAL	REV.
	ALT. ANALYSIS	✳	M2-0608	2	E2-0603-03	3
	FAB. ISO.	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.
	CS-2-SB-030	1	S2-0611	6	M2-0654	1

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPVD.
0	ISSUED FOR CONST. REF.	2-17-84	VLM		WP
CONT.	PSE R.0 & CPPA# 36911	~	~		~

C.P.S.E.S. 38-1199

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

PLANT: COMANCHE PEAK

JOB NO: 2323

SUPPORT NO. CS-2-309-701-S53R

SHEET 1 OF 1 REV. 0

THIS DOCUMENT AFFECTED BY DESIGN CHANGES

97241

Form No. HP 50

Ifso IR.1 △ R.A. Johnson

COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)

COMPONENT MODIFICATION CARD (CMC)

SERIAL NO. 97423R.1

① APPLICATION: PIPE SUPPORT WELD MOD. [N/A] Q [✓] NON-Q [N/A] DESIGN CHANGE/~~DEVIATION~~ [✓]

② DWG. NO. BRH. REV.0 CH-2-215-704-S23R

③ LINE NO./COMPONENT NO. N/A

④ REASON FOR CHANGE: SITE ENGR. ERROR: INCORRECT WELD SYMBOL
△ DRAFT ERROR

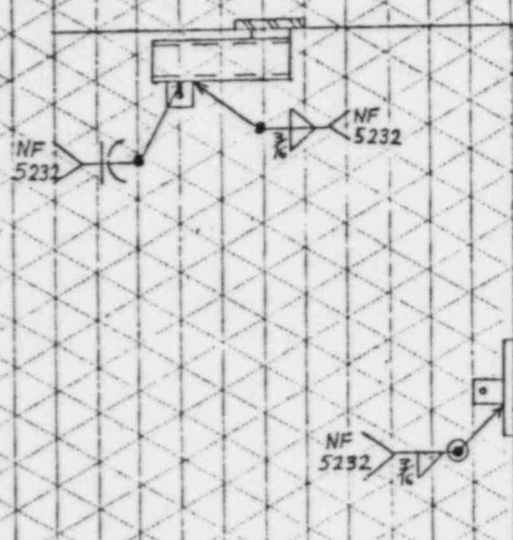
⑦ ORIGINATOR
EARLE SKINNER
NAME
[✓] CPPE
[N/A] ORIGINAL DESIGNER

⑤ INSTRUCTIONS:

REMOVE [N/A]

ADD [N/A]

⑥ SKETCH (Note: 1) Rotate End Attach. @ Sect BB 90°) △



PLAN VIEW @ EL. 785'-9 3/8"

⑧ APPROVED BY:
ES Tim Sullivan 3-22-84 DATE
△ Tim Sullivan 3-23-84 DATE
DATE
DATE
DATE
DATE

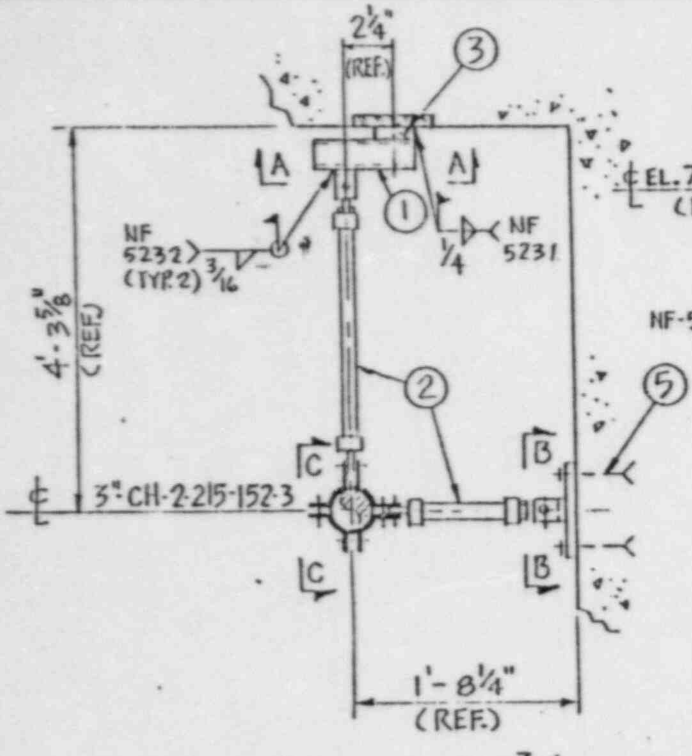
⑨ DISTRIBUTION	DCC CNTL NO.	QTY
TECH SERVICES	INFO	2
SITE DAMAGE STUDY GROUP	INFO	

FOR OFFICE AND ENGINEERING USE ONLY

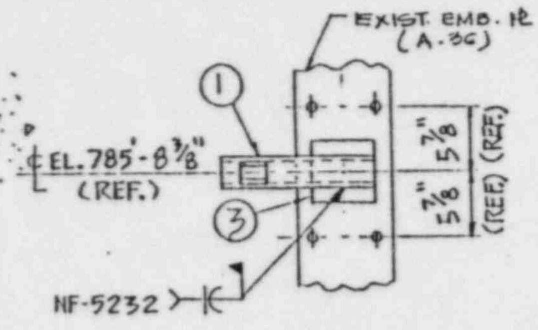
~~THIS REVISION VOIDS AND SUPERSEDES DOCUMENT SERIAL NO.~~ CMC# 97423R.0

FOR OFFICE AND ENGINEERING USE ONLY

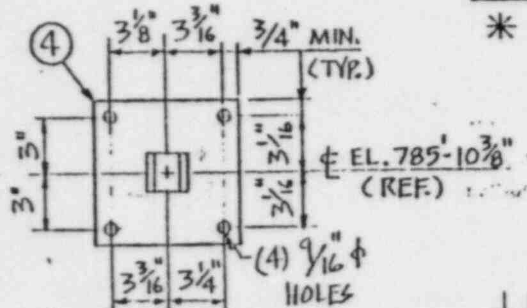
THIS DOCUMENT AFFECTED BY DESIGN CHANGES



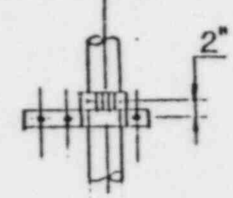
PLAN VIEW @ EL. 785'-9⅜" (REF.)



SECTION A-A



SECTION B-B



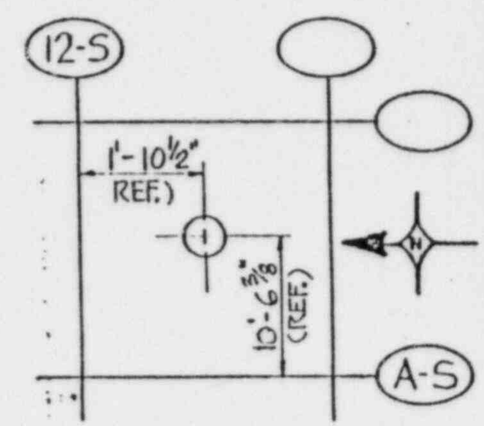
VIEW C-C

ITEM NO.	QTY. REQ'D.	MATERIAL DESCRIPTION	MATERIAL DESIG.
1	1	T.S. 2x2x.250x0'-8½" LG. (CUT TO SUIT)	A-500, GR. B
2	2	STRUT, SBS-06-PC W/SPC-06-030 CLAMP	
3	1	℔ 1/2" x 4" x 0'-4" LG.	SA-36
4	1	℔ 1/2" THK. (SEE SECTION B-B)	SA-36
5	4	1/2" x 7" HILTI-KWIK BOLT (4½" MIN. EMB.)	

APPLY ONE COAT OF ... ABOVE ... BE TREATED ...

FOR OFFICE AND ENGINEERING USE ONLY

✳ ALTERNATE ANALYSIS CH-2-SB-009, R.0



LOCATION PLAN

DATA PT.	SUPPORT LOADS (lbs)	A	B	C	D	PIPE MVTS (INCHES)
860	DESIGN	SERVICE LEVEL LIMITS				
VERT.						.003
N-S		10	42	74		
E-W		102	148	194		

NOTE +N,E,UP -S,W,DN

AUTHORIZED NUCL. INSP. YES ☑ NO ☐

ASME CODE CLASS 3

REF. DWGS.	STRESS ISO.	REV.	MECHANICAL	REV.	ELECTRICAL	REV.
	ALT. ANALYSIS	✳	M2-0604	2	E2-0602-01	5
	FAB. ISO.	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.
	CH-2-SB-009	0	S2-0605	7	M2-0652	1

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPVD.
0	ISSUED FOR CONST. REF. PSE R.0 & CPM# 35915	12/21/83	VLH	TC	SL

Brown & Root, Inc.
HOUSTON, TEXAS

PLANT: COMANCHE PEAK
JOB NO: 2323

SUPPORT NO. CH-2-215-704-S23R
SHEET 1 OF 1 REV. 0

97423

TEXAS UTILITIES SERVICES INC.		REV.	ISSUE DATE	PAGE
ENGINEERING GUIDELINE TITLE	COVER SHEET FOR GUIDELINE REVISIONS	1	12-10-81	1 OF 1
Section i Requirements for Issuing New or Revised Pipe Support Engineering Guidelines		APPROVED: John C. Finneran Jr. PSE PROJ. ENGR.		

I. INSTRUCTIONS FOR FILING GUIDELINE PAGES

1. Remove the "Cover Sheet for Guideline Revisions", Rev. 0, dtd. 10-15-81, for Section i and pages 1 and 2 Rev. 0 of Section i.

2. Replace with Rev. 1 of each of the above.

II. STATUS OF GUIDELINE PAGES

PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV
1	1										
2	1										

SECTION i: Requirements for issuing new or revised pipe support engineering guidelines.

1.0 REFERENCES

1-A Pipe Support Engineering Guidelines

2.0 GENERAL

Purpose and scope

This section of the Pipe Support Engineering Guidelines describes the method used to issue new or revised engineering guidelines. It's intent is to assure that the information contained in the guidelines has been properly reviewed, authorized and distributed.

3.0 METHOD

Responsibilities

It is the responsibility of each PSE group member to recommend new or revised guidelines when the need becomes apparent.

When an individual identifies a need for a revision he/she should consult with his/her immediate supervisor for applicability of the revision. If necessary, the supervisor may consult with higher levels of management.

3.2 DRAFT REVISION REVIEW

The draft revision shall be submitted to the PSE Project Engineer through the author's supervisor.

The Project Engineer shall route the draft revision to selected personnel to assure review by the proper level of supervison and expertise.

The Project Engineer (or his designate) will consolidate any comments on the draft revision and forward to the author's supervisor for review and possible resolution.

After resolution or incorporation of the comments, the draft revision shall be submitted for final typing through the design control supervisor (DCS).

3.3 APPROVAL

After final typing the author shall proof read and forward to his immediate supervisor.

The supervisor shall verify that all agreed upon comments have been incorporated and forward to the DCS.

| Denotes change.

The DCS shall complete a "Cover Sheet for Guideline Revisions", revise the guideline index as necessary, and forward the package to the Project Engineer for approval.

3.4 DISTRIBUTION

The DCS shall make distribution of new or revised guidelines and maintain records of receipt.

The guideline holders shall be responsible for maintaining the guidelines in a current status.

The DCS shall perform periodic audits to insure guidelines are current.

PSE Attachment 7

Brown & Root, Inc.

P.O. BOX 1001 GLEN ROSE, TEXAS 76043

MESSAGE	REPLY
To Eng. Guideline Committee	DATE
DATE March 1, 1983	CC: J. Finneran J. Ryan C. Smaney P. Chang K. Williams G. Abele D. Schultz M. Chamberlain G. Griswold B. Hill
Attached are items which need to be discussed prior to revising our guidelines. A meeting is scheduled for Thursday at 1:00. Dick Kissinger is invited. Please come prepared. Thanks, BY Dale Reed	SIGNED

INSTRUCTIONS TO SENDER: 1. SEND TO JOB. FILE 2. SEND WHITE AND PINK COPIES WITH CARBON INTACT.

INSTRUCTIONS TO RECEIVER: 1. WRITE REPLY. 2. DETACH STUB, KEEP PINK COPY, RETURN WHITE COPY TO SENDER

Speed Letter. 44-912

~~To~~ Dale Leech we need a meeting.

Speed Letter.

To ~~J. FINNERAN~~ / NANCY

From M. CHAMBERLAIN
R. WHITLEY

Subject: PSE DESIGN GUIDELINES (SECT. XI FIG. 5)

MESSAGE

Date 2-23 1983

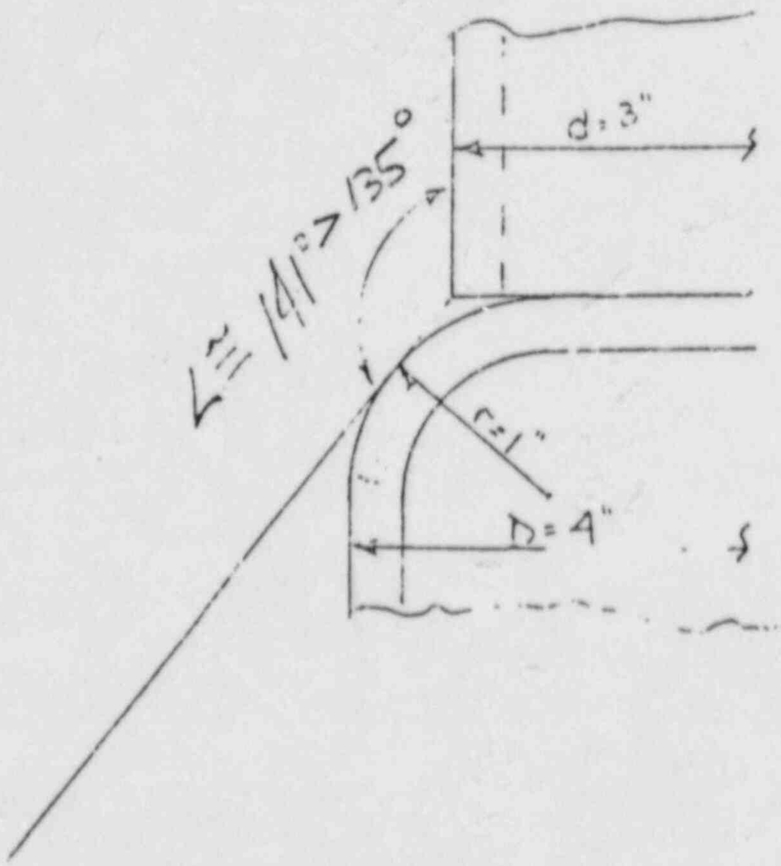
PER FIG. 5 REFERENCED MATCHING 3x3 TUBE TO 4x4 TUBE GIVES A RATIO OF .75 WHICH IS LESS THAN .8. HENCE YOU HAVE AN ACCEPTABLE FILLET WELD. HOWEVER, IF 4x4x½ TUBE IS USED THE LARGE RADIUS PREVENTS A LEGAL FILLET WELD (SKEW OF ~141° - SEE ATTACHED SKETCH) PLEASE BRING THIS MATTER UP FOR DISCUSSION AT THE NEXT DESIGN MEETING.

Signed [signature] GMC 2-23-83

REPLY

Date ______ 19__

Signed



d/D = .75 ≤ .8

BENNETT PRINTING & OFFICE SUPPLY · CLEBURNE, TX 76031

Brown & Root, Inc.

P.O. BOX 1001 GLEN ROSE, TEXAS 76043

MESSAGE

To: ENG. GUIDELINE COMM.

DATE 7-5-83

Attached revision to SECT XI will be discussed at a meeting scheduled for Thurs., July 7 at 1:00 pm.

Thanks,
Dale

BY

REPLY

DATE

DIST: J. Finneran
C. Smaney
P. Chang
J. Ryan
M. Yazhari
K. Williams
G. Griswold
M. Chamberlain
B. Hill
D. Schultz

SIGNED

INSTRUCTIONS TO SENDER:
1. SEND TO JOB FILE 2. SEND WHITE AND PINK COPIES WITH CARBON INTACT.

INSTRUCTIONS TO RECEIVER:
1. WRITE REPLY. 2. DETACH STUB. KEEP PINK COPY. RETURN WHITE COPY TO SENDER

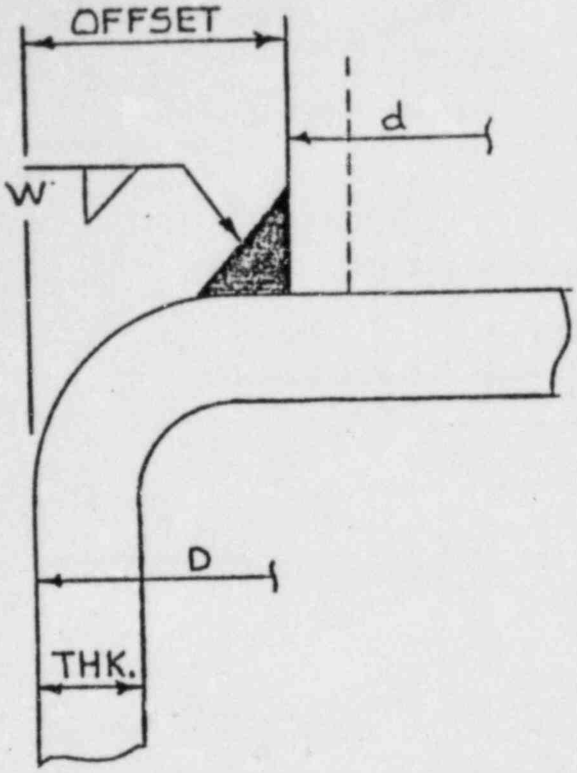


Figure 5

Two structural tubes of unequal size.

Where d/D $\leq$ .8 a fillet weld can be used. Effective throat "te" is equal to .707 x weld size, with exceptions for certain step joints with a 1/2" or 1" offset (see table below).

Effective Throats For Step Joints Where te ≠ .707 x W

FILLET SIZE

"D" THK.	OFFSET	3/16" (.1325)	1/4" (.1767)	5/16" (.2209)	3/8" (.2651)	7/16" (.3093)	1/2" (.3535)	= .707 x W
3/16"	1/2"	.1307 98.64%	.1693 95.81%	.2039 92.3%	-------	-------	-------	= te = %
1/4"	1/2"	.1203 90.79%	.1548 87.6%	.1859 84.15%	.2127 80.23%	-------	-------	= te = %
5/16"	1/2"	.1138 85.88%	.1456 82.39%	.1745 78.99%	.1994 75.21%	.2180 70.48%	-------	= te = %
3/8"	1/2"	.1142 86.18%	.1444 81.72%	.1716 77.68%	.1950 73.55%	.2123 68.63%	-------	= te = %
3/8"	1"	-------	-------	.2200 99.59%	.2614 98.6%	.3010 97.3%	.3387 95.81%	= te = %
1/2"	1/2"	.1368 103%	.1693 95.81%	.1975 89.4%	.2209 83.32%	.2375 76.78%	-------	= te = %
1/2"	1"	.1264 95.39%	.1659 93.88%	.2040 92.34%	.2407 90.79%	.2759 89.2%	.3096 87.58%	= te = %
5/8"	1/2"	Groove weld must be used - Gap exceeds 3/16".						
5/8"	1"	-- -	.1586 89.75%	.1937 87.68%	.2276 85.85%	.2601 84.09%	.2913 82.4%	= te = %

CALC. BY: Dale Leech

CHK/APPR. BY: S. Mazumdar.

CPPA-12080

PSE Attachment 8

TEXAS UTILITIES SERVICES INC.

OFFICE MEMORANDUM

To D. N. Chapman Glen Rose, Texas August 20, 1981

Subject COMANCHE PEAK STEAM ELECTRIC STATION
TUGCO CORRECTIVE ACTION REQUEST
CAR NO. 003
TUGCO QA AUDIT TCP-6, FOLLOW-UP #3
REFERENCE: MEMO D. N. CHAPMAN TO
J. T. MERRITT DATED AUGUST 19, 1981

In response to the referenced correspondence, please find the attached Corrective Action Request Response.

Please contact this office if additional information can be provided.

M. R. McBay
M. R. McBay
Engineering Manager

MRM:RPB:km
cc: ARMS
J. T. Merritt
R. G. Tolson
B. R. Clements
J. B. George
J. N. Baker

RECEIVED
AUG 21 1981
Texas Utilities Services, Inc.
CPSES Const. Office

Telecopied
8-21-81
2:40PM

	FILE
GENTRY	R. BAKER
HICKS	
SCHOEN	
N. SMITH	
MURRAY	BURGESS
C. WILSON	KISSINGER
CALDER	CREAMER
HUTCHINSON	POPPLEWELL
ALL	WADE
MERRITT	N. BAKER
GEORGE	McBAY

CORRECTIVE ACTION REQUEST (CAR)

CAR # 003   Date: 8/19/81

Response due 8/24/81

Assigned to: J. T. Merritt / Manager Engineering/Construction
Name   Title

SUBJECT: INADEQUATE CORRECTIVE ACTION

I. Description of Original Deficiency: (Audit/Surveillance # TCP-6/Deficiency # 3)
Follow-up 2&3

No approved instruction had been established by PSDG to assure that loads indicated on Grinnell pipe hanger drawings are commensurate with loads reflected in the latest stress problems.

Description of Corrective Action Commitments:
(Ref: Response letter # CPPA 9628 4/21/81)

Corrective action response stated that the subject instruction was issued on 2/25/81 as an internal PSDG Guideline. PSDG then committed to incorporate the guideline into the PSDG Engineering Manual on or before 5/15/81.

Details of Present Condition of Deficiency:

The guideline was incorporated into the engineering Manual as Instruction XVII on 8/07/81. Rev. 1 of this instruction was then issued on 8/17/81. All Engineers except for those on vacation had signed off on the distribution list. During a random sample of the Engineering manuals that had been signed off, 6 manuals were observed. Only two had incorporated the instruction into the manual and voided the old instruction. See attachment for details.

Description of Restrictions/Holds Applied:

N. S. Hesler, 8/19/81   Antonio Vega, 8/19/81
Auditor   Date   Lead Engineer   Date

D N Chapman 8/19/81
Manager, Quality Assurance   Date

II. Details of Proposed Corrective Action: To insure that all future revisions to the PSDG Engineering Manual are incorporated, a transmittal form will be used which will require each person to acknowledge that the revision has been received and incorporated by signing and dating the transmittal form, attaching the superceded pages to the transmittal form and returning it to the PSDG clerks. The clerks will retain the transmittal forms and destroy the superceded pages.

Implementation Date: 8/20/81

M. R. McBay, 8/21/81
Responsible Site Manager   Date

III. Response Acceptable: Yes____ No____ ________ / ________
Auditor/Date   Lead Engineer/Date

Implementation of Corrective Action Verified:
(Ref: Audit/Surveillance # ________)

CAR Closed: ________ / ________
Manager, Quality Assurance   Date

ATTACHMENT

The following is a detailed breakdown of the six Engineering Manuals observed by random sample, checking for the inclusion of Instruction XVII.

Manual #	Status
52,60,&83	Instruction XVII,R.1 had not been incorporated into the manual and the original issue had not been voided.
29	Instruction XVII,R.1 had been incorporated into the manual;however, the original issue had not been removed or voided. (Rev. 0 is not identified as such or dated)

Manuals 12 and 27 were found in acceptable condition.

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To [redacted] Glen Rose, Texas August 19, 1981

Subject Comanche Peak Steam Electric Station
TUGCo Corrective Action Request
CAR No. 003 & 004
QA File: CAR No. 003 & 004
Audit No. TCP-6 Follow-up 2 & 3

Attached is a copy of TUGCo CAR No. 003 & 004 which is transmitted to you for immediate action.

Please complete Part II of the attached form and return it by 8/24/81.

By copy of this memo to J. B. George, we request your involvement in providing an expenditious resolution to the cited deficiency. Should you have any questions, please contact Antonio Vega or me.

D N Chapman
D. N. Chapman
Manager, Quality Assurance

DNC/AV/AEK/ls

cc: B. R. Clements
J. B. George

QTN-437

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To J. T. Merritt

Dallas, Texas ~~October 8, 1981~~

RECEIVED
OCT 13 1981
Texas Utilities Services, Inc.
CPSES Const. Office

Subject COMANCHE PEAK STEAM ELECTRIC STATION
TUGCO CORRECTIVE ACTION FOLLOW-UP
QA FILE: CAR NO. C03
AUDIT NO. TCP-6 FOLLOW-UP 3

On October 7, 1981, auditors, Al'An Kesler and Debra Anderson reviewed four PSDG Engineering Manuals for verification of corrective action on CAR 003, concerning document control activities.

The four manuals reviewed were: the master, #27, #29 and #38. The following problems were observed:

1. All the manuals had two or more missing documents.
2. None of the 20 sections within the four manuals had been documented to show they had been reviewed and approved except for part of Section XVII.
3. Ten of the 20 sections were not dated.
4. Revision numbers within each section were inconsistent.
5. Pages were not numbered or only partially numbered.
6. In manual #38, five outdated revisions were still in the manual.
7. Manuals #29 and #27 had handwritten revisions that were not present in the master or #38.
8. There are no formal controls on changes/revisions.

Due to our current findings, CAR 003 cannot be closed at the present time. At the conclusion of our review, John Finneran committed to a rework program to correct the problems and to a new document control program to prevent recurrence. The rework program should include a review to assure the adequacy of design documentation contained in the Engineering Manual. We request a response from you by October 13, 1981, delineating the details and anticipated completion dates of these commitments.

We will review your response and advise you of its adequacy as soon as our evaluation is complete.

Should you have any questions, please contact A. Vega at 214-653-4895.

D N Chapman
D. N. Chapman
Manager, Quality Assurance

DNC/AV/DLA/AEK:med

cc: B. R. Clements
J. B. George

GEORGE	McJAY
MERRITT	N. BAKER
ALL	WADE
HUTCHINSON	POPPLEWELL
CALDER	CREAMER
C. WILSON	KISSINGER
MURRAY	BURGESS
N. SMITH	
SCHOEN	
HICKS	
GENTRY	R. BAKER
	FILE

4/7 · CAR
TCP6 FU 3

CPPA-13235

TEXAS UTILITIES SERVICES INC

OFFICE MEMORANDUM

To D. N. Chapman Glen Rose, Texas October 12, 1981

Subject COMANCHE PEAK STEAM ELECTRIC STATION
TUGCO QA AUDIT TCP-6 FOLLOW-UP NO. 3
CORRECTIVE ACTION REQUEST (CAR) NO. 3
REFERENCE: 1) QTN-437
2) CPP-5704

In response to reference 1 dated October 8, 1981, the following corrective actions will be implemented to establish positive control of the PSE (PSDG) Engineering Manual.

1. A program has been established to review the Manual in its entirety. Reference 2 details the schedule for this review.

2. An additional section will be added addressing control of the Manual.

These efforts will be completed on or before December 1, 1981.

Please advise if additional information can be provided.

M. R. McBay
M. R. McBay
Engineering Manager

MRM:RPB:km
cc: ARMS
B. R. Clements
J. B. George
J. T. Merritt
J. C. Finneran

Telecopied
10-12-81 3:10PM

RECEIVED
OCT 13 1981
Texas Utilities Services, Inc.
CPSES Const. Office

GEORGE	McBAY
MERRITT	N. BAKER
ALL	WADE
HUTCHISON	POPPLEWELL
CALDER	CREAMER
C. WILSON	KISSINGER
MURRAY	BURGESS
N. SMITH	
SCHOEN	
HICKS	
GENTRY	R. BAKER
	FILE KM

CPP-5704

TEXAS UTILITIES SERVICES INC

OFFICE MEMORANDUM

To Distribution Glen Rose, Texas October 9, 1981

Subject COMANCHE PEAK STEAM ELECTRIC STATION
REVIEW OF THE PSE ENGINEERING DESIGN MANUAL

Due to an outstanding Corrective Action Report (CAR) issued by Quality Control, it is necessary that a comprehensive review of our design manual be performed.

In this respect, all individuals requested to review all sections of the manual should do so in the time frame indicated in Attachment 1 to this memo.

All comments should be submitted to C.R. Smaney via a marked-up copy of the applicable section or by placing your comments on a separate piece of paper. Please be specific with your comments to help in the consolidation of the reviews. Please look for inconsistencies and duplications; we are looking also to strengthen all areas where there may be deficiencies.

If you have any questions, please contact C.R. Smaney at extension 351.

John C. Finneran Jr.
John Finneran

JCF:gr

cc: C. Smaney
J. Ryan
P. Chang
W. Fleming
M. Chamberlain
K. Williams
G. Brown
D. Schultz

ATTACHMENT 1

DESIGN MANUAL SECTIONS
&
REQ'D REVIEW COMPLETION DATE

Persons To Review	I 10/13/81	II 10/13/81	III 10/15/81	IV 10/15/81	V 10/20/81	VI 10/20/81	VII 10/20/81	VIII 10/26/81	IX 10/30/81	X 10/30/81	XI 10/30/81	XII 11/4/81	XIII 11/10/81	XIV 11/10/81	XV 11/10/81	XVI 11/10/81	XVII 11/13/81	XVIII 11/18/81	XIX 11/18/81	XX
J. Finneran																				
C. Smaney																				
J. Ryan																				
P. Chang																				
W. Fleming																				
M. Chamberlain																				
K. Williams																				
G. Brown																				
D. Schultz																				

QTN-440

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To J. T. Merritt

Dallas, Texas October 16, 1981

Subject Comanche Peak Steam Electric Station
TUGCO Corrective Action Request
Response Evaluation
CAR No. 003
QA File: CAR-003 &
TCP-6 Follow-up 2 & 3

RECEIVED
OCT 19 1981
Texas Utilities Services, Inc.
CPSES Const. Office

Your response logged CPPA-13235 dated October 12, 1981 has been evaluated and found acceptable by TUGCO QA.

Verification of implementation of your corrective actions will be performed consistent with your commitment dates.

Antonio Vega
FOR D. N. Chapman
Manager, Quality Assurance

DNC/AV/DLA/AEK:ljj
cc: B. R. Clements
J. B. George
J. C. Finneran
M. R. McBay

GEORGE	CLAY
MERRITT	N. BAKER
ALL	WADE
HUTCHINSON	POPPLEWELL
CALDER	CREAMER
C. WILSON	KISSINGER
MURRAY	BURGESS
M. SMITH	
SCHOEN	
ICKS	
ENTRY	R. BAKER
	FILE

L/7-C

QTN-468

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To J. T. Merritt

Dallas, Texas January 4, 1982

Subject COMANCHE PEAK STEAM ELECTRIC STATION
TUGCO CORRECTIVE ACTION FOLLOW-UP
QA FILE-CAR NO. 003
AUDIT NO. TCP-6 FOLLOW-UP 3

On December 14, 1981, auditors Al'An Kesler and Steve Davis reviewed the PSE Manual rework program for verification of corrective action on CAR No. 003 concerning document control activities.

The rework program, committed to as part of the corrective action, had not at this time been completed. Each section of the manual is currently being rewritten, and a new system for control of the PSE Manuals has been established. Four sections of the manual were ready for issue, and the rest were in varying stages of completion.

After reviewing the work that has been done to date, auditors feel that upon completion and full implementation the problems previously identified will not occur again. We are, however, unable to close the CAR No. 003 based on the present amount of work completed.

During the course of our review, we obtained a firm commitment date of April 1, 1982, from John Finneran for the completion of the rework program. Consistent with that commitment date, we will verify completion of the corrective action on CAR No. 003. At that time we will review the manual from an administrative and also a technical viewpoint. We acknowledge PSE's commitment that no technical changes to the manual will effect present or past work.

Should you have any questions, please contact Al'An Kesler at (214) 653-4665.

w/ dist.

D. N. Chapman
D. N. Chapman
Manager, Quality Assurance

DNC/AV/DLA/AEK:pko

cc: B. R. Clements
J. B. George

RECEIVED
JAN 07 1982
Texas Utilities Services, Inc.
CPSES Const. Office

GEORGE	[illegible]
[illegible]	N. BAKER
[illegible]LL	WADE
[illegible]	POPPLEWELL
[illegible]	CREAMER
[illegible] WILSON	KISSINGER
[illegible]	BURGESS
[illegible] SMITH	UC4
[illegible]	
HICKS	
GENTRY	R. BAKER
	FILE

1/7-C

QTN-499

4-30 ② JCF

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To J. T. Merritt

Dallas, Texas April 26, 1982

Subject COMANCHE PEAK STEAM ELECTRIC STATION
TUGCO QA AUDIT REPORT TCP-38
PIPE SUPPORT ENGINEERING
QA AUDIT FILE: TCP-38

Attached is TUGCO QA Audit Report TCP-38 which details the result of our audit of Pipe Support Engineering performed on April 13-14, 1982. The audit was conducted by Al'An Kesler (Acting Team Leader) and Tony Valdez.

Attachment A contains an audit summary including attendees of the pre- and post-audit meetings and personnel contacted during the audit. No deficiencies or concerns were identified; therefore, a response to this report is not required. *

Should you have any questions, please contact Al'An Kesler at 214-653-4665.

D N Chapman
D. N. Chapman
Manager, Quality Assurance

DNC/AV/DLA/AEK:med

Attachments
cc: B. R. Clements
R. G. Tolson
G. R. Purdy

lc-dist

	McBay
George	J. Johnson
Merritt	Popplewell
Hall	Creamer
Hutchinson	Kissinger
Calder	Finneran — lc
C. Wilson	Norman
Murray	Bernier
N. Smith	Davis
Schoen	— 0
Hicks	
Gentry	— 4/7.0

ATTACHMENT A

AUDIT SUMMARY

TCP-38

Attendance - Pre Audit Meeting
QA Audit No. TCP-38
Date 4/13/82

Name	Title	Name	Title
[illegible] Kesler	TUGCO QA		
[illegible]	" "		
Jim B[illegible]	Supervisor Design Control		
John Finnegan	PSE Supervisor		
C.R. Smaney	PSE - Staff		

Attendance - Post Audit Meeting
Date 4/14/82

Name	Title	Name	Title
[illegible] Kesler	TUGCO QA		
[illegible]	" "		
Jim B[illegible]	Supervisor Design Control		
C.R. Smaney	PSE - STAFF		
John C. Finnegan Jr.	PSE Supervisor		

TCP-38

Audit Summary

Audit Team:

Al'An Kesler - Acting Team Leader
Tony Valdez

Personnel Contacted:

J. Finneran
C. Smaney
J. Busby
N. Harrelson

Audit Scope:

TCP-38 was conducted to verify corrective action taken by PSE on the Control of the Pipe Support Engineering Manual in response to CAR-003. In addition, auditors reviewed the revised manual to verify no changes had been made that could have an adverse impact on past or present work.

The audit was divided into the following two categories:

1. Control of the Pipe Support Engineering Manual

2. Review of the revised manual for changes that could have an adverse affect on past or present work

Al'An Kesler reviewed Pipe Support Engineering's system for controlling the Engineering Manual. Section "i" in the Pipe Support Engineering manual governing the control of the manual was reviewed and found to have the controls required per 10CFR50, Appendix B, Criterion VI. Implementation of Section "i" was also verified and Pipe Support Engineering (PSE) was found to be in satisfactory compliance with this procedure.

A detailed review of the entire Pipe Support Engineering manual was conducted by Tony Valdez. No changes that could have an adverse impact on past or present work were identified.

Summary:

Based on the scope identified above, auditors feel that Pipe Support Engineering's corrective action has been adequately accomplished. CAR-003 is, therefore, considered to be closed.

A. E. Kesler
Acting Team Leader

PACKAGE AUDITS

PACKAGE NO. CC-1-RB-047 R/0 DATE 2-24-84

REQUIREMENTS	YES	NO	REMARKS
1. HAVE PKG. CONTENTS BEEN COMPLETED?		✓	Items # 2, 4, have not been checked.
2. IS PKG. COMPLETE PER CP-EI-4.0-1, PARA. 3.2.4?	✓		
3. ARE ALL BLOCKS SIGNED AND DATED?		✓	No date on Sht. 5 of 5 sketch # CC-1-RB-047-001-5, R/0
4. ARE ENGR'S SIGNING APPROPRIATE BLOCKS?	✓		
5. ARE INITIALS, SIGNATURES AND DATES LEGIBLE?	✓		
6. IS PKG. IN GOOD CONDITION?	✓		
7. ARE ALL COPIES LEGIBLE?	✓		
8. ARE CURRENT FORMS BEING USED?	✓		
9. ARE REFERENCES ADEQUATE?	✓		
10. ARE ANALYSIS LOADS AND MVMTS INCORPORATED INTO CALC'S?	✓		
11. ARE CALC'S IN ACCORDANCE WITH PSE GUIDELINE CRITERIA?		✓	See attached audit deficiencies
12. DOES CALC. PKG ADEQUATELY ADDRESS ALL PROCEDURAL REQUIREMENTS?	✓		
13. DO WELDED ATTACHMENTS MEET THE REQUIREMENTS OF CP-EI-4.0-1, PARA. 3.9?	✓		

AUDIT PERFORMED BY: Chris Schultz / Dale Leech

AUDIT DEFICIENCES - CC-1-RB-047-001-5

1. CMC 73664 R-2 INCREASED HILTI SIZE TO 1" ⌀. THERE ARE NO DIMENSIONS, INSIDE THE BASEPLATE, WHICH ARE GREATER THAN 10D. SEE ATTACHED COPY OF SKETCH. CALCULATIONS DO NOT ADDRESS THIS HILTI SEPARATION VIOLATION.

2. REV. 1A CALC'S REFER TO REV. 0 CALC'S TO QUALIFY HILTI'S. REV. 1 CALC'S ARE CURRENT HILTI CALCS.

AUDIT CONCERN

1. THERE ARE NO CALCULATIONS FOR STEP JOINT (ITEM 3 TO ITEM 1) SINCE IT IS NOT THE CRITICAL JOINT. CARE SHOULD BE TAKEN WHEN THERE ARE ANY STEP JOINTS WHICH HAVE REDUCED ALLOWABLES PER SECT. XI FIGURE 5. "OK BY COMPARISON" MAY NOT BE ADEQUATE.

FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 4-16-84

Calc By DHh

Chk'd/Apprd. By

Filing Code

Sheet No. Of

G & H Job. No.

Subject - RESPONSE TO PKG. AUDIT 2-29-84 Ref. Dwg./Spec. No.

CC-1-RB-047

ITEM 1 DONE

ITEM 3 NO DATE REQ'D FOR CHECKER

ITEM 11

1. SEE SUPPL. CALC. REV. 1B.

2. CALC IN REV. 1B SUPERCEDES OTHERS FOR HILTI'S

Brown & Root, Inc.

P.O. BOX 1001 GLEN ROSE, TEXAS 76043

MESSAGE

To

Delmer Schultz/Mike Yazhari

DATE 5-2-84

The attached audit response is accepted and all corrections have been completed and re-checked by design control.

cc: P. Chang
C. Swaney

BY Dale Leech

INSTRUCTIONS TO SENDER:

1. SEND TO JOB FILE 2. SEND WHITE AND PINK COPIES WITH CARBON INTACT.

REPLY

DATE

SIGNED

INSTRUCTIONS TO RECEIVER:

1. WRITE REPLY. 2. DETACH STUB. KEEP PINK COPY. RETURN WHITE COPY TO SENDER.

ITT GRINNELL ATTACHMENTS

ITT Grinnell PIPE HANGER ENGINEERING DIVISION

BY BKH DATE 3-13-84 SUBJECT Design Calculations SHEET NO. 7 OF ___

CHK'D BY FAC DATE 3-21-84 CUSTOMER ___ SYSTEM ___

PROJECT ___ SUPPORT I.D. 2-632-1-40 4/1-3(C)

___ A_x ___ A_y ___ A_z ___ I_x ___

I_y ___ I_z ___ S_y ___ S_z ___

A_x ___ A_y ___ A_z ___ I_x ___

I_y ___ I_z ___ S_y ___ S_z ___

CONSTANTS E ~~2525000~~ 27200000 ALL (BKH 3/19/84)
10460000

G ~~1010000~~ ALL

BETA 1.57 7, 8, 9 15, 16, 17

~~JOI ___ REL MOM ___ FOR ___~~

JOI ___ REL MOM ___ FOR ___

JOI ___ REL MOM ___ FOR ___

MEM ___ REL ___ MOMENT ___ FORCE ___

MEM ___ REL ___ MOMENT ___ FORCE ___

MEM ___ REL ___ MOMENT ___ FORCE ___

LOADING 1

MEM 1-2 LOAD FOR Y GLOBAL UNIF W- .475 ✓ mem 21-33 W-2.0 ✓

MEM 3-4 LOAD FOR Y GLOBAL UNIF W- 3.95 ✓

MEM 5-13 LOAD FOR Y GLOBAL UNIF W- 5.67 ✓

MEM 14-20 LOAD FOR Y GLOBAL UNIF W- 2.92 ✓

JOI		X	Y	Z	MOM
11	LOAD FOR	88	+9338	645	X=1858 Z=25
31	LOAD FOR	273	+10181	486	X=1400 Z=786
	LOAD FOR				
	LOAD FOR				

LOADING 2

JOI		X	Y	Z	MOM
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				

LOADING 3

JOI		X	Y	Z	MOM
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				

LOADING 4

JOI		X	Y	Z	MOM
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				
	LOAD FOR				

DRAFTER GRA (DJP) TIME 3¾ HRS DATE 11·5·82

CHECKER DS TIME 2

JOB NUMBER AND COLOR #46 GREEN

TYPE OF SKETCHES AND DEGREE OF DIFFICULTY:

MARK NUMBER	TYPE OF ERROR
1-ES-B32-R092	1) ARROW IN LOCATION PLAN SHOULD BE SHOWN OUTSIDE COLUMN ROW (16)
	2.) W DIM FOR FIG. 211 SHOULD BE 3'-10⅛" NOT 3'-11⅛"
	3.) HEADING IN B.O.M. SHOULD HAVE READ THERMAL RESTRAINT ASSEMBLY NOT (STRUT ASSEM. C.O.)
	4.) DO NOT SHOW H.A.S.&E IN B.O.M FOR HM SYSTEMS. ~~[illegible]~~
	5.) TOTAL ASSEMBLY WT. TO BE SHOWN IN B.O.M.
1-ES-B32-R091	1.) B.O.M INCOMPLETE ITEMS #1 & #2 BALLOONED BUT NOT ORDERED IN BILL
	2.) DO NOT SHOW H.A.S.&E FOR HM SYSTEM
1-ES-B-32-R093	1) DO NOT SHOW H.A.S.&E.

F-2299 Revised / Printed in U.S.A.

ITT Grinnell INTER OFFICE CORRESPONDENCE

R.I. #33

TO: P. J. Fang - PHD Analysis **DATE:** Feb. 14, 1983

FROM: P. M. Salcone - PHD QA PMS

SUBJECT: ASME Paragraph XVII-2463

Please reference the attached request for information.

TUSI has requested ITTG's interpretation of Para. XVII-2463 and raised the questions noted on the attached form.

Although ITTG does not generally design base plates with edge distances greater than 6 inches, I believe it is a possibility some as-built unsymmetrical base plate bolt patterns may violate the 6 inch max. criteria.

Please respond to this request as soon as possible; a TUSI expeditor will be in Prov. on Thursday, 2-17-83, and may possibly want a response at that time.

PMS/v

cc: D.M. Sewell - Warren
R.B. Mulcahey - Prov.
V. Kumar - Prov.
R.T. Wisniewski - Prov. ← THIS COPY FOR
T.E. Smith - Prov.
D.E. Powers - Prov.
J. Mangassarian - Prov.

REQUEST FOR INFORMATION

R.I. #33

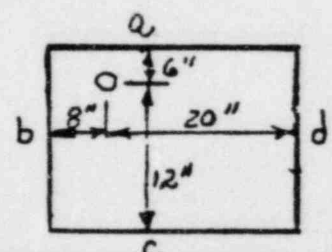
FORM: ES-014
REV. Ø

TO:
- [ ] MANAGER PRODUCT ENGINEERING
- [X] MANAGER PIPING & STRUC. ANALYSIS — P.J. Fang - PHD Analysis
- [ ] DIVISION Q.A. MANAGER
- [ ] MANAGER RD&E
- [ ] MANAGER APPLICATION ENGINEERING
- [ ] OTHER

FROM: P.M. Salcone - PHD QA DATE: 2-14-83

INFORMATION REQUESTED: Please provide ITTG's official interpretation of Para. XVII-2463 Maximum Edge Distance (ASME 1974 Code).

1. Does it apply to base plates? (Consider base plates with large shear forces.)
2. Can the concrete be considered as a "part in contact"? If so, wouldn't base plates have to be considered?
3. In the diagram below, which edge is considered as "nearest edge"? a? a & b? or all four?



CC:
- [X] MANAGER APPLICATION ENGINEERING — T.E. Smith - PHD
- [ ] MANAGER SITE ENGINEEING
- [ ] MANAGER SPECIAL PROJECTS
- [ ] MANAGER RD&E
- [X] OTHER — D.E. Powers - PHD; J. Mangassarian - PHD

ACKNOWLEDGEMENT: THE ABOVE INFORMATION HAS BEEN RECEIVED, RESPONSE TO THIS REQUEST WILL BE ISSUED BY ____________

ACKNOWLEDGED BY: ____________ DATE: ____________

ITT GRINNELL

INTER OFFICE CORRESPONDENCE

TO: PETE SALCONE - PHE DATE: 2/16/83

FROM: RON WISNIEWSKI - PH ANALYSIS RTW

SUBJECT: YOUR REQUEST FOR INFORMATION DATED 2/14/83

With respect to the above Request For Information concerning XVII-2463 (Maximum Edge Distance), our response is as follows:

1) No, it does not apply to baseplates.

2) Not applicable.

3) Not applicable.

Also included as part of our response are the minutes of our 2/15/83 meeting concerning this topic (see attached). Please reference R.I. #33 on any further correspondence concerning this matter.

RW/msb 473
Attachments
cc: T. Smith
D. Powers
J. Mangassarian
V. Kumar
P. Fang

ITT GRINNELL

INTER OFFICE CORRESPONDENCE

TO: DISTRIBUTION DATE: 2/16/83

FROM: RON WISNIEWSKI - PH ANALYSIS RTW

SUBJECT: MINUTES OF 2/15/83 MEETING CONCERNING PETE SALCONE'S 2/14/83 REQUEST FOR INFORMATION (MAXIMUM EDGE DISTANCE)

ATTENDEES: Ron Wisniewski, Pen Fang, Vipin Kumar, Frank Vasiliadis, Frank Birch

A brief meeting was held 2/15/83 concerning the above Request For Information (R.I. #33). The following was decided upon.

Paragraph XVII-2463 Maximum Edge Distance (ASME 1974 Code) does not apply to baseplates for the following reasons:

a) This criteria falls under XVII-2460 "Design Requirements For Bolts" and not XVII-2470 "Design Requirements For Column Bases.

b) This criteria is primarily to prevent the phenomena known as "dishing" in bolted linear type plate connections loaded in tension.

c) This phenomena is a function of stability and not strength.

d) This criteria is also to prevent separation at the ends of a bolted plate connection, i.e. to maintain a tight fit.

DISTRIBUTION
R. T. Wisniewski
P. J. Fang
V. Kumar
F. Vasiliadis
F. Birch

RW/msb 474

ITT GRINNELL - Attachment 5

D. Powers ← THIS COPY FOR

F 2259 Revised / Printed in U S A

Grinnell INTER OFFICE CORRESPONDENCE

TO: Engineering Supervisors/Managers DATE: Sept. 14, 1978

FROM: R. B. Mulcahey

SUBJECT: Design Calculations

Effective immediately all Supervisors are required to audit on a random basis the design calculations of each Engineer reporting to him. This must be done for each Engineer at least once a month. All results must be documented in writing.

I have asked Ed Eramian to begin auditing this documentation to identify recurring errors.

If analysis assistance is required, please contact D. Ledo.

RBM/v

cc: M. Grosso
E. Eramian
D. Ledo
D. Sewell - Warren

PROJECT

DATE: 1-31-84

CALCULATION REVIEW

Sketch No. 2-637-6-8 Rev. No. 2/F2/20

Engineer F. Corrao

Checker [illegible]

Reviewer Bruce [illegible]

Codes:
O.K.: ✓
C.A.R.: Corrective Action Required.
N/A: Not Applicable

Specific Comments:

1. Loads: OK
2. Movements: N/A
3. Steel: OK
4. Plates: N/A
5. Bolts: N/A
6. Welds: N/A
7. References: OK
8. Assumptions: OK
9. Legibility: OK
10. SCN: N/A
11. Errors Reconciled: N/A
12. Code Acceptance Criteria: N/A

Action Items:

I have reviewed the above comments and have completed the required action items:

Engineer: Frank Corrao

Checker: [illegible]

Reviewer: [illegible]

PROJECT

DATE: 1/31/84

★ CALCULATION REVIEW

Sketch No. 2-611-3-6 Rev. No. 1/80

Engineer GS

★ Checker R.B

Reviewer RV

Codes:
O.K.: ✓
C.A.R.: Corrective Action Required.
N/A: Not Applicable

Specific Comments:

1. Loads: OK
2. Movements: OK
3. Steel: OK
4. Plates: N/A
5. Bolts: N/A
6. Welds: CAR
7. References: OK
8. Assumptions: OK
9. Legibility: OK
10. SCN: CAR
11. Errors Reconciled: YES
12. Code Acceptance Criteria: OK

Action Items:

6. END CONNECTION @ EXIST 21WX55 IS MOMENT CONNECTION PER MC-42 Rev-4 II.B ~~STATE~~ ASSUMPTION

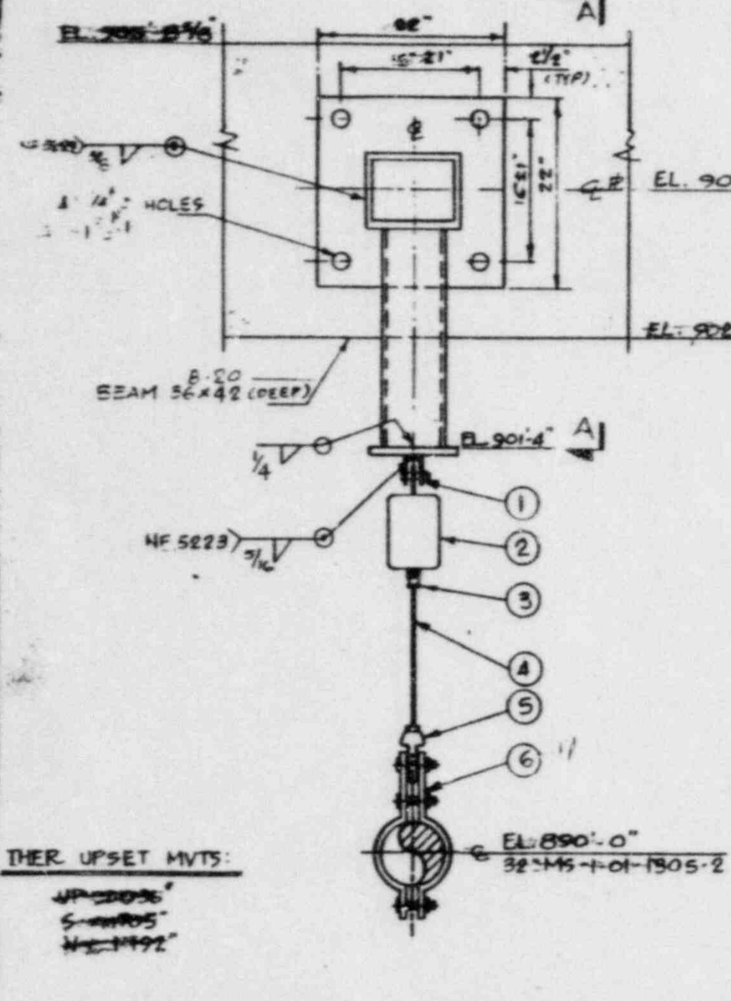
I have reviewed the above comments and have completed the required action items:

Engineer: [signature]

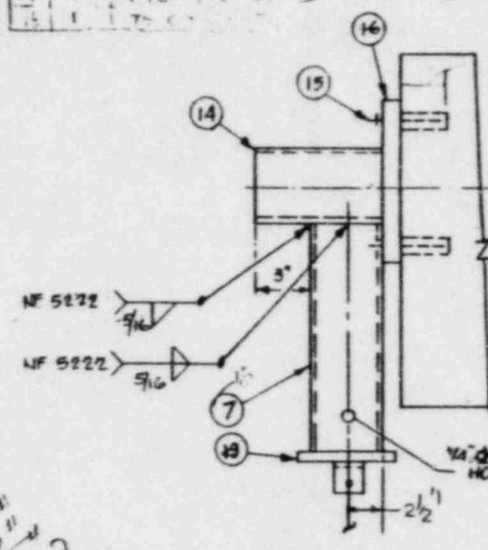
Checker: [signature]

Reviewer: Robert A. Vulpe

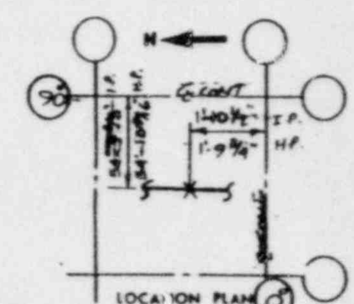
NPS ATTACHMENTS



ELEV: LKG SOUTH



SECTION-A-A



LOCATION PLAN

ITEM NO	NO REQ'D.	DESCRIPTION		WT.	ASME OR ASTM			
1	1	BDD-16 WELDED BEAM ATTACH			SA 36			
2	1	VLB-18 THOO HL-13060#, CL-14412 T-9884			~			
--	--	VARIABLE SPRING SUPPORT			~	-		
3	2	FHN-2" Φ HEAVY HEX NUT			A 307	CSS		
4	1	RET-16L HANGER ROD			SA 36	CSS		
5	1	REN-16 WELDLESS EYE NUT			A 668 GR C	CSS		
6	1	PTC-990-0804 PIPE CLAMP			SA 36	CSS		
7	1	T.S. 6 x 6 x .375"			A 500 GR B	L		
8	1	TS 6 x 6 x .375"			A 500 GR B	L		
9	1	W8 x 25			SA 36	L		
10	8	RWP-12 EXCEPT 1" x 8" x 8" STK.			SA 36	CSS		
11	4	RAT-12 x 1'-3" LG. STUDS			SA 36	CSS		
12	8	FHN-1 1/2" Φ HVY HEX NUTS			A 307	CSS		
13	1	FP 3/4" x 7" x 7"			SA 36	PCS		
14	1	TS 8 x 8 x .500"			A 500 GR B	L		
15	4	BSA-1 1/4 x 12 1/4 SUPER HILTI STUD ANCHOR			A 108 GR	CSS		
16	1	FP 2" x 22" x 22" (SEE ELEV. LKG SOUTH)			SA 36	PCS		
17	1	PTC-[illegible] CLAMP			[illegible]			
[illegible]	1	TS [illegible]			[illegible]	L		

REV.	DATE	DESCRIPTION	DR.	CHK	APP.
0		ISSUED FOR CONSTRUCTION			
1		REVISED ITEMS [illegible]			
2		REV'D LOC. PLAN, REV'D LOAD			

LOAD (LBS)	GRAV.	THER.	HYDRO	OBE	SSE	DESIGN LOADS			MVTS (IN.)	THER.	SEISMIC
UP									VERT.		
DN			24736			12,368			N-S		
N									E-W		
S									PIPE CALC.		
E									DATA POINT		
W									SUPPT CALC.		

REFERENCE DRAWINGS	G & H ISOMETRIC	REV.	PIPING	REV.	ELECTRICAL	REV.
	2323-MI-3202-01	4	2323-MI-0506	8	2323-E1-0602	8
	FAB. ISOMETRIC	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.
	MS-1-RB-02	5	2323-S1-0552	2	2323-MI-552	5

SUPPT. 130 — NPSI: MS-1-RB-02

CODE/CLASS:
PAINT. CARBOZINC
ZONE ~

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

nps industries. inc.
an nps group company

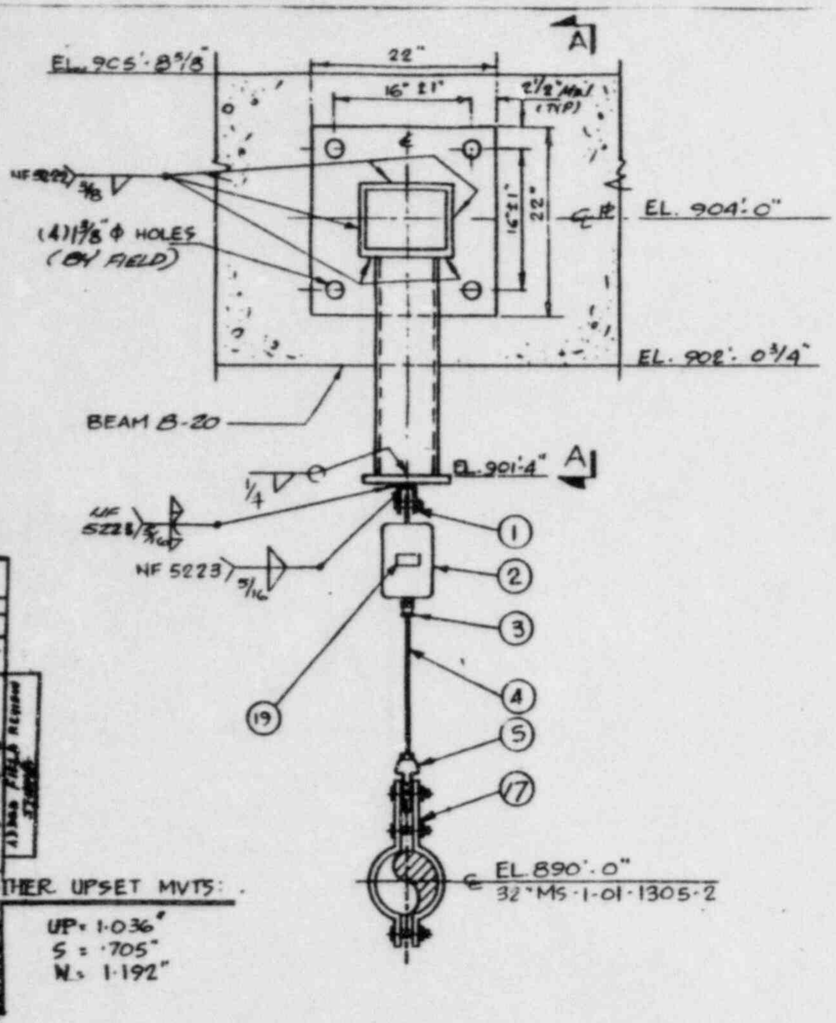
DRAWN	DATE	CHK'D	DATE	APPV'D	DATE
RR	5/11/78		5/15/78		5/15/78

P.O. NO. CP-0046 A-1 — MFG. REL.

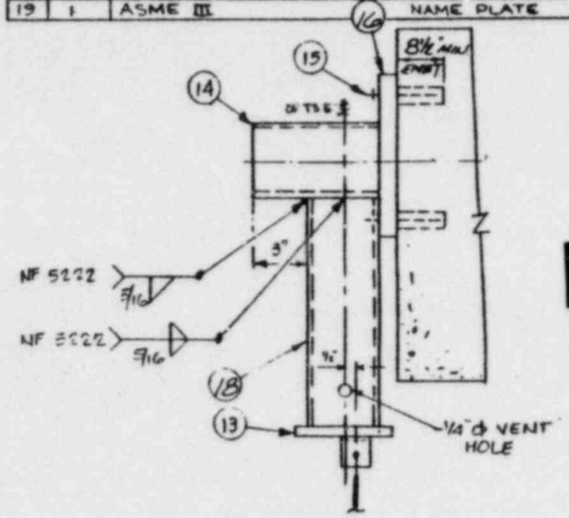
PRODUCTION ORDER — SERIAL NUMBER — SHEET 1 OF 1

138 — MK. NO. MS-1-01-002-C725 — REV. 1

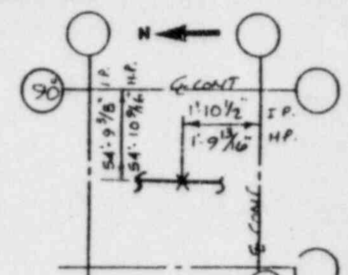
NPS Attachment 1



ELEV. LKG. SOUTH



SECTION A-A



LOCATION PLAN

ITEM NO	NO REQ'D.	DESCRIPTION	WT.	ASME OR ASTM	F M
1	1	BBD-16 WELDED BEAM ATTACH		SA 36	CSS
2	1	VLB-18 THOC HL-12790#, CL-14142#, T-1.017" VARIABLE SPRING SUPPORT		~	CSS
3	2	FHN-2" ϕ HEAVY HEX NUT		A 307	CSS
4	1	RET-16L HANGER ROD R_1-3", R_2-8"		SA 36	CSS
5	1	REN-16 WELDLESS EYE NUT		A 668 GR C	CSS
~~6~~	~~1~~	~~PTC-320-0824 PIPE CLAMP~~		~~SA 36~~	~~CSS~~
~~7~~	~~1~~	~~TS 6 x 6 x .375"~~		~~A 500 GR B~~	~~L~~
~~8~~	~~1~~	~~TS 6 x 6 x .375"~~		~~A 500 GR B~~	~~L~~
~~9~~	~~1~~	~~W 8 x 25~~		~~SA 36~~	~~L~~
~~10~~	~~8~~	~~RWP-12 EXCEPT 1" x 6" x 6" STK.~~		~~SA 36~~	~~CSS~~
~~11~~	~~4~~	~~RAT-12 x 1'-3" LG. STUDS~~		~~SA 36~~	~~CSS~~
~~12~~	~~8~~	~~FHN-1 1/2" ϕ HVY HEX NUTS~~		~~A 307~~	~~CSS~~
13	1	FP 3/4" x 8" x 8"		SA 36	PCS
14	1	TS 8 x 8 x .500"		A 500 GR B	L
15	4	1 1/4" ϕ SUPER HILTI x 12 3/16" LG (BY FIELD)		A 108 GR 1137	CSS
16	1	FP 2" x 22" x 1'-10" (SEE ELEV) BY FIELD		SA 36	PCS
17	1	PTC-320-0832 PIPE CLAMP		SA 36	CSS
18	1	TS 6 x 6 x .500		A500 GR B	L
19	1	ASME III NAME PLATE		~	~

FIELD REVIEW OF SUPPORT DESIGN
DATE: 9-29-80 REVIEWED BY: S. ZANIJI

REFERENCE COPY

REV.	DATE	DESCRIPTION	DR.	CHK	APP.
0	5/15/78	ISSUED FOR CONSTRUCTION	RE	JM	JD
1	8/3/78	REVISED ITEMS 7 & 8 ADDED [illegible]	RS	RK	JD
2	[illegible]	[illegible] FIELD REVIEW STAMP	ST	[illegible]	BG

* INCLUDES PIPE ATTACHMENT WT.

LOAD (LBS)	GRAV.	THER.	HYDRO	OBE	SSE	DESIGN LOADS NORMAL UPSET	EMERG.	FLTD
UP								
DN			12479			12,368		
N								
S								
E								
W								

MVTS (IN.)	NOR. THER.	SEISMIC
VERT.	1.017	
N-S	.673	
E-W	1.180	
PIPE CALC.	1 / 155#	
DATA POINT	35	
SUPP'T CALC	SC-24-1	

REFERENCE DRAWINGS	G & H ISOMETRIC	REV.	PIPING	REV.	ELECTRICAL	REV.	CODE/CLASS: III/2
	2323-MI-3202-01	4	2323-MI-0506	8	2323-EI-0502	8	PAINT [illegible] #11
	AB. ISOMETRIC	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.	
	MS-1-RB-02	8	2323-SI-0532	2	2323-MI-552	5	ZONE ~

81 SUPP'T 150 NPSI: MS-1-RB-02

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

nps industries, inc.
an nps group company

DRAWN	DATE	CHK'D	DATE	APPV'D	DATE
RE	5/3/78	JM	5/15/78	JD	5-15-78

P.O. NO. CP-0046 A-1 | MFG. REL.

PRODUCTION ORDER	SERIAL NUMBER	SHEET
		1 OF 1

138 | MK. NO. MS-1-01-002-C72S | REV. 2

NPS FORM 103 2/78

inter-office memo

NPS Attachment 2

nps

To: S. REBARBER

Date	Subject	From
6. 9. 82	CONT. BLDG.	P. CORBO

PLEASE NOTE THAT IN UNIT #1 MANY SUPPORTS HAVE BEEN REDESIGNED BY THE FIELD DUE [redacted] TO INTERFERENCE WITH EQUIPMENT HATCH @ EL. 832'-0" -

LET'S MAKE AN EFFORT DO NOT LET THE SAME HAPPENE~~D~~ TO UNIT #2 -

CC

TO ALL DESIGNERS -
&
HD

TUSI

nps

INTER-OFFICE MEMO

To: ALL DESIGNERS
From: P.C. / H.D.
Date: 5-30-79
Subject: HANGERS COMPONENTS WEIGHT

ON THE DESIGNER SKETCHES THE WEIGHT OF THE HANGER COMPONENTS (CLAMPS, RODS, Ecc) SHALL BE SHOWN ∴ THE STRUCTURAL ENGINEER SHALL USE THIS LOAD WITH G & H LOADS (FROM COMPUTER ANALYSIS PRINTOUT, TO SIZE UP THEIR STRUCTURAL MEMBERS-

THE DESIGNERS SHALL INCLUDE THE WEIGHT OF THE HANGER COMPONENTS (CLAMPS, RODS, Ecc) TO G & H LOADS TO SIZE UP THE SPRING UNITS IN PARTICULAR FOR SMALL UNITS -

inter-office memo

To: DESIGNERS -TUSI PROJECT-

Date	Subject	From
2-11-82	PIPING SYSTEM INFO.	P. CORBO

- REMINDER TO ALL DESIGNERS -

THE PIPE SUPPORT CALCULATION TRANSMITTAL FORM, BEFORE BEING ISSUED TO THE STRUCTURAL GROUP SHOULD BE COMPLETE WITH ALL DESIGN INFORMATIONS, SUCH AS:

PIPING SYSTEM
MATERIAL
PRESSURE
TEMPERATURE

THE ABOVE INFORMATIONS ALONG WITH THE INSULATION CLASS CAN BE FOUND IN THE FOLDER LISTED AS:

- PIPE LINE DESIGNATION -
TUSI PROJECT.

CC

HM
SR
JD

inter-office memo

To: H. MORRELL
S. REBARBER

Date	Subject	From
9.13.82	-TUSI- DESIGN PROCEDURE	P. CORBO

MAIN STEAM, FEED WATER AND SYSTEMS WITH TEMPERATURE ABOVE 549°F THEY MUST BE APPROVED BY THE PROJECT ENGINEER BEFORE GOING TO THE STRUCTURAL GROUP -

CC
JG
JB
HD
TB
AP

nter-office memo

ATTACHMENT 4

To: G. Breidenbach

NJ-01-3354

nps

Date	Subject	From
May 14, 1982	Review of NPS Standard and Computer Programs	P. Mottola/P. Deubler R. Maurici

INTRODUCTION

On May 10 and 12, 1982, a joint review of the Standards and Computer Programs utilized by Nuclear Power Services, Inc., was conducted by Pete Deubler, Director of Engineering and Richard Maurici, Q.A. Manager of NPS Industries, and Pete Mottola, Q.A. Manager of Nuclear Power Services, Inc. The purpose of the review was to determine if proper verification was performed prior to utilization of the Standards and Computer Programs. This report presents the results of the review.

1. Standards -

   Four Standards were reviewed as follows:

   a. Design Standards for One-Line Contact Supports for ASME Class 1, 2, & 3 pipe. SDS-82-001-R1 3/4/81 - The technical backup for this standard is "A Brief Review of the ASME Design and Assessment criteria for Class 1 components and a Design method for One Line Contact Pipe Support Structures" NPS-AM83-003-001/Rev. 0. A review of these documents indicated that the backup document provides adequate verification of the Design Standard.

   b. Structural Design Requirements SDS: NF11.1 thru 11.5 and 12.1 thru 12.3. These documents are summaries of the requirements of ASME III Subsection NF and Appendix XVII design formulas and allowable stresses. Therefore, the technical backup is the Code itself and the checking performed during the preparation of the document is sufficient.

   c. Computational Sheet for Local Stress in Cylindrical Shells. This document is a computational sheet and it was verified using WRC-107/Aug. 65 prior to its issuance.

   d. Design Procedure for Shear Lugs. This document is a sample calculation and was verified using Kellog "Design of Piping Systems" second edition.

The above four reviews indicate that standards are adequately verified prior to their issuance and use.

2. Computer Programs -

   The computer programs used break down into two areas: Computer Programs originated by Nuclear Power Services, Inc., and Computer Programs procured from outside sources.

   a. Computer Programs originated by Nuclear Power Services, Inc.:

      There are currently three programs in use and one under development. The three programs in use are BASEPLATE, DYNAPO, and PIPLOC. Development of computer programs is covered by NPS generic Work Procedure 3.1.2 Rev. 1 dated 4/15/82 (not yet formally issued).

The BASEPLATE version 3.0 was certified on 5/13/81. The certification and backup verification were in accordance with the requirements of W.P. 3.1.2 Rev. 1.

The DYNAPO 3 was certified on 2/19/82, and the certification and backup verification were in accordance with W.P. 3.1.2 Rev. 1. DYNAPO 4 verification and certification on 10/20/81 were also in accordance with W.P. 3.1.2 Rev. 1.

The PIPLOC was verified by report NPS-AM-82-005-005-2, however certification in accordance with the latest W.P. has not been completed yet since the program predates the revised procedure.

b. Procured Computer Programs:

There are currently several procured computer programs in use by Nuclear Power Services, Inc. Their verification is covered by W.P. 3.1.2 Rev. 0. This W.P. requires verification either by the Supplier or Nuclear Power Services, Inc. Currently, Nuclear Power Services, Inc., is in the process of reviewing for acceptance the documentation of verification by the supplier for STRUDL and and ANSYS and obtaining documentation for other programs. It should be noted that the programs being utilized have generally been accepted for use in the industry.

Conclusions and Recommendations

The items examined during this review revealed that the standards and computer programs being utilized were generally adequately verified. However, it is recommended that a new procedure be issued as a parallel to W.P. 3.1.2 Rev. 1, the new procedure to cover procured computer programs and that the ongoing efforts relative to reviewing the verification of procured computer programs be completed.

Pete Mottola

Pete Deubler

Rich Maurici

PM/PD/RM/dmp

cc: J. Gartenberg
J. Grabie
J. Lefter
F. Samaan
J. Takeuchi

nuclear power services, inc.

NONCONFORMANCE REPORT

MARK NO. ☐ DWG. NO. ☒ SPEC. NO. ☐ NPS-2S-874	CALC NO.:	NCR NO. 1-1015
SYSTEM NO.: MK. No. SI-2-197-401-S32K, Rev. 2	PROJECT: TUSI	SITE ______ HO ☒
PACKAGE NO.:	OTHER	DATE 3-19-82
		INITIATOR: J. Grabie
		NPS PROCEDURE: CP-PP-11, Rev. 3

DESCRIPTION OF NONCONFORMANCE (BE SPECIFIC)

Revision 2 of this drawing was not submitted for Q.A. Review as required by Paragraph 4.1.17 of Project Procedure CP-PP-11, Rev. 3. In addition, this revision was signed off as "Drawn" and "Checked" by personnel whose initials do not appear on the authorized signature list.

D I S P O S I T I O N

☒ CATEGORY 1 PROCEED WITH WORK
☐ CATEGORY 2 PROCEED WITH WORK. HOLD TRANSMITTALS
☐ CATEGORY 3 HOLD WORK. HOLD TRANSMITTAL
☐ CATEGORY 4 CORRECT PREVIOUS TRANSMITTALS
☐ OTHER

	DATE		DATE	QUALITY ASSURANCE	DATE
	DATE	CUSTOMER	DATE	P. Nottola (signature)	DATE 3/19/82

S P E C I F I C   I N S T R U C T I O N S

The revision in question is dated 10-21-81. For the TUSI Project, determine which drawings were transmitted without going through QA for the period 8-21-81 to 12-21-81. QA is to review any that are found and specifically check for unauthorized signatures. These must be rechecked and upgraded to the next revision level. Work to be completed by 4-19-82.

VERIFICATION OF DISPOSITION AND/OR COMMENTS: Drawings have been re-checked and those affected have been marked for revision (See attached memo from P. Corbo to G. Henry dated 6-2-82).

	DATE		DATE	MANAGER OF Q.A.	DATE
George Henry (signature)	6-3-82			Peter Nottola (signature)	6-3-82

CORRECTIVE ACTION REVIEW

☐ REQUIRED

☒ NOT REQUIRED

REFERENCE DOCUMENTS (i.e. CAR) ______

Peter Nottola (signature) — MANAGER OF QUALITY ASSURANCE — 6-3-82 DATE

C01086 TP 091280

inter-office memo

To: Pete Mottola

Date	Subject	From
May 11, 1982	NCR No. 1-1015 -TUSI Project-	P. Corbo

The supports issued during the period of 8-21-81 thru 12-21-81 have been reviewed for unauthorized signature.

During this period only 5 of 505 supports have been found to have signatures not listed in the authorized signature list.

These supports will be rechecked and upgraded when the next revision will occur.

The entire work related to this NCR No. 1-1015 is available to Q.A. personnel upon request.

PC:rm

cc: J. Gartenberg
G. Breidenbach
H. D'Errico
F. Labay
G. Henry

inter-office memo

To: G. Henry

nps

Date	Subject	From
June 2, 1982	NCR No. 1-1015 - TUSI Project	P. Corbo

Reference inter-office memo to P. Mottola dated May 11, 1982.

Rechecking the 505 supports issued during the period of August 21, 1981 thru December 21, 1981 only the following 4 supports have been found to have a signature not listed in the authorized signature list:

NPS-2213	CS-1-079-029-C42A	Rev. 2
-3077	CC-1-207-015-C53R	Rev. 2
-996A	MS-1-004-005-C72K	Rev. 3
-262	SI-1-106-003-C42R	Rev. 4

A note has been added to the originals of these drawings which says that they will be upgraded when the next revision occurs.

Philip Corbo
P. Corbo
June 2, 1982

PC:rm

PC
TB

NPS Attachment 6

inter-office memo

To: Distribution

nps

QA-83-864

Date	Subject	From
December 8, 1983	10 CFR 21 Committee Meeting Minutes	P. Mottola

On this date, discussions were held to review those actions taken by NPS to verify the close-out of Nonconformance Reports 1-1020 & 1-1021.

Those involved were:

P. Mottola - Manager of Quality Assurance
J. Gartenberg - Vice President of Engineering
D. Behan - Vice President of Projects
G. Burke - Manager of Computer Program Applications
B. Goldman - Project Manager, Computer Program Development

By review of all documentation describing those actions taken and the results of those actions, (potential reportable deficiency investigation), it is our opinion that NPS is not required to advise the NRC as stated in 10 CFR 21.21(b)(3) and 10 CFR 50.55(e).

It is also our opinion that NPS Client, Westinghouse Electric Corp., user of the STIFFPLATE Program be advised of the error for their information and handling.

All supporting documentation justifying this decision is located within the Quality Assurance Departments Nonconformance Report Files.

P. Mottola

PM/ka

P. Mottola
Manager of Quality Assurance

G. Burke
Manager of Computer Program Applications

J. Gartenberg
Vice President, Engineering

B. Goldman
Project Manager, Computer Program Development

D. Behan
Vic President, Projects

cc: A. J. Moellenbeck G. Breidenbach D. Ravad G. Henry
Q. A. File 10 CFR 21 File (original)

nuclear power services, inc.

AUDIT FINDING SHEET

(1) AUDIT NUMBER	(2) FINDING NUMBER	(3) AUDITOR
1	1	Felix R. Labay

(4) AUDIT AREA TUSI-Comanche Peak
Design Control - Revisions

(5) AUDIT DATES June 25-26, 1981

(6) REQUIREMENTS Section 4.1.5 of CP-PP-11, Rev. 1, Dated 2-17-81, Design Control - Revisions, states, the Design Change Notice will be forwarded by the Design Project Engineer to the Support Design Team Leader, who will assign it to a designer. After appropriate action has been taken, that action shall be indicated by the dated initials of the responsible party.

(7) CRITERIA Stated in Section (6)

(8) FINDING

Based on the number of DCNs reviewed (10), it has been found that all actions taken are not indicated on the corresponding activity block on the DCN form.

(9) AUDITOR Felix R Labay DATE 7/16/81

(10) FINDING ACKNOWLEDGED BY Brian L. Murphy 7/16/81; Philip Corbo 7/16/81

(11) RECOMMENDED ACTION

The method of indicating actions taken on the DCN sheet should be modified to comply with the requirements stated in Section (6). The activity blocks on the DCN sheet should be marked to indicate completion of that appropriate activity.

(12) EFFECTIVE DATE 8-16-81 (13) MANAGER OF QA APPROVAL Joel Seelise

RE-AUDIT

(14) ACTUAL CORRECTIVE ACTION

Corrective Action has been implemented per Section 4.1.5 of CP-PP-11. Inter-office memo dated 8-4-81 has been issued to Team Leaders to correct discrepancies found during the audit.

(15) DATE ACTION TO BE COMPLETED 10-9-81 (16) RESPONSIBLE SIGNATURE Philip Corbo

RE-AUDIT RESULTS

A review of the DCN books showed that the discrepancies had been corrected. The Quality Assurance Department shall make further surveillance for compliance of this requirement.

AUDITOR Felix R Labay DATE 11/11/81

MANAGER OF QA Joel Seelise DATE 11-12-81

C0108E TP 091180

nuclear power services, inc.

AUDIT FINDING SHEET

(1) AUDIT NUMBER	(2) FINDING NUMBER	(3) AUDITOR
3	8	G. Henry

(4) AUDIT AREA TUSI-COMANCHE PEAK
Design Control - New

(5) AUDIT DATES December 15-16, 1981

(6) REQUIREMENTS
Upon completion of the incorporation of field comments, the Design Team Leader or his designee reviews the design sketches and forwards them along with a signed Pipe Support Calculation Transmittal form...to the Sturctural Team Leader.

(7) CRITERIA Section 4.1.14 of CP-PP-10, Rev 2

(8) FINDING
Pipe Calculation Transmittal Sheet transmitting support or Problem 2-56A were not signed by Team Leader (or his Designee).

(9) AUDITOR George Henry DATE 1-20-82

(10) FINDING ACKNOWLEDGED BY Philip Corbo DATE 1.20.82

(11) RECOMMENDED ACTION

Institute controls so that the requirement for the above section of the procedure is complied with.

(12) EFFECTIVE DATE 2-22-82 (13) MANAGER OF QA APPROVAL [signature] 1-21-82

RE-AUDIT

(14) ACTUAL CORRECTIVE ACTION
Pipe Support Calculation Transmittal Sheet for Problem 2-56A will be signed and dated by Team Leader or his Designee to comply with Section 4.1.14 of CP-PP-10, Rev. 2.

(15) DATE ACTION TO BE COMPLETED 3/2/82 (16) RESPONSIBLE SIGNATURE Philip Corbo

RE-AUDIT RESULTS
The Pipe Support Calculation Transmittal Sheet for Problem 2-56A has been signed and dated by the Team Leader in compliance with the requirements stated in Section (6) of the audit finding sheet.

AUDITOR [signature] DATE

MANAGER OF QA [signature] DATE [illegible]

nuclear power services, inc.

nps

AUDIT FINDING SHEET

(1) AUDIT NUMBER	(2) FINDING NUMBER	(3) AUDITOR
1	7	Felix R. Labay

(4) AUDIT AREA TUSI-Comanche Peak
Design Control - Revisions

(5) AUDIT DATES June 25-26, 1981

(6) REQUIREMENTS Section 4.1.11 of CP-PP-11, Rev. 1, dated 2-17-81, Design Control - Revisions, states, the Structural Team Leader assigns the drawing package to one of the Structural Designers who will perform the necessary revisions to the existing calculations to qualify the Support/Restraint for the applicable conditions. These calculations will be performed on standard NPS Form 101 6/77.

(7) CRITERIA Stated in Section (6)

(8) FINDING

The Structural Department currently perform their calculation on a new form utilizing a revision sticker, thereby superseding NPS Form 101 6/77.

(9) AUDITOR Felix R Labay DATE 7/16/81

(10) FINDING ACKNOWLEDGED BY [signature] DATE 7/16/81
Philip Corbo 7.16.81

(11) RECOMMENDED ACTION
Revise Section 4.1.11 of CP-PP-11 to incorporate the new form being used for the Structural calculations.

(12) EFFECTIVE DATE 8-16-81 (13) MANAGER OF QA APPROVAL [signature]

RE-AUDIT

(14) ACTUAL CORRECTIVE ACTION
Section 4.1.11 of CP-PP-11 has been revised to 4.1.10 of CP-PP-11, Rev. 2 to incorporate the new form being used for the structural calculations.

(15) DATE ACTION TO BE COMPLETED 10-9-81 (16) RESPONSIBLE SIGNATURE Philip Corbo

RE-AUDIT RESULTS
Revised Sections 4.1.10 and 4.1.11 of CP-PP-11 of the TUSI Project Procedures Manual was issued on 9-30-81. After this date, all structural calculations shall be performed on standard NPS calculation sheets.

AUDITOR Felix R Labay DATE 11/11/81

MANAGER OF QA [signature] DATE 11-12-81

C0108E-TP 091180

inter-office memo

To: Felix Labay

Date	Subject	From
12-23-81	TUSI Project Technical Audit	Bruce Goldman

Reviewed Problem #2-56 A

Three support designs audited - CC-2-201-402-C53R
CC-2-201-407-C53R
CC-2-201-404-C53R

CC-2-201-402-C53R

Reviewed conceptual -

Location plan agrees with Iso

Shop weld plate to CC-2-247-402-C53R not possible, should be field weld, three sides only.

Field weld to CC-2-193-409-C52R weld symbol indicates welding on top of tube. This is not accessible. Weld symbol should indicate welding on far side.

Dimension 9 7/16 disagrees with other dimension on detail (4 9/16" + 5")

Stiffeners are located at 10" O.C. These will interfere with U-bolt. On drawing stiffeners were correctly relocated. This does not agree with conceptual

Reviewed Structural analysis -

Ay and Az have different values. For a square tube they should be equal.

Torsional loading does not agree with arrangement and load in conceptual.

Weld calculations for rear bracket does not agree with geometry of weld on detail.

CC-2-201-407-C53R

Reviewed conceptual -

Location plan agrees with Iso.

Connection to 2C-2280 A cannot be fillet welded on bottom.

CC-2-201-404-C53R

Reviewed conceptual -

Location plan different than Iso CC2-RB97
(6' - 1 1/2 vs 6' - 8 1/8) Drawing shows 6' - 4 3/4"

To : Felix Labay
From : Bruce Goldman
Subject: TUSI Project
Date : December 23, 1981

Reviewed calculation - OK

Recommended Action

General

Review a sample of support details to assure accessibility for welding to existing structures all around, particularly to upper attachments is not a generic problem.

Review a sample of support details to assure welding symbols are correctly detailed with regard to near side vs far side weld.

Specific

Revise details to correct errors.
Revise structural calculations for CC-2-201-402-C53R.

Bruce Goldman

sb

nuclear power services, inc.

NONCONFORMANCE REPORT

NCR NO. 1-1005

SITE ______ HO ☑

MARK NO. ☐ DWG. NO. ☐ SPEC. NO. ☐ N/A	CALC NO.: N/A	DATE 11-20-81
SYSTEM NO.: N/A	PROJECT: VARIOUS (SEE BELOW)	INITIATOR: JOEL GRABIE
PACKAGE NO.: N/A	OTHER	NPS PROCEDURE: CQAM - SECTION 15.0

DESCRIPTION OF NONCONFORMANCE (BE SPECIFIC)

AS INDICATED DURING THE NRC AUDIT OF NPSI/NPS PERFORMED ON NOV. 16 - 19, 1981, SEVERAL SUPPORT SKETCHES WERE FOUND TO HAVE HAD FILLET WELDS WHICH WERE UNDERSIZED AS PER ASME/AISC CRITERIA FOR MINIMUM SIZE FILLET BASED ON MEMBER SIZE.

DISPOSITION

☐ CATEGORY 1 PROCEED WITH WORK	☐ CATEGORY 2 PROCEED WITH WORK. HOLD TRANSMITTALS	☐ CATEGORY 3 HOLD WORK. HOLD TRANSMITTAL	☐ CATEGORY 4 CORRECT PREVIOUS TRANSMITTALS	☑ OTHER SEE BELOW

	DATE		DATE	QUALITY ASSURANCE	DATE
[signature]	11-20-81	David Raisz [signature]	11-20-81	[signature]	11-20-81
	DATE	CUSTOMER	DATE		DATE

SPECIFIC INSTRUCTIONS

PRELIMINARY INVESTIGATION REVEALS THAT THIS PROBLEM MAY AFFECT SEVERAL PROJECTS INCLUDING TUSI, STP, MAANSHAN, LAGUNA VERDE, ZIMMER AND BYRON. DISPOSITION ON AN INDIVIDUAL SUPPORT BASIS CAN BE MADE ONLY AFTER A COMPLETE INVESTIGATION HAS BEEN PERFORMED.

DISPOSITION: 1) INITIATE NCR FOR EACH PROJECT TO IDENTIFY SUPPORTS INVOLVED
2) INITIATE 10CFR 21 REVIEW TO DETERMINE SAFETY IMPLICATIONS AND REPORT.

VERIFICATION OF DISPOSITION AND/OR COMMENTS: See attachment for details

	DATE		DATE	MANAGER OF Q.A.	DATE
				[signature]	1-19-82

CORRECTIVE ACTION REVIEW

☐ REQUIRED

REFERENCE DOCUMENTS (i.e. CAR) ______

☑ NOT REQUIRED

[signature] MANAGER OF QUALITY ASSURANCE — 1-19-82 DATE

ATTACHMENT

NONCONFORMANCE REPORT 1-1005

Verification of Disposition and/or Comments

The following have been issued to satisfy the stated disposition on this NCR. All further actions necessary are stated in the instructions areas on NCR'S 1-1006, 1-1007, 1-1008, 1-1009, 1-1010, 1-1011 and 1-1012.

TUSI

A) Stated Disposition 1 -

Initiate NCR for each project to identify supports involved.

Action Taken

1) Inter-Office Memo QA-82-376 dated 1-18-82 has been issued for:

(a) NCR-1010 - Byron Project 1062
(b) NCR-1011 - Zimmer Project 1040
(c) NCR-1012 - Zimmer Project 1047

2) Inter-Office Memo QA-82-377 dated 1-18-82 has been issued for:

(a) NCR-1-1006 - Laguna Verde Project 3138
(b) NCR-1-1007 - STP Project 3006
(c) NCR-1-1008 - Maanshan Project 3043/3044
(d) NCR-1-1009 - TUSI Project 3010/3011

B) Stated Disposition 2

Initiate 10CFR21 review to determine safety implications and report.

Action Taken

1) Inter-Office Memo QA-82-373 dated 1-15-82 has been issued outlining the procedures to be followed for the performance of the required review.

This Nonconformance Report is considered closed.

inter-office memo

To: A.J. Moellenbeck

nps

QA-82-373

Date	Subject	From
January 15, 1982	10CFR 21 Review Reference NCR-1-	Joel Grabie

Please be advised that a 10CFR 21 Investigation Panel was convened on December 14, 1981 to discuss the investigation relative to the referenced Nonconformance Report.

The attendees were as follows:

A. J. Moellenbeck - President
J. Gartenberg - Vice President Engineering
G. Breidenbach - Engineering Manager
D. Ravad - Site Engineering Manager
J. Grabie - Manager of Quality Assurance

The following items were discussed during the meeting:

1) Drawing review criteria
2) Preliminary review results
3) Scope of review to be performed
4) Reporting requirements

Future meetings are to be held to discuss the progress and interim results of the review. The scheduled completion date of the review is January 30, 1982.

Joel Grabie

JG/ka

cc: J. Gartenberg
G. Briedenbach
D. Ravad

nuclear power services, inc.

NONCONFORMANCE REPORT

NCR NO. 1-1009

SITE ______ HO [X]

MARK NO. ☐ DWG. NO. ☐ SPEC. NO. ☐ N.A.	CALC NO.: N.A.	DATE 12-14-81
SYSTEM NO.: N.A.	PROJECT: 3010/3011 TUSI	INITIATOR: G. Breidenbach
PACKAGE NO.: N.A.	OTHER	NPS PROCEDURE: CQAM - Section 15.0

DESCRIPTION OF NONCONFORMANCE (BE SPECIFIC)

Design Drawings for this project may include fillet welds which are undersize per ASME criteria based on member size.

DISPOSITION

[X] CATEGORY 1 PROCEED WITH WORK	☐ CATEGORY 2 PROCEED WITH WORK. HOLD TRANSMITTALS	☐ CATEGORY 3 HOLD WORK. HOLD TRANSMITTAL	☐ CATEGORY 4 CORRECT PREVIOUS TRANSMITTALS	[X] OTHER See Below

[signature]	DATE 12-15-81		DATE	QUALITY ASSURANCE [signature]	DATE 12-14-81
	DATE	CUSTOMER	DATE		DATE

SPECIFIC INSTRUCTIONS

Perform a documented drawing review to determine if the problem exists, the extent of the problem, and required disposition.

Review is to be initiated immediately with periodic meetings to be held (usually biweekly) as called for by the Project Manager. Targeted completion date for the review is 1/30/82.

VERIFICATION OF DISPOSITION AND/OR COMMENTS: Review has been completed and the corrective action taken verified. Refer to attached memo from J. Grabie to P. Mottola (0-QE-82-070 dated 10-4-82).

	DATE	George Henry	DATE 10-13-82	MANAGER OF Q.A. Peter Mottola	DATE 10-13-82

CORRECTIVE ACTION REVIEW

☐ REQUIRED

[✓] NOT REQUIRED

REFERENCE DOCUMENTS (i.e. CAR) ______

Peter Mottola 10-13-82

MANAGER OF QUALITY ASSURANCE DATE

8301080 TP 091280

inter-office memo

To: Pete Mottola

nps

0-QE-82-0

Date	Subject	From
October 4, 1982	Undersized Weld Evaluation	Joel Grabie

With regard to NCR 1-1006 (as it relates to the Laguna Verde Project), NCR 1-1007 (as it relates to the STP Project), NCR 1-1008 (as it relates to the Maanshan Project) and NCR 1-1009 (as it relates to the TUSI Project), a detailed review of designs was performed. The total review covered approximately 13,700 sketches, of which 1,300 sketches included welds which were undersized by Appendix XVII criteria.

Evaluation undersized, overstressed welds -

For its potential use in dispositioning welds found to be undersized by the review, the design stress was noted from the design data, or calculated if the weld was sized by inspection. The review indicated that 12 (out of the 1300 noted undersized) welds were overstressed.

1) Laguna Verde - there were no undersized overstressed welds discovered.

2) STP Project - eight (8) undersized, overstressed welds were discovered. On further review of the related calculations, four (4) were found not to be overstressed. The remaining four (4) shared a common condition of exceeding the through plate thickness tensile limits which were in the Code in effect on that project. These tensile limits were deleted in the W78 Addenda as being counter-productive, therefore, it was evaluated as not a defect and not reportable.

3) Maanshan Project - four (4) undersized, overstressed welds were discovered. A review of the related calculations revealed that the allowable stresses selected were too conservative, and the welds proved to be not overstressed when compared to the actual Code allowables.

4) TUSI Project - there were no undersized overstressed welds discovered.

A series of training sessions had been given to design personnel instructing them in the use of Appendix XVII criteria. It is hoped that this Corrective Action will avoid a recurrance of this problem.

Joel Grabie

cc: J. Gartenberg
G. Breidenbach
~~G. Henry~~

CPP-7436 to sign

TEXAS UTILITIES SERVICES INC.

OFFICE MEMORANDUM

RECEIVED 6/16/82

To M.R. McBay Glen Rose, Texas May 11, 1982

Subject COMANCHE PEAK STEAM ELECTRIC STATION
FILLET WELD SIZING REQUIREMENTS

NCR H15-019

copies P. Drubler, R. Maurici, P. Mottola, Tim/H.D, P.C., J.G., G.B, P.M, P.D., R.M., P.M.

As requested in your leter of 3-15-82, I am responding concerning the above subject. The requirements for minimum fillet weld sizes are specified in Appendix XVII to the ASME Code; paragraph XVII-2452.1 and table XVII 2452.1-1. NPSI has informed us by letter of 663 supports that were released with fillet welds specified that did not meet the above requirements (letter 12-1768 listed 382 Q supports and letter 13-318 listed 281 non-Q supports). PSE has reviewed our situation in light of the above and we have identified 8 SB typicals that have the same problem. The weld sizing criteria have always been a part of our "Engineering Guidelines", so we feel there is no problem with SB special designs or LB site designs. As a backup however, we will take actions 3 & 4 described below.

Our corrective actions are:

1) The supports identified in NPSI's letters have all been placed on "HM" hold, which is not a hold on construction. If the minimum welds still exist on these supports they will dispositioned by CMC. These would be coded "HMR" as progress on the PSE "ACT" report. ✓

2) George Bunt is identifying where he has used the problem SB typicals (CP-AA-101, 102, 114, 300, 302, 406, 426, and 427). None of these are commonly used typicals. Each support where these typicals were used will be CMC'ed.

3) Both SB and LB CMC review groups have been told to check each support they review for weld sizing problems.

4) Our PSE past design audit will include a check for weld sizing problems also.

With the above actions we feel that all weld sizing problems will be identified and corrected.

John C. Finneran
John C. Finneran

JCF/cs

cc: J. Ryan
P. Chang
R. Baker
G. Bunt
R. Gustafson
J.R. Johnson

NPS INDUSTRIES, INC.
60 20005
JUN 16 1982
RECEIVED

nps industries. inc.

NONCONFORMANCE REPORT

NCR No. H-15-019

Hold Tag No.

AUS ☐ PDX ☐ HO☐

Identification Number	Item No.	Production Order No.	DATE: 2-8-82
Supplier: NPS, INC (DESIGN)	Qty —	Project: TUSI NF	Initiator: HERMAN W. D'ERRI
Manufacturer: NPS INDUSTRIES	Qty —	Other Identification: CP 0046A.1	QC Supervisor: R Maurer

DESCRIPTION OF NONCONFORMANCE (Be specific)

Ref. NPSI Procedure

NPS INC. HAS PROVIDED PIPE SUPPORT DESIGN FOR THIS PROJECT THAT INCLUDED UNDERSIZED FILLET WELDS PER THE MINIMUM WELD CRITERIA OF THE ASME CODE APPENDIX 17 TABLE XVII-2452.1-1 "MINIMUM SIZE OF FILLET WELDS". A DOCUMENTED DRAWING REVIEW IDENTIFIED 382 SUPPORTS WITH UNDERSIZED WELDS PER THE ABOVE CRITERIA. THE ATTACHED LISTING IDENTIFIES THE AFFECTED SUPPORTS AND WELDS.

DISPOSITION See memo from TUSI

Use As Is ☐	Qty	Rework ☐	Qty	Repair ☐	Qty	Reject ☐	Qty	Other (if not for Mat'l or Item) ☐

Production	Date	Engineering	Date	Quality Assurance	Date
				Richard Maurer	6/21/82
		Customer	Date	A N I	Date

SPECIFIC INSTRUCTIONS

No action required see memo from TUSI

Verification of Disposition Action and/or Item(s)/ Part (s) Reinspected:

Comments: See attached memo from TUSI

Quality Control	Date	QA / QC Supervisor	Date	Manager of Q A	Date
		Richard Maurer	6/21/82	Richard Maurer	6/21/82

CORRECTIVE ACTION REVIEW

☐ Required Reference Documents: (ie. CAR etc.)

☒ Not Required AUS ☐ PDX ☐ HO ☒ CCRP ☐

Richard Maurer 6/21/82

Manager of Quality Assurance Date

inter-office memo

To: J. Takeuchi

NJ-01-3130

nps

Date	Subject	From
February 15, 1982	10 CFR 21 Review NCR-H15-009/HO-0003	Leo Hovi

NCR H15-009 was issued on November 20, 1981, to review nuclear designs for the undersized fillet welds identified in that NCR. On December 10, 1981, Deubler, Hovi, Hoera, and yourself convened a 10 CFR 21 panel and concluded this situation also required review for reportable defect under 10 CFR 21.

The review of nuclear designs prepared for pipe support projects and for miscellaneous sales is now complete. The detail by project is on the individual NCR's, but the total review covered approximately 13,700 sketches, of which 1,300 included welds which were undersized by Appendix XVII criteria.

On February 9, 1982, the 10 CFR 21 panel was reconvened to discuss and reach a final evaluation on these welds. The panel membership consisted of:

NPS Industries: P. Deubler - Director of Engineering
W. Hoera - Director of Projects
L. Hovi - Senior Vice President
R. Maurici - H.O. Manager of Quality Assurance

Nuclear Power Services: G. Breidenbach - Engineering Manager
J. Grabie - Manager of Quality Assurance
A. Moellenbeck - President

F. Samaan, NPS Structural Group Supervisor, also was present at the meeting. Note that this was a joint meeting for those projects where NPSI has subcontracted design to NPS, to allow simultaneous resolution of NPS' 10 CFR 21 requirements.

The design sketch review performed under the NCR identified (1) welds which were undersized, and (2) also indicated that a few of these undersized welds were overstressed. The evaluation was performed separately for the two conditions.

(1) Evaluation of undersized welds - Subsection NF of the Code references Appendix XVII for the design of linear supports. Appendix XVII was adopted by the ASME from the AISC Specification for the design, fabrication, and erection of structural steel for buildings, and includes a Table XVII-2452.1-1. This table establishes minimum sizes for fillet welds based on the thickness of the members being joined. The relative need for and importance of this minimum weld size for NF Code and AISC Code welding, and the differences in welding parameters and inspection practices was discussed. The panel concluded that these weld joints, even if as-built welded to the dimension on the sketch, did not constitute a substantial safety hazard and thus were not reportable. The panel requested that P. Deubler and G. Breidenbach prepare a detailed report covering the technical aspects of this evaluation.

(2) Evaluation of undersized, overstressed welds - For its potential use in dispositioning welds found to be undersized by the review, the design stress was noted from the design data, or calculated if the weld was sized by inspection. The review indicated that 12 welds were overstressed and resulted in the panel reviewing this condition independently as a reportable defect.

Four of these supports are on the Maanshan Project. A review of the calculations revealed that the allowable stresses selected were too conservative, and the welds proved to be not overstressed when compared to the actual Code allowables. These supports were therefore evaluated per (1) above as not reportable, but the panel noted that this project was for a foreign customer and not subject to 10 CFR 21.

The remaining eight overstressed supports are on the STP Project. Four of the eight were found to be not overstressed on further review of the calculations. The four remaining shared a common condition of exceeding the through plate thickness tensile limits which were in the Code in effect on that project. These tensile limits, NF-3226.5 and 3321.1(c) were deleted in the W78 Addenda, as being counter-productive for the lamellar tearing problem they were intended for. This was evaluated by the panel as not a defect and not reportable. Two of the same four were identical and also had a shear stress of 103% allowable. This condition was evaluated as a defect which could not create a substantial safety hazard and not reportable.

The shipping status of all 12 of these supports was unknown at the time of this evaluation, and was not a pertinent factor in view of the evaluation.

There were no other deviations from this NCR requiring evaluation.

Signed for NPS Industries: ____________ Director of Engineering
____________ Director of Projects
____________ Senior Vice President
____________ HO Manager of Quality Assuran

Signed for Nuclear Power Servcies ____________ Engineering Manager
____________ Manager of Quality Assurance

LH:dmp

Attachments for file:

(a) Technical report for (1) above
(b) Sketch identification and supporting data for (2) above

10CFR21 Review Meeting
2/9/82 Attendance Sheet

Signature	Company	Title
Richard Mannin	NPS INDUSTRIES INC	QA Manager
B. J. [illegible]	"	Director of Engineering
Leo Horn	"	S.V.P.
Walt Horn	"	Director of Projects
G. BREIDENBACH	NPS	ENGR. MGR.
J. GARTENBERG	NPS	V.P. ENG.
A. Moellenbeck JM	Nuclear Power Services	Pres
[illegible signature]	NPS, INC	MGR. QA
F. SAMAAN	NPS	STRUCT GROUP SUPER

nps industries, inc.

CORRECTIVE ACTION REQUEST

TO: Nuclear Power Services
One Harmon Plaza, Secaucus, NJ
Attn: A. Moellenbeck

cc: G. Breidenbach, J. Gartenberg, J. Grabie

LOCATION
- [ ] CORPORATE
- [ ] AUS
- [x] HO (NPS) (V)
- [ ] PDX

CAR NUMBER CAR-004-V2

DATE 3/1/82

DESCRIPTION OF CONDITION:

Reference NRC Inspection Report #99900531/81-01 dated February 18, 1982, page 2, para. 3 (relating to design errors and verification) and page 5 of 8, first para. (relating to programmatic deficiencies). NPSI concludes that these situations are caused by lack of implementation of and training in NPS QA Manual and Generic Work Procedures.

REQUIREMENT OF: NPSI purchase orders and customer specifications for project design work (TUSI, STP, Maanshan, and Laguna Verde) subcontracted to NPS.

RECOMMENDATION(S) FOR CORRECTIVE ACTION:

Implement QA Manual Rev. 4 April 1, 1981; and Generic Work Procedures 9/22/80 on Project Work for NPSI

Define priority & overall plan by 3/5/82
Define detailed training schedule by 3/12/82
Comp. priority sections by 5/15/82
Complete all sections by 7/15/8

MANAGER OF QUALITY ASSURANCE [signature] DATE 3/1/82

COMMITTED CORRECTIVE ACTION:

See Attachment

SCHEDULED DATE OF COMPLETION: 7-15-82 BY: [signature] TITLE Mgr. Q.A. DATE 3-5-82

REVIEW OF COMMITTED CORRECTIVE ACTION:
- [ ] NOT APPROVED
- [x] APPROVED

MANAGER OF QUALITY ASSURANCE [signature] DATE 4-21-82

CORRECTIVE ACTION HAS BEEN REVIEWED/VERIFIED AND FOUND TO BE:
- [ ] UNSATISFACTORY
- [x] SATISFACTORY AND THIS CAR IS CLOSED. Training and Revisions to TUSI and Maanshan Project Procedure completed prior to the requested completion dates

MANAGER OF QUALITY ASSURANCE Richard Mannici for J Takeuchi DATE 7/22/82

ATTACHMENT
CAR-004-V2

To satisfy the requirements of NPSI Corrective Action No. CAR-004-V2, it is the intent of NPS, Inc. to:

1) incorporate the applicable sections of the Generic Project Procedures Manual into the specific Project Procedures Manuals for the TUSI, Maanshan, Laguna Verde and STP Projects.
2) conduct training sessions for personnel performing "quality related" activities for NPS, Inc. on the aforementioned projects. These training sessions shall be developed to cover.
   - (a) general requirements of the overall NPS, Inc. Quality Program
   - (b) specific items contained in the individual Project Procedures Manuals. This specific training shall be presented to those individuals engaged in those areas.

This overall plan shall be implemented on a priority basis for both the individual projects affected and the applicable Generic Project Procedures required. Below is a listing of the priorities established for both of the items indicated above:

1) <u>Project Implementation Priorities</u>

   (a) TUSI
   (b) Maanshan
   (c) Laguna Verde
   (d) STP

<u>NOTE</u>: If during the course of implementing this plan, work is suspended on any of these listed projects, that project shall be removed from the priority listing.

2) <u>Generic Project Procedure Priorities</u>

   (a) 2.0.1 - Training
   (b) 2.0.2 - Technical Proficiency Training
   (c) 15.0.1 - Identification & Control of Nonconformances
   (d) 15.0.2 - Control of Issued Nonconformances
   (e) 15.0.3 - Control of Design Errors
   (f) 16.0.1 - Corrective Action Requests
   (g) 3.0.5 - Pipe Support Design Control - Conceptuals
   (h) 3.0.6 - Manual Analysis - Control and Verification (Structural)
   (i) 3.0.8 - Pipe Support Design Control - Details
   (j) 3.0.9 - Design Control Procedure - Revisions
   (k) 3.0.7 - Preparation of Design Reports
   (l) 6.0.1 - Incoming Document Control
   (m) 6.0.2 - Outgoing Document Control
   (n) 2.1.1 - Control of Distribution of Revisions
   (o) 3.1.1 - Requests for Information

(p) 5.0.1 - Work Procedure Preparation
(q) 18.0.1 - Quality Assurance Program Audit Control
(r) 18.0.2 - Lead Auditor/Auditor Qualifications & Records
(s) 17.0.1 - NPS Quality Assurance Records

The individual Project Procedures Manuals for the Projects as listed in Priority List No. 1, shall be revised to incorporate the requirements of the above listed procedures. Training shall then be performed for the individuals performing each individual task.

It is the intent of NPS to complete these activities on a per project basis (ie - prior to initiation on Maanshan, TUSI shall be complete).

WESTINGHOUSE ATTACHMENTS

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

DOC SHEET

TITLE TBX, OBE-TEST RUN; AS-ANALISED CONDS			PAGE 1 OF 1
PROJECT TBX	AUTHOR H.J. Baumgartner DATE 10/14/83	CHK'D. BY [signature] DATE 10/18/83	CHK'D. BY —NR— DATE
S.O. TBCP-1144	CALC. NO.	FILE NO. TBX145/155/44	GROUP PSA

RUN NUMBER ANQAØ8M DATE 10-14-83

PROGRAM AND VERSION UPDATE, WESTDYN80

PURPOSE: MAKE OBE-BASED COMPUTER RUN REFLECTING AS-ANALISED CONDITIONS BASED ON REFERENCE PARENT MODEL WC=58. RESULT WILL BE COMPARED AGAINST AS-BUILT CONDITIONS, REF. 3

RESULTS: USING REF. 1&2 BASED INPUT DATA, CORRESP. TO ORIGINAL WC=58 GEOMETRY, PREPARED "AS-ANALISED" OBE-COND. #30 COMPUTER RUN, SAVED UPDATE&TAPE14 TAPES

REFERENCES:

1. DOC SHEET ON "GRTAEDX", 12-13-82 BY T.A. EVANTO
2. DOC SHEET ON "GRTAED", 12-16-82 BY T.A. EVANTO
3. DOC SHEET ON "ANQAØ8N"; 10-14-83 BY H.J. BAUMGARTNER

INPUT: TAPES

1. "AB44UPDATE" CY=2; HF=HFB, ID=PHTBX REF. 1
2 "TBX SEISMIC UPDATE10", CY=4; HF=HFB, ID=PMDRF, REF. 2

① (1)(UPDATE RUN ON CDC)
② (A)(SOLUTION RUN ON CRAY)

OUTPUT MICROFICHE ____ PAGES, PLOTS ____ PAGES ____

PAPER

TAPES AB44OBEASAUPDATE, CY=1, ID=PHTBX, HFB, TAPE14, TBX44OBEASAT14, CY=1; ID=PHTBX, HFB

REV. NO.	REV. DATE	AUTHOR DATE	CHK'D. BY DATE	CHK'D. BY DATE

WESTINGHOUSE FORM 55213D

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

DOC SHEET

TITLE			PAGE
Sleeves in TBX Problem 54A + 43D			1 OF 1
PROJECT: TBX	AUTHOR: S. York DATE: 11-17-83	CHK'D. BY: T. Reese DATE: 11/18/83	CHK'D. BY / DATE
S.O.: TZCP-1154A.DC TZCP 11 43D	CALC. NO.	FILE NO.: TBX-145-15C-54A,B,C 43D	GROUP: PSA

RUN NUMBER ACØQOZ6 DATE 11-9-83

PROGRAM AND VERSION Wesfor

PURPOSE:

To determine if any interference exists at the sleeves listed in reference 1 and 5.

RESULTS: All pipe displacements at the sleeves in ref 1 and 5 are less than the clearances given.

REFERENCES:

1) Sleeve Take-Off Sheet for stress problem 54A, Gary Parks, 6-10-82.
2) Doc Sheet for run ACØQØNR, 10-7-83, Y. Suzumegano, 10-8-83.
3) Check package New154.CP, U.C. 258, YES, 3-27-83.
4) Brown & Root Dwgs: BRP-RC-1-RB-022 rev 3, -016 rev 7, CS-1-RB-029 rev 8
5) Sleeve Take-OFF Sheet for stress problem 43D, Chris Argue 5-28-82

INPUT: TAPES

Tape 14 : FINAB54AT16 CY=1, ID=PMTBX, MF=MFE (ref 2)

OUTPUT MICROFICHE 1 PAGES, PLOTS — PAGES

PAPER

TAPES

None

REV. NO.	REV. DATE	AUTHOR	DATE	CHK'D. BY	DATE	CHK'D. BY	DATE

WESTINGHOUSE FORM 86213D

SNTC-TR-83-025

File # TBX-145/

PROCEDURE FOR FINAL AS-BUILT RECONCILIATION AND STRESS REPORT ISSUANCE FOR COMANCHE PEAK UNIT #1 AUXILIARY PIPING ANALYSIS

AUGUST 1983

PREPARED BY: J. S. SHULMAN

WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
SOUTHEASTERN NUCLEAR TECHNOLOGY CENTER
TAMPA, FLORIDA

SNTC-TR-83-025

PREPARED BY: J. S. Shulman ____ 8/3/83

J. S. Shulman, SNTC Date

CHECKED BY: E. W. Pianka ____ 8/3/83

E. W. Pianka, SNTC Date

G. L. Adkins ____ 8/3/83

G. L. Adkins, SNTC Date

APPROVED BY: P. DeRosa ____ 8/3/83

P. P. DeRosa, SNTC Date

TABLE OF CONTENTS

ABSTRACT

The intent of this report is to document the procedure to be implemented in the final as-built reconciliation of Westinghouse scope auxiliary piping analysis.

PROCEDURE FOR FINAL AS-BUILT
RECONCILIATION AND STRESS REPORT
ISSUANCE FOR COMANCHE PEAK UNIT #1
AUXILIARY PIPING ANALYSIS

I. Search the TBX 145/15C file and notebook and record:

A. SNTC deliverables on form shown as Attachment 1. Incorporate this completed form into problem notebooks and files.

B. All Unresolved Issues/Open Items (including as-built letter "open items") on the form shown as Attachment 2. For any unresolved issue that appears to be overdue report to SNTC manager. Incorporate completed Attachment 2 in problem book and file.

II. Perform As-Built Analysis Quality Review using the form shown as Attachment 3. Incorporate the completed Attachment 3 into the problem book and file.

III. Receipt/Review of Final As-Built Documentation from TUSI

A. Receipt/review of Final As-Built Support Stiffnesses (Class 1).

1. Compare Final As-Built Support Stiffnesses with As-Built Analysis Values (see Attachment 4 and pages 3-4 of Attachment 7).

2. Identify missing Final As-Built Support Stiffness data.

3. Report conclusions on Final As-Built Support Stiffnesses by:

a. Transmitting letter to TUSI in form of Attachment 5 if all other Final As-Built Documentation (BRPs, BRHLs, BRHs) has not been resolved.

OR

b. Proceeding to Step III.B.2 (i.e. input to Attachment 6) if all needed Final As-Built Documentation has been received.

B. Receipt/Review of Final As-Built BRPs, BRHLs, BRHs, GHHs

1. Compare those Attachment 2 Unresolved Issues/Open Items, requiring TUSI input, with responses provided by TUSI in their Final As-Built Documentation. If there are "open items" which are still unresolved report per III.B.2 as input to Attachment 6.

2. Review TUSI As-Built Verification Package Contents (BRPs, BRHLs, BRHs, GHHs) and identify any missing data; report on form shown as Attachment 6. Transmit Attachment 6 form.

3. Conduct final as-built reconciliation in accordance with the evaluation summary, shown on Attachment 7, as follows:

   a. Compare final as-built drawings with as-built drawings and identify deviations. Use Attachment 4 data to summarize stiffness deviations for Class 1 problems only.

   b. Review deviations between as-built analysis and as-built drawings (BRPs, BRHLs, BRHs, GHHs) documented on marked up "check package" for as-built analysis only if deviations are identifed in a. above. Incorporate with deviations identified in a. above into summary.

   c. Review final as-built loads against those used in as-built analysis.

   d. Perform evaluation conclusion and incorporate completed Attachment 7 form in problem notebook and file.

   e. Document reconciliation with conclusions being:

      1) Reanalysis required - report to TUSI per form shown as Attachment 9, file in problem book and file. Proceed to III.A.

      2) Reanalysis not required - report to TUSI per form shown as Attachment 10, file in problem books and files. Proceed to IV.A., Stress Report Compilation.

   f. Close out deliverables identified in Attachment 1. and items identified on Final As-Built Evaluation checklist, Attachment 8.

IV. Final As-Built Reanalysis

A. Receive concurrence from TUSI as to the need for reanalysis.

B. Receive TUSI response to our forms shown as Attachment 5 (missing data) and Attachment 9 (TUSI reponse regarding support stiffness modifications).

C. Remodel, as necessary, to address the deviations identified in III.B.3 and documented on form shown as Attachment 7.

D. Reanalyze.

E. Retransmit, as necessary, analysis data identified in I.A., incorporate into problem file/book. Proceed to V, Stress Report Compilation, for Class 1 stress problems.

V. Class I Auxiliary Piping Stress Report Compiliation

A. Obtain and/or generate system schematics and PAGES data base plots for each auxiliary line.

B. Tabulate Design Condition Primary Stresses and Limits for the RCS, CVCS, RHRS and SIS from the individual stress analysis books on form shown as Attachment 11.

C. Tabulate Faulted Condition Primary Stresses and Limits for the RCS, CVCS, RHRS and SIS from the stress analysis books on form shown on Attachment 12.

D. Obtain and Tabulate Primary plus Secondary stresses and Fatigue Usage Factors for the RCS, CVCS, RHRS and SIS from the stress analysis books on form shown as Attachment 13.

VI. Class 1 Stress Report

STRESS PROBLEM ______________

ATTACHMENT 1: SNTC DELIVERABLES*

ENTRY	ITEM(1)	INTERFACE(2) (Organization) (Individual)	TRANSMITTAL (Letter #) (Date)	RESPONSE DUE	RESPONSE RECEIVED	COMMENT(3)
R1	Stress Report, Class 1 (Class 1 Lines)	TUSI				
R2	Letter Report (Non-Class 1 Lines)	TUSI				
V1	W Supplied Class 1 Valve, Nozzle End Loads and Acceleration: Report Satisfaction of Limits. (Should be in Stress Report).	TUSI				
	Same as "V1" except limits cannot be satisfied. Letter Report.	TUSI/EMD ✓				
V3	Owner Supplied Class 1 Valves or Valves in Non-Class 1 Extensions, Nozzle End Loads Letter report.	TUSI				
V4	Same Valves as "V3", Accelerations. Report Satisfaction of Limits. (Should be in Stress Report).	TUSI				
	Same as "V4" except limits cannot be satisfied. Letter Report.	TUSI				
V5	Owner Supplied, Non-Class 1 Valves, Nozzle End Loads & Accelerations, Letter Report.	TUSI				
B1	Report Pipe Breaks Letter Report.	TUSI				
B2	Report-Jet Impingement Effects. (Should be in Stress Report).	TUSI				

*Incorporate a copy in Problem Book.

ATTACHMENT 1 CONTINUED

ENTRY	ITEM(1)	INTERFACE (2) (Organization) (Individual)	TRANSMITTAL (Letter #) (Date)	RESPONSE DUE	RESPONSE RECEIVED	COMMENT(3)
L1	Provide all Support Loads. Letter Report.	TUSI				
L2	Provide Branch Displacements for all non-W problem branches. Letter Report.	TUSI				
L3	Provide Loads on Primary Equip. Noz. All lines. Letter Report.	SEED/SSD E. Johnson				
L4	W Thermal Equip. Noz. Loads, Report satisfaction of Limits. (Should be in Stress Report).	SEED/AEA M. Patel				
	Same as "L4" except limits not satisfied or no limits given in E-Spec. Letter Report.	SEED/AEA M. Patel				
L5	Non-W Thermal Equipment Nozzle Loads, Letter Report.	TUSI				
L6	Provide Nozzle Loads at Moment Restraints. Letter Report.	TUSI				
L7	Provide Nozzle Loads at Penetrations. Letter Report.	TUSI				

(1) If several transmittals were made to accomplish complete delivery of a particular item, list each on a separate line. Keep all transmittals on a particular item adjacent to each other.

(2) Organization and/or individual to whom the item should be transmitted.

(3) Indicate "Complete", "What further action is required", or "Supplements/ Supersedes (Letter #).

(5) Owner may subsequently specify Jet Impingement Loads.

(6) Unless new support scheme mandated.

ATTACHMENT 2

COMANCHE PEAK UNIT #1

UNRESOLVED ISSUES - STRESS PROBLEM

Description of Unresolved Issue	Issue Documented In Letter No(s)/Date(s)	To	Issue Resolved Closure Letter No(s)/Date(s)

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

ATTACHMENT 3

TITLE Stress Problem As-Built Analysis Quality Review			PAGE 1 OF 1
PROJECT Comanche Peak (TBX)	AUTHOR / DATE	CHK'D. BY / DATE	CHK'D. BY / DATE
S.O. TUAP	CALC. NO.	FILE NO. TBX 145/15C	GROUP SNTC-PAD

	Yes	No	Comment
1) Has C.P. been signed and checked? (Engineer Signature)			
2) UPDATE Doc Sheet signed and checked (Engineer Signature)			
3) Doc Sheets for DW, TH, OBE, SSE, LOCA, JET LOADS THRUST LOADS (where applicable) signed and checked (Engineer Signature)			
4) Does use count for (3) agree with C.P.? (If No, state reason)			
5) Post Processor Doc Sheet signed and checked (Engineer Signature)			
6) Is As-Built Reconciliation complete and verified?			

REV. NO.	REV. DATE	AUTHOR / DATE	CHK'D. BY / DATE	CHK'D. BY / DATE

WESTINGHOUSE FORM 55213D

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

ATTACHMENT 4

TITLE Stress Problem #1- As-Built Support Stiffness Comparison (Class 1 Only)			PAGE OF
PROJECT Comanche Peak (TBX)	AUTHOR DATE	CHK'D. BY DATE	CHK'D. BY DATE
S.O. TUAP	CALC. NO.	FILE NO. TBX 145/15C	GROUP SNTC- PAD

STRESS PROBLEM 1-

References:
1. Check Package .Cp, UC= Date -
2. Run #
3. Stiffness transmittal from TUSI CCPA- Date -

Sr. No.	Support Name	Node #	Type	Pipe Size	Analysis Model Stiffness	As-Built Stiffness	Rigid Stiffness	Change % Inc.	Change % Dec.

REV. NC.	REV. DATE	AUTHOR DATE	CHK'D. BY DATE	CHK'D. BY DATE

ATTACHMENT 5

Westinghouse Electric Corporation
Water Reactor Divisions

Nuclear Technology Division

6001 South Westshore Boulevard
Tampa Florida 33616

WPT-
S.O. TBX-145
Ref: 1. CPPA 30,870
(6/3/83)

Mr. J. B. George
Project General Manager
Texas Utilities Services, Inc.
P. O. Box 1002
Glen Rose, Texas 76043

Texas Utilities Services, Inc.
Comanche Peak Steam Electric Station

Final As-Built Class 1 Support Stiffnesses

Dear Mr. George:

We have reviewed the final as-built stiffness data provided to us in Reference(s) for the following stress problems:

The final as-built stiffness data provided to us is complete with the following exceptions:

It is important to note that this review addresses stiffness data exclusively and therefore necessitates routine, possibly conservative, conclusions to be reported at this time. It is only upon review of complete final as-built documentation identifying piping layout, supports' type and directionality (i.e. BRP's, BRHL's, BRH's) that final judgment can be made regarding the need for support modifications.

Our review indicates that the following stiffness deviations may require support stiffness modification as per Reference 1.

Pending receipt and review of the remaining final as-built data, this response may be considered for information only.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

A. T. Parker, Manager
Texas Projects

CC: ARMS, TUSI, 1L 1A
D. A. Bartol, W, 1L
F. G. Burgess, TUSI, 1L
H. A. Harrison, TUSI, 1L
R. Moller, W, 1L 1A
J. S. Shulman, W, 1L 1A
D. W. Westbrook, TUSI 2L 2A

ATTACHMENT 6

Westinghouse Electric Corporation

Water Reactor Divisions

Nuclear Technology Division

6001 South Westshore Boulevard
Tampa Florida 33616

WPT-
S.O. TBX-145
Refs:

Mr. J. B. George
Project General Manager
Texas Utilities Services, Inc.
P. O. Box 1002
Glen Rose, Texas 76043

Texas Utilities Services, Inc.
Comanche Peak Steam Electric Station

Final As-Built Reconciliation Review

Dear Mr. Westbrook:

We have reviewed the final as-built documentation provided to us in Reference(s)
for stress problem

We are lacking the following information, needed to complete the final as-built reconciliation:

1. Final As-Built Support Stiffnesses (Class 1)

2. Final As-Built BRP

Mr. D. W. Westbrook
Page Two

3. Final As-Built BRHL (or GHH)

4. Final As-Built BRH

5. As-Built Analysis Letter No. ______________________ "Open Items"

This lacking information will impact our schedule if not received within ______ days of the date of this letter.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

A. T. Parker, Manager
Texas Projects

CC: ARMS, TUSI, 1L 1A
D. A. Bartol, W, 1L
F. G. Burgess, TUSI, 1L
H. A. Harrison, TUSI, 1L
R. Moller, W, 1L 1A
J. S. Shulman, W, 1L 1A
D. W. Westbrook, TUSI 2L 2A

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

ATTACHMENT 7

TITLE Stress Problem Evaluation of Final As-Built Reconciliation Summary			PAGE 1 OF 8
PROJECT Comanche Peak (TBX)	AUTHOR DATE	CHK'D. BY DATE	CHK'D. BY DATE
S.O. TUAP	CALC. NO.	FILE NO. TBX 145/15C	GROUP

Purpose: To reconcile the Comanche Peak piping analysis to the final as-built condition.

Method: The attached checklist is used to verify the acceptability, within stated tolerances, of the present analysis to the final as-built condition. Any deviations exceeding these tolerances are addressed using engineering judgment. Conclusions as to the acceptability of the model are then made.

References:

1) Latest applicable PAGES Data Base Filename ________UC________Date ___________

a) Is this data base same as WESTDYN Model ___Yes ___No

b) If no, Update changes are:

Run#	Tape Name	CY	ID	MF	Date

2) Building: Containment ____H. El. Auxiliary____H. El. Other

3) Final as-built documentation package CPPA-___________, dated ____________

REV. NO.	REV. DATE	AUTHOR DATE	CHK'D. BY DATE	CHK'D. BY DATE

WESTINGHOUSE FORM 55213D

TITLE Stress Problem
Evaluation of Final As-Built Reconciliation Summary

PAGE 2 OF 8

PROJECT Comanche Peak (TBX)

AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

S.O. TUAP

CALC. NO.

FILE NO. TBX 145/15C

GROUP SNTC-PAD

ITEMS TO BE CHECKED	TRUE	FALSE	N/A	REMARKS
PART I - TO EVALUATE THE MODEL (I.1) GEOMETRY CHECK 1. All segment orientation angles are within ±5° of the actual				
2. Segment length discrepancies are within the following tolerances: Pipe Segment Length, L — Tolerance L ≤ 5' — 6" L > 5' — ±10%				
3. All segments & branches are included; also branches and tees are modeled at correct locations on the run pipe				
4. All elbow types (i.e. SRE, LRE, 5D) in analysis are consistent with final as-built.				
5. All reducers and fittings in analysis are consistent with final as-built condition				

REV. NO | REV. DATE | AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

TITLE: Stress Problem Evaluation of the Final As-Built Reconciliation Summary
PROJECT: Comanche Peak (TBX)
S.O.: TUAP
CALC. NO.:
FILE NO.: TBX 145/15C
GROUP: SNTC-PAD
AUTHOR: DATE: CHK'D. BY: DATE: CHK'D. BY: DATE:
PAGE 3 OF 8

ITEMS TO BE CHECKED	TRUE	FALSE	N/A	REMARKS
PART I - TO EVALUATE THE MODEL (Con't) (I.2) SUPPORTS CHECK 1. All supports shown in the final as-built documentation package are included in the model (Check Update changes - include penetration anchors)				
2. All support location discrepancies are within the following tolerances: Nominal Pipe O.D. / Tolerance O.D. ≤ 4" / Greater of Nominal O.D. or 3" O.D. > 4" / Lesser of Nominal O.D. or 18"				
3. No support has been relocated from one side of a fitting to the other.				
4. All Class 1 As-Built support stiffnesses are within: Pipe Design Temp $\leq 200^oF$ ST ≤ 0.8* MST ± 20% .8* MST < ST ≤ MST { +NTR, -20% } ST > MST { +NTR, -20% below MST }				

REV. NO | REV. DATE | AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

TITLE: Stress Problem Evaluation of the Final As-Built Reconciliation Summary

PROJECT: Comanche Peak (TBX) | AUTHOR | DATE | CHK'D BY | DATE | CHK'D BY | DATE

S.O.: TUAP | CALC. NO. | FILE NO.: TBX 145/15C | GROUP: SNTC-PAD

ITEMS TO BE CHECKED	TRUE	FALSE	N/A	REMARKS
PART I - TO EVALUATE THE MODEL (Con't)				
4. Pipe Design Temp. $\geq$ 200^{o}F ST $\leq$ 0.8* MST $\pm$ 20% .8* MST < ST $\leq$ MST { +NTR / - 20% } ST > MST { +NTR / lesser of -25% and 20% below MST } NTR = No Tolerance Required MST = Minimum Rigid Stiffness ST = Design Stiffness				
5. All support directions are within $\pm$ 10^{o} to the actual				
6. All support types are modeled correctly				
7. Supports on the C.G. of the valve are modeled correctly				
8. Pipe materials and welds are specified correctly				

REV. NO. | REV. DATE | AUTHOR | DATE | CHK'D BY | DATE | CHK'D BY | DATE

TITLE Stress Report Evaluation of the Final As-Built Reconciliation Summary
PAGE 5 OF 8
PROJECT Comanche Peak (TBX)
S.O. TUAP | CALC. NO. | FILE NO. TBX 145/15C | GROUP JNTC-PAD
AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

ITEMS TO BE CHECKED	TRUE	FALSE	N/A	REMARKS
PART I - TO EVALUATE THE MODEL (Con't)				
(I.3) EQUIPMENT TAG NO. & PIPE LINE NO. CHECK				
1. Valve & equipment tag number in the final as-built are the same as those used as a basis for the as-built analysis.				
2. Pipe line numbers in the final as-built condition are the same as those used as a basis for the as-built analysis.				
(I.4) VALVE MODELING				
1. Valve locations are within the greater of 3" or nominal OD of the analyzed locations.				
2. Valve stem orientations are within ± 10° of the analyzed orientations.				

REV NO | REV DATE | AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

TITLE: Stress Problem Evaluation of Final As-Built Reconciliation Summary

PROJECT: Comanche Peak (TBX)

S.O.: TUAP | CALC NO.: | FILE NO.: TBX 145/15C | GROUP: SNTC-PAD

AUTHOR | DATE | CHK'D BY | DATE | CHK'D BY | DATE

PART II - LOADS RECONCILIATION - FOR LOAD CHANGES IDENTIFIED SUBSEQUENT TO AS-BUILT ANALYSIS

	Used in (1) Existing Analysis	Final (1) (2) As-Built Definition
Design Pressure		
Deadweight		
Pipe Runs		
Insulation		
Valves		
Misc. Components		
Fluid Weight		
Seismic		
Thermal		
LOCA		
Jet Impingement		
Pipe Whip Impact Loads		
Valve Thrust Loads		
Anchor Motions		

(1) Insert a value, report # or source used including revision or date if needed.

(2) Use additional pages, if necessary, to explain differences from the "Existing Analysis".

REV NO | REV. DATE | AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

TITLE Stress Problem Evaluation of Final As-Built Reconciliation Summary

PROJECT Comanche Peak (TBX)

S.O. TUAP | CALC NO. | FILE NO. TBX 145/15C | GROUP SNTC-PAD

AUTHOR | DATE | CHK'D BY | DATE | CHK'D BY | DATE

PART III - EVALUATION CONCLUSION (Check One)

Model represents 100% as-built condition (i.e., all deviations are within tolerance) ( )

Model adequately reflects 100% as-built condition (all deviations exceeding tolerances are satisfactorily addressed in the attached pages) ( )

Model significantly deviates from final as-built condition; reanalysis is required ( )

List of significant deviations ( )

PART IV - DOCUMENTATION COMPLETENESS REVIEW

All calculations, doc sheets, pages models, etc. are signed by both author and checker(s). Anything written for information only is clearly stamped as such. ( )

Doc sheets are written for all computer runs including the CDC update portions of CRAY runs. All these runs are listed on the final computer runs summary. ( )

A minimum of 1 copy of microfiche is available for each computer run. ( )

REV NO | REV. DATE | AUTHOR | DATE | CHK'D BY | DATE | CHK'D BY | DATE

TITLE Stress Problem Evaluation of Final As-Built Reconciliation Summary

PAGE 8 OF 8

PROJECT Comanche Peak (TBX)

AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

S.O. | CALC. NO. | FILE NO. | GROUP SNTC-PAD

Final Computer Runs					CDC/CRAY Runs			
Source of Run*	Co. No.	Type of Analysis (Inc. Post Processor)	CDC Runs Microfiche Name	Date	CDC Update Microfiche Name	CRAY Run Name	CRAY Microfiche Name	Date

* 1 = Phase 1 Analysis
2 = As-Built
3 = Final As-Built

REV. NO. | REV. DATE | AUTHOR | DATE | CHK'D. BY | DATE | CHK'D. BY | DATE

WESTINGHOUSE NUCLEAR TECHNOLOGY DIVISION

ATTACHMENT 8

TITLE	Stress Problem Final As-Built Evaluation Check List
PAGE	1 OF 1
PROJECT	Comanche Peak (TBX)
AUTHOR / DATE / CHK'D. BY / DATE / CHK'D. BY / DATE	
S.O.	TUAP
CALC. NO.	
FILE NO.	TBX 145/15C
GROUP	SNTC-PAD

Applicalbe D-Specs ____________ ____________

____________ ____________

ITEM	EVALUATED (Y or N or NA)	ACCEPTABLE (Y or N)	COMMENTS
Welded Attachments			
Sleeve Penetration Displacement Limits			
Non-Class 1 Branch Stress			
Flange Evaluation			
NB-3673 Restrictions (Class 1 Only)			

REV. NO.	REV. DATE	AUTHOR	DATE	CHK'D. BY	DATE	CHK'D. BY	DATE

ATTACHMENT 9

Westinghouse Electric Corporation

Water Reactor Divisions

Nuclear Technology Division

6001 South Westshore Boulevard
Tampa Florida 33616

WPT-
S.O. TBX-145
Refs.

Mr. J. B. George
Project General Manager
Texas Utilities Services, Inc.
P. O. Box 1002
Glen Rose, Texas 76043

Texas Utilities Services, Inc.
Comanche Peak Steam Electric Station
Final As-Built Reconciliation

Dear Mr. Westbrook:

We have reviewed the final as-built documentation provided to us in Reference(s) for the following stress problem:

From the review, we conclude that a reanalysis of the subject stress problem is required for the following reasons:

Your concurrence for reanalysis is required by ____________________.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

A. T. Parker, Manager
Texas Projects

CC: ARMS, TUSI, 1L 1A
D. A. Bartol, W, 1L
F. G. Burgess, TUSI, 1L
H. A. Harrison, TUSI, 1L
R. Moller, W, 1L 1A
J. S. Shulman, W, 1L 1A
D. W. Westbrook, TUSI 2L 2A

ATTACHMENT 10

Westinghouse Electric Corporation
Water Reactor Divisions
Nuclear Technology Division
6001 South Westshore Boulevard
Tampa Florida 33616

WPT-
S.O. TBX-145
Refs.

Mr. J. B. George
Project General Manager
Texas Utilities Services, Inc.
P. O. Box 1002
Glen Rose, Texas 76043

Texas Utilities Services, Inc.
Comanche Peak Steam Electric Station
Final As-Built Reconciliation

Dear Mr. George:

We have reviewed the final as-built documentation provided to us in Reference(s) for the following stress problem:

From the review, we conclude that a reanalysis of the subject stress problem is not required. The analysis of this stress problem is considered complete and reconciled to the closure documents listed on attachment 1.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

A. T. Parker, Manager
Texas Projects

CC: ARMS, TUSI, 1L 1A
D. A. Bartol, W, 1L
F. G. Burgess, TUSI, 1L
H. A. Harrison, TUSI, 1L
R. Moller, W, 1L 1A
J. S. Shulman, W, 1L 1A
D. W. Westbrook, TUSI 2L 2A

ATTACHMENT 11

TABLE

DESIGN CONDITION

PRIMARY STRESS SUMMARY

LINE, LOOP

Node Point	Piping Component	Maximum Equation Stress (ksi)	Allowable Stress 1.5 S_m (ksi)
	Butt weld		
	Long radius elbow		
	Branch connection		
	CRUN		
	Tee		
	Socket weld		
	Socket-welded elbow		

Stress Report Compilation

Stress Problem ________

________________ ________________
Author Date

________________ ________________
Verifier Date

ATTACHMENT 12

TABLE

FAULTED CONDITION

PRIMARY STRESS SUMMARY

LINE, LOOP

Node Point	Piping Component	Maximum Equation 9 Stress (ksi)	Allowable Stress 3.0 S_m (ksi)
	Butt weld		
	Long radius elbow		
	Branch connection		
	CRUN		
	Tee		
	Socket weld		
	Socket-welded elbow		

b. Allowable stress at

Stress Report Compilation

Stress Problem ______

______________ ______________
Author Date

______________ ______________
Author Date

ATTACHMENT 13

EXAMPLE

TABLE

SUMMARY OF FATIGUE EVALUATION

LINE, LOOP

Section	Piping Component	Maximum Equation 12 Stress (ksi)	Maximum Equation 13 Stress (ksi)	Allowable Stress 3.0 S_m (ksi)	Maximum Cumulative Usage Factor
1	CRUN	-(a)	-(a)		
	Butt weld	-(a)	-(a)		
	Long radius elbow	-(a)	-(a)		
	Valve butt weld	-(a)	-(a)		
2	Butt weld				
	Tee (12x12)				
3	Long radius elbow				
	CRUN				
	Butt weld				
	Tee (12x8)				
4	CRUN				
	Butt weld				

a. Equation 10 not exceeded

Stress Report Compilation
Stress Problem ________

________ Author ________ Date ________ Verifier ________ Date

IA-81-16

"SAMU - COMANCHE PEAK"

JULY 2?, 1981

S. M. Stahl, Lead Auditor
Systems Compliance

7/27/81
Date

APPROVED: D. N. Aising, Manager
Systems Compliance

7/27/81
Date

IA-81-16

"SAMU - COMANCHE PEAK"

1.0 Audit Purpose

1.1 Audit the NTD/NCOD divisional and departmental controls necessary for adequate description and implementation of quality-related activities performed at the SMd Structural Analysis Mobile Unit (SAMU) located at the Comanche Peak Site, Texas, against the requirements presented in the Audit Plan (PI-DA-81-123, 6/16/81).

1.2 Assess the effectiveness of the applicable quality program through implementation verification.

1.3 Identify noncompliance and recommend solutions to appropriate levels of management.

1.4 Verify corrective action to assure close-out of identified nonconformances.

2.0 Audit Data

2.1 Audit Dates

Introduction Meeting - July 9, 1981
Audit Interviews - July 9, 14, 15, 1981
Exit Meeting - July 15, 1981

2.2 Audit Team

S. M. Stahl, Lead Auditor
A. C. Chan, Auditor

2.3 Audit Scope

The audit criteria and departments contacted are presented in the Audit Plan (PI-DA-81-123, 6/16/81). Personnel contacted during the course of the audit are as follows:

D. H. White, Manager, Piping & Structural Site Engineering
C. W. Gay, Manager, Comanche Peak Structural Services
P. T. McManus, Manager, Design Assurance Systems
A. T. Parker, Project Manager, South Texas & Texas Utilities
M. S. Rana, Engineer, Comanche Peak Structural Services
J. R. Lumm, Engineer, Comanche Peak Structural Services

3.0 Audit Summary

The audit results are favorable. Personnel working at the site were knowledgeable concerning technical aspects of their work and were able to provide adequate responses to the audit questions. The work appears to be progressing in a controlled manner, with weekly production meetings held between Westinghouse and Texas Utilities Services personnel. There were two findings and one observation identified as a result of this audit. Areas presently deficient include external interface definition and training documentation. Following the audit, a training presentation was provided at Comanche Peak to SAMU personnel on the requirements of 10CFR50, Appendix B and 10CFR21.

3.1 Audit Findings

The areas that require corrective action are summarized in the attachment to this report. Details pertaining to the audit findings are also provided. Each finding and observation requires a formal written response to Systems Compliance from the identified responsible manager(s) by August 15, 1981. The forms provided in the attachment may be completed by responsible management as a means of providing the formal response. The response must indicate the corrective action, action to prevent recurrence of similar deficiencies and scheduled or actual completion dates of these actions. Corrective action recommendations are provided in the report, but it should be understood that alternate actions may also sufficiently address the audit findings, if agreed to by the lead auditor. A follow-up report should be provided to Systems Compliance when corrective actions are completed.

NUCLEAR TECHNOLOGY DIVISION
AUDIT RESULTS

AUDIT NO. IA-81-16

ORGANIZATION	DATE	AUDIT TITLE
NTD PI&DA	7-15-81	SAMU-Comanche Peak

AUDITOR: S. M. Stahl

FINDING NO. 1

OBSERVATION NO.

I. REQUIREMENT WRD-OPR-3.0, Rev. 2 (LIST BRIEF DESCRIPTION OF REQUIREMENT)

The flow of information involving design interfaces within and between participating design and support organizations is to be depicted in appropriate documents and is to include interface actions involved in conducting reviews, approvals, releases, distributions, retention and revisions.

II. DESCRIPTION OF FINDING OR OBSERVATION

Design interface activities are currently not adequately described for the Comanche Peak SAMU Trailer in the following areas:

A) Drawing Control, and
B) Correspondence Control.

(CONTINUED ON NEXT PAGE)

III. RECOMMENDED ACTION

Write an interface agreement and receive required approvals describing flow of information between W SAMU Trailer and Texas Utilities Services Incorporated.

IV. ASSIGNED TO C. W. Gay/A. T. Parker RESPONSE DUE DATE 8-15-81

TO BE COMPLETED BY THE RESPONSIBLE AUDITED MANAGEMENT (PLEASE TYPE)

V. ACTION TAKEN OR TO BE TAKEN

ACTION COMPLETION DATE ______ SIGNATURE ______ TITLE ______

VI. RESPONSE ACCEPTABLE

LEAD AUDITOR DATE

VII. VERIFICATION ACTION

VERIFIER DATE

VII. FINDING/OBSERVATION CLOSED

LEAD AUDITOR DATE

Westinghouse Form

CONTINUATION SHEET

NUCLEAR TECHNOLOGY DIVISION
AUDIT RESULTS

AUDIT NO. IA-81-16

ORGANIZATION	DATE	AUDIT TITLE
NTD - PIADA	7-15-81	SAMU-Comanche Peak
AUDITOR	FINDING NO. 1 (Continued)	
S. M. Stahl	OBSERVATION NO.	

III. DESCRIPTION OF FINDING OR OBSERVATION

Finding No. 1 (Responsible Management: A. T. Parker/C. W. Gay)

The method used by SAMU personnel to implement required drawing revisions is not adequately defined by an external interface agreement. Isometric drawings, originated by Gibbs and Hill, which require revisions based on SAMU design analysis results, are marked up by SAMU personnel indicating necessary changes. This information is provided to TUSI drafting personnel who issue a new drawing which incorporates the required revisions. This new drawing is then initialed by W SAMU personnel indicating that the revision was made as indicated on the Gibbs and Hill drawing.

The method used to control correspondence information between Westinghouse and SAMU personnel is also not adequately defined by an external interface agreement. Personnel at the SAMU trailer use a TUSI typing pool to issue letters. Thus, Westinghouse letters written to TUSI personnel are contained on TUSI letterhead. This information is available for TUSI use at the time of typing rather than being transmitted to the customer through the NCOD Project Office as required by existing procedures.

The required scope of work definition is not formally issued, but the weekly production meetings held between W SAMU personnel and TUSI representatives alleviates the potential of miscommunication relative to organizational responsibilities. It is, however, recommended that a clear definition of responsibilities be developed within an external interface agreement between W SAMU and TUSI personnel. It is also noted that the W work proposal letter WPT-3977 states that, "Others are to provide a mutually agreed upon Program Plan for the conduct of the work which provides (a) designation of piping system and related equipment included, (b) work procedures and methods, and (c) identification of responsible parties for each activity and associated interfaces." This document was not found to exist.

NUCLEAR TECHNOLOGY DIVISION
AUDIT RESULTS

AUDIT NO. IA-81-16

ORGANIZATION	DATE	AUDIT TITLE
NTD - P[illegible]A	7-15-81	SAMU-Comanche Peak

AUDITOR: S. M. Stahl

FINDING NO. 2

OBSERVATION NO. ______

I. REQUIREMENT NTD-DPP-1C, Rev. 1 (LIST BRIEF DESCRIPTION OF REQUIREMENT)

It is NTD policy to provide for indoctrination and training of personnel associated with safety-related activities to assure that they are knowledgeable of quality assurance and technical requirements and the pertinent procedures governing such activities.

II. DESCRIPTION OF FINDING OR OBSERVATION

Contrary to the above requirement, documentation of training for SAMU personnel was not available for review at the site location.

III. RECOMMENDED ACTION

Provide training to Comanche Peak SAMU personnel according to requirements listed in NTD-DPP-1C, Rev. 1 and document such activities.

IV. ASSIGNED TO C. W. Gay　　　RESPONSE DUE DATE 8-15-81

TO BE COMPLETED BY THE RESPONSIBLE AUDITED MANAGEMENT (PLEASE TYPE)

V. ACTION TAKEN OR TO BE TAKEN

ACTION COMPLETION DATE ______ SIGNATURE ______ TITLE ______

VI. RESPONSE ACCEPTABLE [illegible] ______ [illegible] ______

VII. VERIFICATION ACTION [illegible] ______ [illegible] ______

VIII. [illegible] CLOSED [illegible] ______ [illegible] ______

[illegible]

NUCLEAR TECHNOLOGY DIVISION
AUDIT RESULTS

AUDIT NO IA-81-16

ORGANIZATION	DATE	AUDIT TITLE
NTD - PI&DA	7-15-81	SAMU-Comanche Peak

AUDITOR: S. M. Stahl

FINDING NO ____

OBSERVATION NO 1

I. REQUIREMENT WRD-OPR-19.0, Rev. 1 (LIST BRIEF DESCRIPTION OF REQUIREMENT)

Section 206 of the Energy Reorganization Act of 1974 and other documents needed to satisfy the requirement of 10CFR21.6 shall be posted in conspicuous locations on the premises where activities subjected to this procedure are conducted.

II. DESCRIPTION OF FINDING OR OBSERVATION

Contrary to the above, such requirement on 10CFR21.6 and Section 206 of the Energy Reorganization Act of 1974 was not posted at the Comanche Peak SAMU.

III. RECOMMENDED ACTION

Post the requirement in a conspicuous location at Comanche Peak SAMU.

IV. ASSIGNED TO C. W. Gay

RESPONSE DUE DATE 8-15-81

TO BE COMPLETED BY THE RESPONSIBLE AUDITED MANAGEMENT (PLEASE TYPE)

V. ACTION TAKEN OR TO BE TAKEN

ACTION COMPLETION DATE ________ SIGNATURE ________ TITLE ________

VI. RESPONSE ACCEPTABLE

LEAD AUDITOR ________ DATE ________

VII. VERIFICATION ACTION

VERIFIED ________ DATE ________

VII. FINDING/OBSERVATION CLOSED

LEAD AUDITOR ________ DATE ________

Westinghouse Form 60696

GIBBS & HILL ATTACHMENTS

DESIGN/ENGINEERING
CHANGE/DEVIATION REQUEST

[ ] NUCLEAR SAFETY-RELATED [ ] NON-NUCLEAR SAFETY RELATED - QA PROGRAM APPLICABLE [ ] NON-NUCLEAR SAFETY RELATED

G&H Job. No.________ DE/CD Request No.________ Rev.________

Requested By: G&H [ ] Client [ ] Field [ ] Vendor [ ] ________ FROM________

Reference Document________ Rev.____ Date________

Documents Affected:________

DESCRIPTION OF CHANGE/DEVIATION REQUESTED:

ENGINEERING JUSTIFICATION FOR ABOVE:

REQUEST PREPARED BY:________ Title________ Date________

INTERDISCIPLINE REVIEWS

	Initials	Date
Structural		
Mechanical		
Electrical		
QA		

Design Reviewer/Engineer Completes This Section

1. Is this a significant deviation or error? YES [ ] NO [ ]
2. Is this a recurring deviation or error? YES [ ] NO [ ]

Design Reviewer Completes This Section

Design Verification: Approved [ ] Not Approved [ ]

Design Review Eng.________ Date________

Job Engineer Completes this Section

1. Is change potentially reportable under 10CFR21? YES [ ] NO [ ]
2. Is change in compliance with BTP-ETSB 11-1? YES [ ] NO [ ] NA [ ]
3. Applicable DCAs.________ Date________

CHANGE/DEVIATION REQUEST:

Approved [ ] Not Approved [ ] Approved [ ] Not Approved [ ]

J. E.________ Date________ Project Manager:________ Date________

DESIGN REVIEW

RECORD FORM

Texas Utilities Services, Inc. — CLIENT
Comanche Peak S.E.S. — PROJECT
2323 — G&H Job No.

Title: SPENT FUEL POOL COOLING & CLEAN UP

[ ] Drawing [X] Calculation [ ] Specification

AB-1-151A — DOCUMENT NO.
0 — REVISION NO.
10/15/82 — DATE

COMMENTS ARE AS NOTED ON DOCUMENT SHEETS LISTED BELOW EXCEPT AS STATED HEREIN:

COMMENTS ARE AS NOTED ON THE ATTACHED DESIGN REVIEW PACKAGE

See P2-3

REQUIRED ACTION CORRECTIVE ACTION IS REQUIRED ON COMMENTS: See P 2.3

Hsin-yung Chang — DESIGN REVIEW ENGINEER
10/19/82 — REVIEW DATE

REQUIRED ACTION SATISFACTORILY COMPLETED YES [✓] NO [ ]

COMMENTS

Hsin-yung Chang — DESIGN REVIEW ENGINEER
10/19/82 — REVIEW DATE

Design Review (DR) of Calculation AB-1- 151A Sht. 1 Of 3

Design Review By: HYC

DR Package Received: 10/15/82 2PM

DR Package Started: 10/15/82

DR Package Finished: 10/19/82

DR Package Returned (with comments): 10/15/82 & 10/18/82

DR Comments Resolved/Package Signed Off: 10/19/82

Contents of Package Received:

1. AB-1- 151A Calculation Book
2. AB-1- 151A As-Built S.A. Checklist 10/14/82
3. AB-1- 151A Computer Output J78 DTD. 10/13/82
4. Drawings:

BRP-SF-X-FB-017A REV 4
-017B REV 3

BRHL-SF-X-FB-017A Rev. 1
-018B REV 1

Comments/Questions are on the Attached Sheets According to the Following Format:

A. Computer Output/Drawings ✓
B. Calculation Book
C. As-Built Stress Analysis Checklist
D. Design Review Checklist
E. Miscellaneous

Design Review (DR) of Calculation AE-1- 151A Sht. 2 Of 3

COMMENTS/QUESTIONS

A. Computer Output/Drawings

① INPUT DATA

THE ORIENTATIONS OF VALVES (XSF-006 AND XSF-005) ARE INCORRECT. THEY SHOULD BE +Z AND -Z DIRECTION RESPECTIVELY.

② THERE ARE NO S.A.M. CONSIDERED IN THIS PROBLEM. IT IS ASSUMED THE SAM OF EQUIPMENTS (HEAT EXCHANGERS OR PUMPS) ARE ~~THE~~ SAME AS THE BUILDING. THIS ASSUMPTION SHOULD BE ADJUSTIFIED.

③ SNUBBER AT 700 MISSING.

Design Review (DR) of Calculation AB-1- 151A Sht. 3 Of 3

COMMENTS/QUESTIONS

B. **Calculation Book**

① p 15. THE Equation SHOULD BE

$$i = 0.4 \left(\frac{t_m}{T_r}\right)^{2/3}\left(\frac{r_m'}{R_m}\right)$$

② p. 18, 19.

THE COMBINED PUMP LOAD MAY BE REDUCED IF THE SIGNS OF DEAD WEIGHT AND THERMAL LOADINGS CONSIDERED.

DESIGN REVIEW

RECORD FORM

Texas Utilities Services, Inc. — CLIENT
Comanche Peak S.E.S. — PROJECT
2323 — G&H Job No.

Title: COMPONENT COOLING SYSTEM

[ ] Drawing [X] Calculation [ ] Specification

AB-1-62C — DOCUMENT NO.
0 — REVISION NO.
4/23/82 — DATE

R5

COMMENTS ARE AS NOTED ON DOCUMENT SHEETS LISTED BELOW EXCEPT AS STATED HEREIN:

COMMENTS ARE AS NOTED IN THE ATTACHED DESIGN REVIEW PACKAGE.

IN ADDITION THIS CALCULATION HINGES ON THE VERIFICATION OF THE ADLPIPE REVISION "1B" DATED FEB 1977.

REQUIRED ACTION CORRECTIVE ACTION REQUIRED ON COMMENTS A-1, A-2, B-1, 2, 3, 4, 5, 6, E-1 & THE VERIFICATION OF ADLPIPE "1B"

NOTED APR 2 1 1982 H.W.MENTEL

[signature] — DESIGN REVIEW ENGINEER
4/21/82 — REVIEW DATE

REQUIRED ACTION SATISFACTORILY COMPLETED YES [X] NO [ ]

COMMENTS ALL COMMENTS SATISFIED

[signature] — DESIGN REVIEW ENGINEER
5/6/82 — REVIEW DATE

NOTED APR 2 1 1982 H.W.MENTEL

Design Review (DR) of Calculation AB-1- 62C Sht. 1 Of 7

Design Review By: H. W. Mentel

DR Package Received: 4/21/82 1:15 Am

DR Package Started: 4/21/82 1:30 PM.

DR Package Finished: 4/21/82 4:00 Pm

DR Package Returned (with comments): 4/22/82 9:30 AM.

DR Comments Resolved/Package Signed Off:

Contents of Package Received:

1. AB-1- 62C Calculation Book - NOTE: LATEST (AS DESIGNED) CALC SEPARATE 2323-200-1-62C-1
2. AB-1- N/A As-Built S.A. Checklist
3. AB-1- 62C Computer Output J314 DTD. 4/16/82
4. Drawings:

   BRP-CC-1-EC-001 REV. 11

   BRHL-CC-1-EC-001 REV. 4

NO RE-ANALYSIS REQUIRED - PER ATTACH 5.2 a&b

NO H.E. ; NO MWV ; NO V.I.

WA- ANCHOR 626

Comments/Questions are on the Attached Sheets According to the Following Format:

A. Computer Output/Drawings

B. Calculation Book

C. As-Built Stress Analysis Checklist

D. Design Review Checklist

E. Miscellaneous

NOTED APR 2 1 1982 H.W.MENTEI

Design Review (DR) of Calculation AB-1- 62C Sht. 2 Of 7

COMMENTS/QUESTIONS

A. Computer Output/Drawings

1) PUT COMPUTER OUTPUT IN A BINDER ✓

2) STAMP THE OUTPUT - NOTING THAT IT REPRESENTS AB-1-62C - GET THE NECESSARY SIGNATURES. ✓

NOTED APR 21 1982 H.W.MENTEL

Design Review (DR) of Calculation AB-1- 62C Sht. 3 of 7

COMMENTS/QUESTIONS

B. Calculation Book

1) ON SHT. NO. 1

A) CHECKING METHOD # MISSING ✓

B) SHEET NUMBERS ARE MISSING ON ITEMS 3 & 4 ✓

2) ON SHT. NO. 2

A) ITEM 8 SHOULD REFLECT REVISION 1B ✓

B) GENERATE A DUPLICATE COPY OF THE COMPUTER OUTPUT AND ENTER THE NECESSARY INFO ON ITEM 9.

C) NEXT TO ITEM 13 INDICATE "N/A" ✓

D) UNDER "OTHER CORRES" IN ITEM 14 INDICATE "N/A" ✓

E) HAVE R. DEERY STORE YOUR INPUT/OUTPUT ON MASTER TAPES AND ENTER THE NUMBERS IN ITEM 15. (PRESENT OUTPUT NUMBER NOT VALID)

F) AFTER COMPLETION OF A → E HAVE THE CHECKER INITIAL THIS SHEET

NOTED APR 2 1 1982 H.W.MENTEL

Design Review (DR) of Calculation AB-1- 62C Sht. 4 Of 7

COMMENTS/QUESTIONS

B. Calculation Book

3) THE CHECKING METHOD NUMBER IS MISSING ON SHEETS 3, 4, 5, 6 & 7 ✓

4) ON SHT. 5

A) ALLOWABLE FOR EQ. 9 UPSET IS 18000 NOT 1800. ✓

5) INITIALS ARE NOT REQUIRED ON THE CALCULATION ATTACHMENTS SHEET. ✓

6) MAKE A COPY OF 2323-200-1-62C-1. (RETURN THE FILE COPY IN ITS ACCO BINDER TO THE A.M. FILE).

ADD THE COPY TO THE AB-1-62C PACKAGE — PUT THE ENTIRE PACKAGE (CALC BK & ATTACHMENTS) IN AN ACCO BINDER & LABEL IT.

NOTED APR 2 1 1982 H.W.MENTEL

Design Review (DR) of Calculation AB-1- 62C Sht. 5 of 7

COMMENTS/QUESTIONS

C. As-Built Stress Analysis Checklist

N/A

NOTED APR 21 1982 H.W.MENTEL

Design Review (DR) of Calculation AB-1- 62C Sht. 6 of 7

COMMENTS/QUESTIONS

D. Design Review Checklist: (Comment Numbers Correspond to Design Review Checklist Item Numbers)

3) SEE COMMENT B-2

5) " " "

15) SEE DESIGN REVIEW RECORD FORM.

NOTED APR 2 1 1982 H.W.MENTEI

Design Review (DR) of Calculation AB-1- 62C Sht. 7 of 7

COMMENTS/QUESTIONS

E. Miscellaneous:

1) WHILE THE 3/4" LINES WILL BE ADDRESSED IN THE TRANSMITTAL GTN, THE NEW 3" BRANCH ADDED (3"-CC-1-950-152-3) SHOULD BE ACCOUNTED FOR. IN PARTICULAR THE SIF FOR THE WELDOLET

ADD A CALCULATION SHOWING THE FOLLOWING:

A) SIF AT THE RUN PIPE AND ITS STRESS EFFECT ON THE RUN PIPE SIDE OF THE CONNECTION

B) THE STRESS CONTRIBUTION FROM THE CANTILEVERED 3" LINE.

Gibbs & Hill, Inc.

Interoffice Memorandum

TO: DISTRIBUTION

FROM: H.W. Mentel

SUBJECT: MINIMUM WALL VIOLATION PROCEDURE AB-4

DATE: 7/16/82

JOB NO: 2323

REF. NO:

Attached is the latest revision of the TUSI CPSES minimum wall violation procedure. The technical content of the procedure was not changed, only the format and the assigned procedure number AB-4. Note that the procedure requires that for high energy lines the "K" values should be applied at the actual violation locations; for other systems the "K" valves should be applied to the maximum stress values regardless of where the violations are located. This portion of the procedure must be adhered to, and the designated design reviewers are requested to assure that this is done. Cooperation by all is appreciated.

Gibbs & Hill, Inc.

Interoffice Memorandum

TO: Distribution

DATE: August 12, 1982

FROM: H. W. Mentel

JOB NO: 11-2323-001

SUBJECT: Minimum Wall Violation Procedure AB-4

REF. NO:

Approximately a month ago (7/16/82) the latest revision of the minimum wall violation procedure AB-4 was issued. What is not explicitly clear in the procedure but what must be done is the use of the "K" values in all the problems. As of this memo all as-built calculations must contain a minimum wall violation (MWV) calculation; for high energy problems considering the actual MWV location(s); for other problems using the maximum ADLPIPE stress values for the stress equations regardless of the MWV locations or even if a MWV exists. A separate calculation will be performed to account for those problems already issued to date. Note that this requirement for applying the "K" values across the board was the result of a quality assurance surveillance report, hence this matter is of high visibility and will be closely reviewed in future audits.

HWMe:ecm

DOCUMENT/ PAGE PULLED

ANO. 8407060012

NO. OF PAGES 1

REASON

☐ PAGE ILLEGIBLE

☐ HARD COPY FILED AT. PDR CF

OTHER ______________

☐ BETTER COPY REQUESTED ON __/__/__

☑ PAGE TOO LARGE TO FILM.

☑ HARD COPY FILED AT. PDR CF

OTHER ______________

☐ FILMED ON APERTURE CARD NO 8407060012-01