



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

C. Hammell  
Designated original  
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FEB 21 1986

Docket Nos. 50-445/50-446

MEMORANDUM FOR: Larry C. Shao, Group Leader, Comanche Peak Task Force

FROM: David Terao, Piping & Supports Leader, Comanche Peak Task Force

SUBJECT: AUDIT SUMMARY OF CPSES TRANSIENT ANALYSES

On February 10, 1986, the NRC staff and its consultants from Teledyne Engineering Services (TES) conducted an audit of the piping dynamic transient analyses performed by Stone & Webster Engineering Corporation (SWEC) for Comanche Peak. The audit was held at SWEC offices in Boston, MA. The following paragraphs summarize the highlights of the topics discussed during the audit. A list of persons attending the audit are included in Attachment 1 to this memorandum.

1. Process for the Selection of Fluid Transients

The staff discussed with SWEC those piping systems at CPSES which are susceptible to the dynamic fluid transients. The fluid transient of concern are those which produce a sudden one-dimensional force along the pipe axis. SWEC has established a special fluid transient group which reviews the piping systems and pipe configurations and develops the time-history forcing functions used in the piping dynamic analyses. The fluid transient group used NUREG-0582, "Water Hammer in Nuclear Power Plants" for guidance in determining which systems are most susceptible to water hammer loadings. SWEC also reviewed the input from previous fluid transient analyses performed by Gibbs & Hill.

A general discussion regarding the susceptibility of steam-generator water hammer in the feedwater piping arose. The staff questioned whether CPSES had implemented Westinghouse generic recommendations for reducing the possibility of water hammer in Model D4 and D5 steam generators as a result of the CRSKO event. In addition, it was unclear whether the licensing commitment to perform preoperational tests for water hammer had been implemented yet. The applicant stated it would review the staff's questions and address it at a later date.

2. Systems Subject to Fluid Transients

SWEC gave a detailed presentation describing for each piping system the nature and type of fluid transient which could occur in each system, the conditions causing the most limiting conditions, and the severity of the loadings. In those cases where system modifications could be implemented to eliminate or reduce the possibility for a fluid transient, the modifications or proposed resolutions were presented. Discussion also focused on the assumptions used to develop the forcing functions although it was noted by SWEC that the assumptions and methodology used were the same as those used in other SWEC designed nuclear plants.

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The SWEC presentation covered the containment spray, service water, chemical and volume control system (CVCS), main steam, safety injection, residual heat removal, and feedwater systems.

It was noted that SWEC is not using the revised ASME Code Case N-411 damping values for the time history analysis but rather is using the damping values given in Regulatory Guide 1.61.

Table 1, attached to this memorandum, provides a summary of the fluid transients anticipated for CPSES for each piping system.

Schedule and Status of Completion

The schedule for completion of the fluid transient analysis of each piping system is provided below.

| System | Unit 1                    |                  | Unit 2                    |                  |
|--------|---------------------------|------------------|---------------------------|------------------|
|        | Scheduled Completion Date | Percent Complete | Scheduled Completion Date | Percent Complete |
| CT     | 02-05-86                  | 100              | 02-21-86                  | 50               |
| SI     | 02-24-86                  | 80               | 03-11-86                  | 10               |
| SW     | 02-05-86                  | 100              | 03-14-86                  | 20               |
| RH     | 10-29-85                  | 100              | 01-13-86                  | 100              |
| CS     | 01-25-86                  | 100              | 03-21-86                  | 15               |
| MS     | 02-24-86                  | 90               | 03-09-86                  | 10               |
| FW     | 02-15-86                  | 75               | 02-17-86                  | 60               |

The staff discussed its plan to audit the transient analysis for the residual heat removal (RH) system during the week of February 24, 1986, at the SWEC offices in New York, NY, as part of the piping system reanalysis audit.

A total of 30 staff hours was involved with this audit. No violations were identified.

*David Terao*

David Terao  
Piping & Supports Leader  
Comanche Peak Task Force

Attachment: As stated

cc: V. Noonan  
T. Westerman  
C. Trammell  
A. Vietti-Cook  
S. Hou  
G. Mizuno  
D. Landers (TES)  
R. Hookway (TES)  
P. Chen (ETEC)

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Attachment 1

FLUID DYNAMICS MEETING ON FEBRUARY 20, 1986

SMEC, BOSTON

Attendance List

| <u>Name</u>    | <u>Company</u> | <u>Area of Responsibility</u>  |
|----------------|----------------|--------------------------------|
| D. Herron      | SMEC           | Assistant Project Manager      |
| P. Cavallaro   | SMEC           | Asst. Manager-PWR (Mechanical) |
| P. Dunlop      | SMEC           | Engineering                    |
| T. Snyder      | TERA           | CPRT-DAP Third-Party           |
| R. Strong      | TERA           | CPRT-DAP Third-Party           |
| D. Terzo       | NRC            | Comanche Peak Task Force       |
| J. Fineran     | TUGOR          | Piping & Supports              |
| R. Stuart      | Telecon        | NRC Audit                      |
| B. Hookway     | Telecon        | NRC Audit                      |
| D. A. Van Dyne | SMEC           | Assistant Chief, EMD           |
| L. Semprucci   | Telecon        | NRC Audit                      |
| M. Yow         | SMEC           | EMD Fluid                      |
| R. Klause      | SMEC           | Project Manager                |
| M. Mang        | SMEC           | EMD Stress                     |
| D. Foster      | SMEC           | Chief, Eng. - EMD              |
| R. Smith       | SMEC           | Power Division                 |
| D. Lechner     | NRC            | NRC Audit                      |
| J. ...         | SMEC           | EMD Fluid Dynamics             |