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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

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APPLICANTS' MOTION FOR SUMMARY DISPOSITION
REGARDING USE OF GENERIC STIFFNESSES INSTEAD OF
ACTUAL STIFFNESSES IN PIPING ANALYSIS

Pursuant to 10 C.F.R. §2.749, Texas Utilities Electric Company ("Applicants") hereby move the Atomic Safety and Licensing Board for summary disposition of the Citizens Association for Sound Energy's ("CASE") allegations regarding Applicants' use of generic stiffnesses instead of actual stiffnesses in piping analyses. As demonstrated in the accompanying affidavit and statement of material facts, there is no genuine issue of fact to be heard regarding these issues. Applicants urge the Board to so find, to conclude that Applicants are entitled to a favorable decision as a matter of law, and to dismiss this issue from the proceeding.

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I. BACKGROUND

In computing the response of a piping system that is either ASME Safety Class 2 or 3, Applicants use generic stiffness values rather than actual stiffness values. For Safety Class 1 systems, however, Applicants use the actual support stiffnesses. (Iotti and Finneran Affidavit at 2).

CASE witness Mr. Jack Doyle raised an allegation relating to Applicants' use of generic stiffness values for pipe supports. In essence, the allegation is that the use of generic stiffness values does not adequately represent actual stiffness values for the purpose of calculating piping system seismic response. The substance of the allegations is set out in Section XI of CASE's Proposed Findings of Fact and Conclusions of Law, filed August 22, 1983. CASE's position is that the Board should require Applicants to use actual rather than generic stiffness values for purposes of calculating piping system responses (CASE Proposed Findings at XI-5).

The issue concerning the use of generic stiffness values was fully litigated. Applicants addressed the allegations in their Proposed Findings of Fact (August 5, 1983) at 58-59, and in their Reply to CASE's Proposed Findings (September 6, 1983) at 32-35.

The NRC Special Inspection Team addressed this allegation in its Report.¹ It said (at 40-41):

In computing the response of a piping system to complex loading combinations such as those which include a seismic event, it is important to assure that piping supports are sufficiently stiff so that they do not

¹ NRC Inspection Report 50-445/82-26, 50-446/82-14, February 15, 1984 ("SIT Report") (NRC Staff Exhibit 207).

adversely affect the response of the piping system. The Applicant uses generic stiffness values in its calculations of piping system response. The use of generic stiffness values is common practice and is acceptable provided that the generic stiffnesses adequately represent the stiffness of the installed supports. The Applicant and its piping analyst, Gibbs & Hill, indicated that they believe that the use of their overall deflection guideline of 1/16 inch maximum deflection under service B condition loads will result in supports whose stiffness is adequately conformed to the generic values used in the piping stress analysis. In discussions with the Applicant, the Special Inspection Team noted that in the absence of review of the particular supports, it was unclear that the 1/16 inch deflection guideline in fact results in support stiffness comparable to the generic stiffness used in the piping stress analysis. The Applicant agreed to provide a study demonstrating that supports designed in accordance with Applicant's criteria and guidelines have sufficient stiffness to assure that they do not adversely affect the response of the piping system. This matter remains unresolved.²

In its December 28, 1983, Memorandum and Order (Quality Assurance for Design) at page 57, the Board ruled that the issue concerning the use of generic stiffness values remained unresolved.

Subsequently, on February 3, 1984, Applicants submitted their Plan to Respond to Memorandum and Order (Quality Assurance for Design). Therein, Applicants proposed to resolve this issue as follows (at 6-7):

- (9) Provide evidence in the form of sensitivity studies and other reference material that stresses and displacements in the piping system, and support loads, are not significantly affected by differences between assumed generic stiffness and actual stiffnesses which do not exceed approximately two orders of magnitude. Further, provide evidence in the form of the same studies and

² In response to this commitment Applicants submitted a "Parametric Study of Support Stiffness" in response to the SIT Report. The study appears in the record as CASE Exhibit 823.

reference material that the effects of support gaps or other non-linearities will likewise not result in different behavior of the piping system and its supports when they are within the anticipated dimensions.

The accompanying affidavit of Dr. Robert C. Iotti and Mr. John C. Finneran, Jr., describes the studies undertaken to resolve the issue concerning the use of generic stiffnesses. As is explained in the affidavit, the results of these studies demonstrate that there is reasonable assurance that supports designed in accordance with Applicants' generic stiffness criteria are adequate and will perform their intended safety-function.

II. APPLICANTS' MOTION FOR SUMMARY DISPOSITION

A. General

Applicants have previously discussed the legal requirements applicable to motions for summary disposition in their "Motion for Summary Disposition of Certain CASE Allegations Regarding AWS and ASME Code Provisions Related to Welding," filed April 15, 1984 (at 5-8). Accordingly, we incorporate that discussion herein by reference.

B. CASE's Allegations Regarding the Use of Generic Stiffness Values Should be Summarily Dismissed

It must be emphasized at the outset that there are no regulatory requirements or guidance indicating that the use of generic stiffnesses is unacceptable for the purpose of calculating piping system response. In fact, the use of generic stiffnesses is virtually a universal practice within the nuclear industry

(see Iotti and Finneran Affidavit at 2-3). It is fully in accordance with all licensing commitments made by Applicants. In short, the use of generic stiffness values, in and of itself, does not violate any Commission requirement.

The issue here was succinctly framed in the SIT Report (at 40): "The use of generic stiffness values is common practice and is acceptable provided that the generic stiffnesses adequately represent the stiffness of the installed supports." To confirm that the generic stiffnesses adequately represent the stiffness of the installed supports, Applicants, as well as Gibbs & Hill, performed several studies prior to and in response to the December 28, 1983, Memorandum and Order. These studies are described in detail in the accompanying affidavit of Dr. Iotti and Mr. Finneran.

First, in response to a request by the SIT, Applicants conducted complete-system calculations for two actual piping systems (id. at 5-6). Following the Board's Memorandum and Order, Applicants also reanalyzed additional stress problems. The distribution of actual stiffness values as computed for all these reanalyses is compared against the assumed generic values in Figure 1 attached to the Iotti and Finneran Affidavit. This distribution is useful in analyzing two possible effects associated with using generic rather than actual stiffnesses. The first effect is that produced by a uniform variation of support stiffness values. As to this effect, a Gibbs & Hill study demonstrates that for actual stiffnesses of supports

differing uniformly by one order of magnitude (i.e., a factor of 10 or less on either side) from the generic stiffness value, the natural frequency of the piping system varies an acceptable 1.2% (id. at 7-8). This result has been confirmed by independent analysis (id.). The second effect is that produced by having supports within a piping run whose ratios of actual to assumed stiffness are significantly different than those of the neighboring supports. This effect has been the subject of studies in the open literature (CASE Exhibit 884) and by Applicants. These studies demonstrate that support reactions and natural frequencies are not significantly affected for local stiffness variations which are less than one order of magnitude (id. at 10). Variations of more than one order of magnitude will, in general, occur only for lightly loaded supports (see id. at 13). The ensuing increases in loads also are found to occur in lightly loaded supports, which, because of the relatively light initial loadings, are able to accommodate relatively large increases in loads (id. at 15-19).

Second, Applicants performed full deflection and stiffness analyses of the sixteen worst-case supports out of those identified by Mr. Doyle in CASE Exhibit 669B (Iotti and Finneran Affidavit at 5). The accuracy of the generic stiffness calculations was verified by testing four actual supports and measuring the deflection under known loads. (Id. at 5 and Attachment 1 thereto).

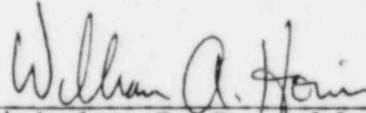
Finally Applicants reviewed a total of about 60 actual supports as part of its reanalysis in response to the Board Memorandum and Order. Of these 60 supports, only four experienced increases in loads in excess of a factor of 2.0. All of these had light initial loadings (id. at 19-20). Only three of these 60 supports were found to experience a load above the established allowable or manufacturers' rating (id. at note 10). For two of these three supports only the snubbers were found to experience loads in excess of the manufacturer's rating, but by margins much less than the known actual capacity of the snubbers as determined by testing. The remaining support saw loads only approximately 5-6% greater than allowables. (Iotti, Finneran Affidavit at 19-20.)

In view of the results of these extensive studies, the Board should conclude that there is reasonable assurance that the use of generic stiffnesses in seismic analyses does not adversely affect plant safety. This assurance is further reinforced by the inherent conservatism in seismic excitation inputs (which is the predominant source of load changes in the actual stiffness analyses (Iotti and Finneran Affidavit at 20-21.)) used for analyses of nuclear power plants (Affidavit of J.C. Finneran, R C Iotti and R. Wheaton Regarding Safety Factors), submitted to the Board under cover letter of May 20, 1984.

III. CONCLUSION

For the foregoing reasons, Applicants' motion for summary disposition should be granted.

Respectfully submitted,



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