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

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File
Allegations

JUL 15 1985

Docket No.: 50-323

MEMORANDUM FOR: Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

FROM: Robert J. Bosnak, Acting Assistant Director
for Components and Structures Engineering
Division of Engineering

SUBJECT: EVALUATION OF ALLEGATIONS ON DIABLO CANYON
UNITS 1 AND 2

The Mechanical Engineering Branch has evaluated the following assigned allegations per G. Knighton's memo of June 13, 1985:

1691	1692	1693	1694	1697	1698	1699	1700	1703	1707
1702			1695				1701	1704	
			1696					1705	

The evaluation is shown in the enclosures. The classification of these allegations per Knighton's memorandum of November 30, 1984 is also included.

Robert J. Bosnak, Acting Assistant Director
for Components and Structures Engineering
Division of Engineering

Enclosures:
As stated

cc: F. Cherny, DE
H. Schierling, DL
M. Ley, DL
T. Sullivan, DE
K. Manoly, R I

[redacted]

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[redacted]

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Task: Allegation or Concern No. 1691
1702

ATS No.: BN No:

Characterization

Engineering calculations of off-site consultant(s) contained an unacceptable high rate of mistakes because of heavy emphasis on production quotas.

Implied Significance to Plant Design, Construction, or Operation

Errors or mistakes in engineering calculations may lead to an under estimation of stresses and exceedance of stress allowables, and an underestimation of piping support loads.

Assessment of Safety Significance

The quality of piping analyses performed by off-site consultants was evaluated by the IDVP. This effort was reviewed by an NRC Task Group, in response to concerns raised by an NRC inspector.

Staff Position

The IDVP evaluation of the off-site consultant's work and the type of errors found in this work, was accepted by the NRC Task Group and described in SSER No. 25, Appendix A, Section 8. No unacceptable high rate of mistakes was found. This issue is considered resolved.

Action Required

None

Task: Allegation or Concern No. 1692

ATS No.: BN No:

Characterization

A wrong formula was used for calculating stresses in welds attaching baseplates to structural steel when subjected to torsional or twisting loads.

Implied Significance to Plant Design, Construction, or Operation

Miscalculation of weld stresses could result in overstressing of welds beyond code limits and possible weld failure.

Assessment of Safety Significance

The safety evaluation of welds in general was addressed previously in the resolution of Allegation No. 1644. PG&E has also provided a response to this concern in the letter of June 13, 1985.

Staff Position

The alleger has not provided specific information to perform an evaluation of the allegation. The response by PG&E is in accordance with the findings of prior staff audits performed in the resolution of License Condition 1 for Units 1 and 2, and is therefore acceptable. This allegation is considered resolved.

Action Required

None

Task: Allegation or Concern No. 1693

ATS No.: BN No:

Characterization

In using the STRUDL computer program there was much confusion regarding the orientation of the principal axis of beam elements.

Implied Significance to Plant Design, Construction, or Operation

Specification of the incorrect orientation of principal axes in structural analysis may lead to underestimation of the bending stresses.

Assessment of Safety Significance

This issue was reviewed and assessed during audits at PG&E by an NRC Review Group. In response to staff concerns PG&E issued Instruction I-58, Rev. 0, "Instruction for Determining the Angle BETA," 5/29/84.

Staff Position

The staff has evaluated the Instruction I-58, Rev. 0, and its implementation as was required for the review of small bore computer calculations, License Condition 2.C(11) Item 1. This has been found acceptable, and is described in SSER No. 25, Appendix A, Section 1. This issue is considered resolved.

Action Required

None.

Task: Allegation or Concern No. 1694
1695
1696

ATS No.: BN No:

Characterization

The STRUDL computer program was improperly applied in the design of pipe supports and baseplates, despite knowledge of inaccuracies in the program.

Implied Significance to Plant Design, Construction, or Operation

The load carrying capacity of piping supports may have been overestimated leading to high piping stresses.

Assessment of Safety Significance

Safety issues related to the quality and application of the STRUDL computer program in the design of pipe supports were addressed under the overall requirements of License Conditions 2.C(11), Items 1 and 7.

Staff Position

The resolution of these issues is addressed implicitly through the findings which are fully described in SSER 25, Sections 1 and 7. These allegations are therefore considered resolved.

Action Required

None.

Task: Allegation or Concern No. 1697

ATS No.: BN No:

Characterization

The use of Hilti expansion concrete anchors in areas subjected to vibratory or shock loads is inappropriate.

Implied Significance to Plant Design, Construction, or Operation

Supports of piping which are anchored to concrete with expansion anchors may fail under normal operating vibratory loading, or under seismically induced vibratory loading.

Assessment of Safety Significance

This allegation is based on a Research Report No. 2156 of the International Congress of Building Officials. The staff has reviewed this report, as well as the PG&E response of June 13, 1985, and the PG&E report on concrete expansion anchors of November 1980, submitted in response to IEB 79-02. Some of the results of this report pertaining to cyclic loading of Hilti expansion concrete anchors were described in the paper "Strength of Concrete Expansion Anchors for Pipe Supports," ASME PVP40, 1980.

Staff Position

Requirements for the use of expansion concrete anchors under static, seismic and cyclic loading are stated in IE Bulletin 79-02, issued in 1979 of which the alleger is apparently not aware. The Research Report No. 2156 also states that anchors may be used under vibratory or shock loads if their adequacy is determined by tests. This adequacy was demonstrated in the references cited above. The staff has therefore concluded that there is no basis for this allegation, and considers it resolved.

Action Required

None.

Task: Allegation or Concern No. 1698

ATS No.: BN No:

Characterization

The M-9 design guide mistakenly permits stress allowables which are higher than yield, for supports designed on an elastic basis.

Implied Significance to Plant Design, Construction, or Operation

The load carrying capacity of piping supports may have been overestimated leading to high piping stresses.

Assessment of Safety Significance

The staff has reviewed the relevant section of the PG&E Design Criteria Memorandum M-9 "Guidelines for Design of Class I Pipe Supports," Rev. 10 and 11, and the response by PG&E to this allegation of June 13, 1985.

Staff Position

PG&E DCM M-9 permits allowables which exceed yield, for faulted conditions, for portions of supports which fall within the jurisdiction of the ANSI B31.1 Piping Code. The basis for these allowables is the ASME B&PV Code, Section III, Subsection NF and Appendix F. This code permits elastic analysis of components and supports when stresses exceed yield under faulted conditions and prescribes criteria for such analyses. The allowables in DCM M-9 are based on these criteria. The staff therefore concludes that there is no basis for this allegation and considers it resolved.

Action Required

None.

Task: Allegation or Concern No. 1699

ATS No.: BN No:

Characterization

"Due to an error in the M-9 design guide used to calculate allowable stresses, pipe supports throughout Diablo Canyon may be underdesigned to only withstand 89% of the stresses from a Hosgri earthquake, which could lead to mass failures if such an earthquake occurred."

Implied Significance to Plant Design, Construction, or Operation

See Allegation No. 1698.

Assessment of Safety Significance

See Allegation No. 1698.

Staff Position

The alleger has provided unclear and insufficient information to evaluate the allegation. The error in question appears to be the stress allowable in bending under faulted conditions, only for those members of piping supports which fall within the ANSI B31.1 jurisdiction. The yield stress is 89% of this allowable, or conversely, the allowable stress in bending is 1.12 times the yield stress which is equal to or less than .70 times the ultimate stress. Performing an elastic analysis subjected to this allowable stress is acceptable per the ASME B&PV Code, Section III. The allegation is therefore without basis and is considered resolved.

Action Required

None.

Task: Allegation or Concern Nos. 1700
1701

ATS No.: BN No:

Characterization

Off-site consultants worked to uncontrolled documents on a generic basis. There was considerable confusion by off-site consultants as to the Diablo Canyon Project Office (DCPO) standards for acceptable calculations.

Implied Significance to Plant Design, Construction, or Operation

Piping and pipe supports may have been designed to incorrect criteria or by incorrect methodology.

Assessment of Safety Significance

The staff reviewed the responses by PG&E in the letter of June 13, 1985, and the pertinent portions of the NRC investigation/inspection report "USNRC RV Report No. 050-275/84-08," dated July 23, 1984.

Staff Position

Based on the NRC inspection report and the responses by PG&E, the staff has determined that there is no basis to these allegations and considers them to be resolved.

Action Required

None.

Task: Allegation or Concern Nos. 1703
1704
1705

ATS No.: BN No:

Characterization

Personnel at off-site consultants often assumed their responsibilities for extended periods prior to receiving any quality assurance indoctrination. Quality assurance surveillance and auditing activities were inadequate.

Implied Significance to Plant Design, Construction, or Operation

Piping and pipe supports may have been designed to incorrect criteria or by incorrect methodology.

Assessment of Safety Significance

The staff reviewed the responses by PG&E in the letter of June 13, 1985, and the pertinent portions of the NRC investigation/inspection report "USNRC RV Report No. 050-275/84-08," dated July 23, 1984.

Staff Position

Based on the NRC inspection report and the responses by PG&E, the staff has determined that there is no basis to these allegations and considers them to be resolved.

Action Required

None.

Task: Allegation or Concern Nos. 1707

ATS No.: BN No:

Characterization

PG&E falsely stated that the American Institute of Steel Construction (AISC) has endorsed the analysis of Australian papers that appear to support the use of structural steel "angles."

Implied Significance to Plant Design, Construction, or Operation

Allowable bending loads of unbraced angle members may have been overestimated, or the allowable unbraced length of certain angle members may have been exceeded for a given allowable stress level.

Assessment of Safety Significance

The staff reviewed the subject papers and has also contacted the AISC regarding the specifications for angle members. In addition, the staff reviewed the response of PG&E to this allegation in its letter of June 13, 1985, where it is claimed that publication in the AISC Journal amounts to a tacit endorsement.

Staff Position

The staff has been advised by the AISC that the relevant section of the AISC Manual of Steel Construction is not applicable to bending of angle members. The staff has reviewed the Australian technical papers and has found the relevant portions with modifications acceptable. It does not consider that the material in these papers has been endorsed by the AISC merely by being published in the AISC Journal. However, it also does not consider the PG&E statement as "false" as claimed by the allegation, but a different opinion with which the staff does not agree. From a safety and licensing point of view this allegation is irrelevant, and is considered resolved.

Action Required

None.

Classification of Allegations Within MEB Scope of Review
(per memo of November 30, 1984, from George Knighton)

1691	D	
1692		R
1693		R
1694		R
1695		R
1696		R
1697		R
1698		R
1699		R
1700	D	
1701	D	
1702	D	
1703	D	
1704	D	
1705	D	
1707		R