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

July 26, 1984

MEMORANDUM FOR: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

FROM: James Lieberman, Director
and Chief Counsel
Regional Operations and Enforcement Division
Office of the Executive Legal Director

SUBJECT: GAP JULY 16, 1984, 2.206 PETITION REGARDING DIABLO CANYON

On July 16, 1984, the Government Accountability Project (GAP) filed the enclosed 2.206 Petition with the Commission on behalf of the San Luis Obispo California Mothers for Peace requesting that the Commission take six minimum steps to assure public safety before any commercial licensing decision at the Diablo Canyon plant. On July 17, 1984, the Commission referred the Petition to the staff for action.

The Petition can be treated as a continuation of GAP's previous Petitions; no specific acknowledgment letter or notice is required. We suggest reviewing the document to determine if any additional technical information has been provided. Our quick review indicates that apart from item 6, no specific response is necessary to the numbered items. The ACRS has notified the EDO's office that it is prepared to provide input to a response if the staff desires. Tom Rehm has indicated that the response, in any event, should be coordinated with the ACRS.

If you have any questions concerning this matter, please contact me or Karen Cyr of my office.

Jim Lieberman by SGB

James Lieberman, Director
and Chief Counsel
Regional Operations and Enforcement Division
Office of the Executive Legal Director

Enclosure: as stated

cc w/o encl.: J. Martin, RV
J. Davis, NMSS
R. DeYoung, IE
E. Christenbury, OELD

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Testimony Before

Subcommittee on Energy and the Environment

Committee on Interior and Insular Affairs

U.S. House of Representatives

on June 14, 1984

Prepared By: I. T. Yin

Mr. Chairman and members of the Congress, my name is Isa Yin. I am a Senior Mechanical Engineer in NRC's Region III, Division of Engineering.

Relative to the Diablo Canyon Nuclear Power Plant investigation effort, my assignment was to follow up on some of the allegations made by Mr. Charles Stokes. The specific investigation areas were restricted to site small bore (S/B) piping suspension system design control. However, due to hardware deficiencies observed during plant walkdown, the licensee design control measures for large bore (L/B) piping system were also included as a part of the overview inspection and evaluation.

On March 26-27, 1984, during the NRC Commission's meeting held to consider reinstatement of the licensee's low power test Operation License (OL), I brought to the Commission's attention the following issues which had not been adequately addressed.

1. Substantiation of design allegations. NRC overview inspections concluded that there had been significant QA program deficiencies in the areas of S/B and L/B piping design control.

2. A large number of calculational errors and deficiencies had not been identified through various reviews and checking stages.

3. Diablo Canyon Project Organization's lack of implementation of a sound design control QA program which resulted in violation of NRC regulations in personnel training, document control, audits, design verifications, and raised questions in many technical and hardware related areas.

4. Reinspection, and necessary hardware re-work and modification could be performed with less complication prior to reactor criticality.

My testimony contributed to the Commissioners' decision to defer the OL reinstatement decision pending review by the ACRS.

Prior to the ACRS meeting held on April 6, 1984, an NRC peer review team was formed under the direction of Mr. Dircks, the NRC Executive Director for Operations. The peer review team reviewed all of the issues and discussed them with Pacific Gas and Electric Company (PG&E) representatives and with me. During the ACRS meeting, the staff presented a consensual view that:

1. It was acceptable to permit low power operation prior to completing corrective actions. Such operation would not compromise corrective actions and would not be a risk to the public health and safety.

2. Prior to operation above 5% power, the significant issues concluded by the NRC peer review team should be addressed and corrected by PG&E and evaluated and accepted by the staff.

The ACRS letter to the Commission, dated April 9, 1984, concurred with the staff position, and requested further review of staff resolution of the various relevant issues raised by NRC inspectors and others.

The low power OL was subsequently reinstated during the April 13, 1984 Commission hearing. The Commission also asked that the peer review team issues be included in a license amendment. This set forth License Condition 2.c.(11) in an Operating License Modification forwarded to PG&E on April 18, 1984.

Presently, the staff is working toward resolving the License Condition items, as well as Independent Design Verification Program (IDVP) concerns and programmatic issues raised by me.

1. The License Conditions included:

   a. Re-analyses and re-qualification of all S/B piping support computer calculations.

   b. Evaluation and shimming of closely spaced rigid to rigid restraints and anchors.

   c. Performing additional piping analyses to ensure functionability of snubbers that were installed in close proximity to rigid supports.

   d. Establishment of inservice inspection to maintain required thermal gaps within the rigid support structures thoughout plant life.

e. Staff observation of hot walkdown inspections of Main Steam and Residual Heat Removal Systems to ensure absence of structural interference.

f. Review of "quick fix" significant design changes; and design criteria that were prescribed in informal "Diablo Problem" correspondence.

g. Consideration of additional technical topics raised by allegations.

These issues are presently handled by the NRC staff.

2. My written concerns on possible inadequate IDVP for L/B and S/B piping stress analyses and support calculations, and seemingly insufficient followup evaluations after deficiencies had been identified were formally submitted to NRR management on April 25, 1984. Joint review of these concerns will be conducted by NRR, IE staff, and me.

3. In addition to the License Conditions, I believe there are other programmatic issues that could affect the quality of ongoing and future project activities. In my view, the following changes are warranted:

a. Improvement of site personnel indoctrination and training program as well as measures to be taken to ensure effective implementation of program requirements.

b. More stringent control of site procedures, including removal of outdated documents, and avoidance of procedure revisions by unauthorized means, for example Inter-office memoranda.

c. Upgrade of procedures to include better control or preliminary design data, design interfaces between Site Stress and Support groups, and PG&E and Westinghouse.

d. Improvement of timeliness of project responses to site personnel safety concerns, and QA audit findings. Corrective actions should include identification of underlying causes, and surveillance to prevent recurrence.

e. Conducting more extensive QA program audits that will: (1) include broader scope and more in-depth review during the audit and prior to accepting audit finding corrective actions, and (2) ensure all aspects of design control requirements, such as design criteria, assumption, judgement basis, review, and approval are implemented in accordance with program provisions.

f. Upgrade of Tolerance Clarification program (TC or commonly called Quick Fixes) to ensure that adequate design reviews will be made prior to major Hardware modifications.

I have discussed these concerns with PG&E management and I am presently reviewing the licensee's actions. As it stands to date, followup actions are incomplete.

Mr. Chairman, and members of the Congress, I thank you for the opportunity to testify, and will truthfully answer any questions that you may wish to ask.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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July 10, 1984

MEMORANDUM FOR: Richard H. Vollmer, Director, Division of Engineering, Nuclear Reactor Regulation

FROM: I. T. Yin, Senior Mechanical Engineer, Division of Reactor Safety, Region III

SUBJECT: COMMENTS ON SSER LICENSE CONDITION 2.C.(11) PREPARED BY THE DIABLO CANYON PIPING PEER REVIEW PANEL

The draft SSER License Condition 2.C.(11) Items 1, 4, 5, 6, and 7 were telecopied to Region III on July 3, 1984. Items 2 and 3 were received on July 9, 1984. Provided herewith are my comments.

Original signed by I. T. Yin.

I. T. Yin
Senior Mechanical Engineer
Division of Reactor Safety
Region III

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SSER for License Condition 2.C.(11), Item 1

PG&E shall complete the review of all small bore piping supports which were reanalyzed and requalified by computer analysis. The review shall include consideration of the additional technical topics, as appropriate, contained in License Condition No. 7 below.

Comments

The following data is required before any meaningful comments can be provided:

1. Subsequent to the DCP's review of all computer analyzed small bore piping supports, how many (among the 358 total population) will require hardware adjustment, modification or rework?

2. In conjunction with 1 above, how many were unable to meet the Code and FSAR requirements after the first rerun in the computer?

   These supports required alternative or additional computational effort in order to meet the design criteria.

3. Peer Review Panel (PRP) identified that OPEG design judgement (design basis and criteria presumably) was not documented in some of the calculations. What PRP action, if any, was initiated to determine that these were just a few isolated cases? If the situation was determined to be generic, was there any license program upgrade mandated by the PRP?

4. PRP identified calculational deficiencies consisting of erroneous STRUDL input assumptions of structural member properties and geometry. Was there a licensee procedure that had included quantitative or qualitative acceptance criteria for accepting these types of deficiencies?

   If not, what are the PRP's criteria in determining that no further action is required?

SSER for License Condition 2.C.(11), Item 2

The licensee shall identify all cases in which rigid supports are placed in close proximity to other rigid supports or anchors. For these cases, the licensee shall conduct a program that assures loads shared between these adjacent supports and anchors result in acceptable piping and support stresses. Upon completion of this effort, the licensee shall submit a report to the NRC staff documenting the results of the program.

Comments

1. The 5D and 10D criteria was established by Peer Review Panel (PRP) on June 20, 1984 at Cloud office with my concurrence. One week later the NRR staff telephoned me stating that the licensee had requested some exemption on the 10D proximity criteria for the snubber-anchor pair. Decoupled branch connections designed by the span rule were requested to be excluded for the review because it will require excessive effort, and that may delay licensing process. The NRR staff honored the request based on the reason that the decoupling branch connections are less important to safety. Please provide technical justification on exempting the PRP criteria. I remember clearly that Dr. Cloud had stated, during various hearings and meetings, that the only small bore piping that will be overstressed during seismic event would be those located at the connections to the large bore piping.

2. The SSER states, "If unacceptable, the actual manufacturer's test reports on lost motion were reviewed for the unique snubber." Please explain why snubber displacements under load were not a concern to the PRP in determining snubber operability?

3. The SSER stated, "The plant site inspection provided the NRC staff (PRP presumably) an opportunity to inspect the affected components on a first hand basis.", and that three snubbers installed in proximity to the equipment nozzle and rigid restraints "were viewed" by PRP. Please discuss the purpose and scope of the viewing, and what hardware attributes had been checked and verified by PRP.

4. Among the 95 "proximity" snubbers, please provide the following technical information:

   a. Installation of the snubber is justified because of excessive (1/16") thermal movement at the location. How many belong in this category?

   b. How many snubbers, subsequent to the evaluation, were determined to be inoperable at either DE, DDE, or Hosgri seismic condition based on the 0.06" deflection criteria?

SSER for License Condition 2.C.(11), Item 3

The licensee shall identify all cases in which snubbers are placed in close proximity to rigid supports and anchors. For these cases, utilizing snubber lockup motion criteria acceptable to the staff, the licensee shall demonstrate that acceptable piping and piping support stresses are met. Upon completion of this effort, the licensee shall submit a report to the NRC staff documenting the results.

Comments

1. The 5D and 10D criteria was established by Peer Review Panel (PRP) on June 20, 1984 at Cloud office with my concurrence. One week later the NRR staff telephoned me stating that the licensee had requested some exemption on the 10D proximity criteria for the restraint-anchor pair. Decoupled branch connections designed by the span rule were requested to be excluded for the review because it will require excessive effort, and that may delay licensing process. The NRR staff honored the request based on the reason that the decoupling branch connections are less important to safety. Please provide technical justification on exempting the PRP criteria. I remember clearly that Dr. Cloud had stated, during various hearings and meetings, that the only small bore piping that will be overstressed during seismic event would be those located at the connections to the large bore piping.

2. Among the 423 rigid restraints, how many required shimming?

3. In conjunction with 2 above, if shimmings are not provided, will the conditions cause over-stress on the supports or piping systems?

4. In conjunction with 3 above, if extensive potentially over-stress conditions did exist without proper structural shimming having been performed, would it be a 10 CFR 50.55(e) reportable item that had never been reported?

SSER for License Condition 2.C.(11), Item 4

PG&E shall identify all pipe supports for which thermal gaps have been specifically included in the piping thermal analyses. For these cases the licensee shall develop a program for periodic inservice inspection to assure that these gaps are maintained throughout the operating life of the plant. PG&E shall submit to the NRC staff a report containing the gap monitoring program.

Comments

The licensee measures taken and proposed future actions are considered to be acceptable.

SSER for License Condition 2.C.(11), Item 5

PG&E shall provide to the NRC the procedures and schedules for the hot walkdowns of the main steam system piping. PG&E shall document the main steam hot walkdown results in a report to the NRC Staff.

Comments

1. The objective failed to describe inspection of spacings provided for piping component seismic (DE, DDE, and Hosgri) movements at operating (hot) positions. The program did not provide measures to inspect for: (1) piping components that may damage potential interferences such as electrical panels and cable trays, (2) components that may be damaged by closely spaced structures, and (3) interference that could change the piping natural frequencies thus caused redistribution of support loads, or shifting of higher loadings to the more critical equipment nozzle connections.

2. Friction of the sliding type support was observed by the licensee to be a problem in meeting the Code, and it was replaced by a sway strut. It can reasonably be assumed that certain types of sliding supports installed at Diablo Canyon could cause excessive frictional force. Did PRP inquire into the licensee measure to review the issue on a generic basis?

3. There appears to be a lack of an orderly and systematic presentation on the PRP performance of their assignment at the site. Please provide the following technical information:

   a. Temperature versus measurement matrix of all data points.

   b. P&IDs, piping isometrics, support details, and pertinent structural drawings and sketches.

   c. Record of pretest walkdowns including review of maximum thermal plus seismic movements, and inspection of possible locations that could be in violation of the above review data conclusions.

SSER for License Condition 2.C.(11), Item 6

PG&E shall conduct a review of the "Pipe Support Design Tolerance Clarification" (PSDTC) Program and the "Diablo Problem" (DP) System activities. The review shall include specific identification of the following:

1. Support changes which deviated from the defined PSDTC Program scope

2. Any significant deviations between as-built and design configurations stemming from the PSDTC or DP activities

3. Any unresolved matters identified by the DP system

The purpose of this review is to ensure that all design changes and modifications have been resolved and documented in an appropriate manner. Upon completion, PG&E shall submit a report to the NRC staff documenting the results of this review.

Comments

1. PDSTC

   a. Approximately 15,000 TCs were written since the inception of the program. This means that about 70% of all the large bore and small bore support design including calculations had been "quickly fixed (or more appropriately - deviated)" by few site engineers. It was inconceivable that the licensee management was unaware of a QA program breakdown of this magnitude. Did PRP investigate whether or not there had been any DCP management's predetermined decision to bypass QA program commitments relative to design change control (FSAR commits to 10 CFR 50 Appendix B QA criteria)?

   b. The SSER stated that, "Upon completion of construction of the support, the complete as-built package, including any PSDTC forms associated with that support, was forwarded by Construction to Engineering for final acceptance in accordance with project engineering procedures." The PRP conclusion was contrary to the evidence provided by an anonymous alleger during the staff interview conducted on May 22, 1984. The documentational evidence showed that some of the TCs were not included in the as-built packages. These TC items included abandoned concrete expansion anchor bolt drilled holes, and added on wing plates to the original base plates.

   c. Many rather significant engineering concerns were brought forth during the May 22, 1984 meeting with the anonymous alleger. The transcript was still in confidential status. The staff stated in the transcript that due to the lateness of the day, a followup on the meeting could probably be scheduled in two weeks. The SSER should address specific reasons for which the followup meeting was not scheduled.

d. Four of the support installations were examined by the PRP team, the team consisted of one NRR Branch chief, one consultant from Battelle, and two consultants from EG&G Idaho. My concerns are:

(1) Considering the size of the group, the sample size selected for observation appeared to be unusually small judging by the NRC regional inspection standard.

(2) Have any or all of the team members had any prior hands-on hardware inspection experience?

(3) Please provide sufficient detail descriptions on how the supports were inspected, and what attributes have been checked and verified.

2. DP

The licensee measures taken, and the PRP review and evaluation effort are considered to be acceptable.

SSER for License Condition 2.c.(11), Item 7

PG&E shall conduct a program to demonstrate that the following technical topics have been adequately addressed in the design of small and large bore piping supports:

(a) Inclusion of warping normal and shear stresses due to torsion in those open sections where warping effects are significant.

(b) Resolution of differences between the AISC Code and Bechtel criteria with regard to allowable lengths of unbraced angle sections in bending.

(c) Consideration of lateral/torsional buckling under axial loading of angle members.

(d) Inclusion of axial and torsional loads due to load eccentricity where appropriate.

(e) Correct calculation of pipe support fundamental frequency by Rayleigh's method.

(f) Consideration of flare bevel weld effective throat thickness as used on structural steel tubing with an outside radius of less than 2T.

PG&E shall submit a report to the NRC Staff documenting the results of the program.

Comments

Above allegation items were not assigned to me for followup actions.