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Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Harold W. Keiser
Vice President-Nuclear Operations
215/770-7502

JAN 09 1987

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Project Director
BWR Project Directorate No. 3
Division of BWR Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
SNUBBER REDUCTION AND REPLACEMENT PROGRAM
PLA-2778 FILES R41-2, A17-20

Docket Nos. 50-387
50-388

Dear Ms. Adensam:

Susquehanna Steam Electric Station (SSES) Units 1 & 2 utilize mechanical snubbers as seismic and dynamic supports of nuclear piping systems. Recent operating experience on both units indicates the existence of snubber performance difficulties similar to those experienced elsewhere throughout the industry. These difficulties stem from failures to satisfy inservice inspection (ISI) and functional testing requirements which have resulted in extensive maintenance activities with attendant impact on ALARA, system reliability, and economy.

Therefore, Pennsylvania Power and Light (PP&L) is initiating a snubber reduction and replacement program to be implemented on SSES in a phased approach. The program aims at eliminating the largest possible number of snubbers through optimization of design using the provisions of recent ASME Section III codes, code cases, WRC Bulletin 300, and by appropriate replacements with more reliable supports. Regulatory Guide 1.84 Rev. 24, accepts the basic Code Cases intended for use in this program with some additional conditions that require NRC plant specific approval. This letter defines the essential elements of the SSES snubber reduction program. The methodologies and design criteria stated herein may also be used for future piping analysis in cases where reanalysis is necessary due to system modifications and/or where new piping systems are added.

The enclosed attachments describe the basic elements of the program as follows:

Attachment 1 Description of SSES snubber reduction and replacement program scope.

Attachment 2 Description of snubber reduction and replacement program elements.

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SSES PLA-2778
Files R41-2, A17-20
Ms. E. Adensam

Attachment 3 "Technical Basis for Energy Absorbers as Supports of Nuclear Power Plant Piping Systems"

Note: This attachment is identical to those previously submitted to the NRC under requests from both Philadelphia Electric Company for use on the Peach Bottom Plant and Wisconsin Electric Power Company, for use on the Point Beach plant. Because Attachment 3 contains information proprietary to Bechtel Western Power Corporation, an affidavit from Bechtel is enclosed which sets forth the basis on which appropriately marked portions of Attachment 3 may be withheld from public disclosure by the NRC in accordance with the requirements of 10CFR2.790(b) (1). Because of its proprietary nature, Attachment 3 is being provided to the addressee only.

PP&L plans to immediately initiate the engineering work on the pilot program (described in Attachment 1) with the target of implementing the resulting physical fixes during the Unit 1 third refueling and inspection outage, which is currently scheduled to begin in early September, 1987. In order to support initiation of the major engineering work activities, it is hereby requested that NRC approval of the fundamental elements of the snubber reduction and replacement program described herein be granted on or before February 9, 1987. We believe that this date should be achievable since the program utilizes methods, criteria, and replacement concepts that are consistent with other programs previously approved or currently being reviewed by the NRC on other dockets. In order to facilitate completion of the required engineering tasks of the pilot program, PP&L is prepared to supply any additional information or attend a review meeting with the NRC staff should it be necessary.

Any questions on this request should be directed to Mr. R. R. Sgarro at (215) 770-7855.

Very truly yours,



H. W. Keiser
Vice President-Nuclear Operations

cc: Document Control Desk - USNRC
L. R. Plisco - USNRC
M. C. Thadani - USNRC

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AFFIDAVIT

STATE OF CALIFORNIA)

CITY AND COUNTY OF SAN FRANCISCO)

ss.

Alan M. Dachs, being first duly sworn, says:

1. I am a Vice President of Bechtel International Corporation. Bechtel International Corporation is the owner of information contained in a document entitled "Technical Bases for Energy Absorbers as Supports of Nuclear Power Plant Piping Systems" dated January 1985, prepared by M. Z. Khlafallah and Hong Ming Lee, hereinafter referred to as "Technical Bases for Energy Absorbers", which Bechtel International Corporation seeks to have withheld from public disclosure.

2. I am making this Affidavit pursuant to the provisions of the Nuclear Regulatory Commission's rules and regulations, including 10 CFR 2.790, and in conjunction with Bechtel Power Corporation's application for withholding.

3. I have personal knowledge of the criteria and procedures utilized by Bechtel International Corporation in determining and designating information as a trade secret or privileged or confidential commercial or financial information.

Under that system, information is customarily designated confidential and held in confidence if the release of that information might result in the loss of an existing or potential competitive advantage. Information which falls in one or more of the following categories is designated confidential:

- a. Information which reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by a competitor without license from Bechtel International Corporation constitutes a competitive economic advantage over other companies.
- b. Information in the form of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
- c. Information which, if available to a competitor would reduce his expenditure of resources or

improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

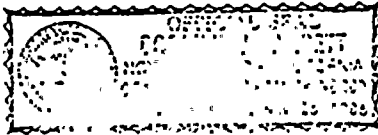
- d. Information concerning cost or price, production capacities, budget levels, or commercial strategies of Bechtel International Corporation, its customers or suppliers.
 - e. Information which reveals aspects of past, present, or future Bechtel International Corporation or customer funded development plans and programs of potential commercial value to Bechtel International Corporation.
 - f. Information which contains patentable ideas or for which patent protection may be desirable.
 - g. Information relating to an invention.
4. The document "Technical Bases for Energy Absorbers" is marked "TRADE SECRET - CONFIDENTIAL COMMERCIAL INFORMATION" and is transmitted to the Nuclear Regulatory Commission in confidence.
5. The document "Technical Bases for Energy Absorbers" contains confidential commercial information relating to an invention conceived and developed by Bechtel International Corporation through the expenditure of substantial amounts of effort and money.
6. The document "Technical Bases for Energy Absorbers", as well as the invention which it describes, has been held in confidence by Bechtel International Corporation and has been disclosed only after each proposed recipient of the information has executed an appropriate agreement.
7. The information contained in the document "Technical Bases for Energy Absorbers" is not available in public sources and, assuming Bechtel International Corporation's application for a patent is granted by the U.S. Patent Office, that information could not be properly acquired or duplicated by others without a license from Bechtel International Corporation. Even if a patent is not granted, the information could not be properly acquired from Bechtel International Corporation without a license from Bechtel International Corporation and the information could not be otherwise duplicated by others without a substantial investment of effort and money by them.
8. Because of both the substantial investment of effort and money by Bechtel International Corporation in conceiving and developing the invention described in the document "Technical

Bases for Energy Absorbers" and Bechtel International Corporation's expectation that this invention will substantially enhance its competitive position in the nuclear industry, Bechtel International Corporation has a rational basis for holding this information in confidence.

Alan M. Dachs

Alan M. Dachs

Subscribed and sworn to before me this 2nd day of January, 1985.



Dorothy J. Everett

Dorothy J. Everett

Notary Public

My Commissions expires: 11/25/86

ATTACHMENT 1

SCOPE OF SSES SNUBBER REDUCTION AND REPLACEMENT PROGRAM

The snubber reduction and replacement program aims at reducing the maximum number of snubbers on Seismic Category I piping systems on both SSES Units 1 and 2, using one or more of the following basic program elements. The conditions, limitations, and acceptable combinations of these approaches are described in Attachment 2.

1. Replacement of snubbers with rigid struts using the recommendations of WRC Bulletin 300 and/or thermal reanalysis;
2. Use of ASME Code Cases N-411 and N-397.
3. Use of Independent Support Motion.
4. Use of the design provisions from later ASME Section III Code editions and addenda.
5. Replacements with energy absorbers on selected systems.

The scope of the program will be implemented in a phased manner starting with a pilot program. The pilot program includes selected small bore systems originally designed using conservative simplified methods and portions of the Reactor Water Clean Up (RWCU) and Standby Liquid Control (SLC) systems under the reactor pressure vessel. Energy absorbers may be used to replace snubbers on the under vessel RWCU and SLC systems. If used, the results of the stress analysis and fatigue design shall be forwarded to the NRC for review as required by Regulatory Guide 1.84 Rev. 24. Additionally, PP&L will inform the NRC of all other systems to which energy absorbers are applied in the future and submit appropriate analysis results.

ATTACHMENT 2

SNUBBER REDUCTION AND REPLACEMENT PROGRAM ELEMENTS

The following sets forth the manner in which each of the principal program elements will be used.

1. Snubber Replacement with Rigid Struts

- a) Snubbers with a maximum thermal movement of 1/8" will be replaced by rigid struts using the recommendations contained in paragraphs 1.3 and 1.4 of the Technical Position on Industry Practice in WRC Bulletin 300 dated December 1984. Appropriate restrictions contained in the Bulletin shall apply.
- b) Snubbers with thermal movements greater than 1/8" may be replaced with rigid struts provided the system is appropriately reanalyzed and qualified to the appropriate acceptance criteria.
- c) This program element may be used in combination with any one or more of the remaining program elements.

2. Use of ASME Code Cases N-411 and N-397

2.1 Code Case N-411: Alternate Damping Values for Seismic Analysis of Class 1, 2 and 3 Piping Section III Division 1.

PP&L expects the use of Code Case N-411 will significantly increase the effectiveness of the snubber reduction program. The use of this Code Case will be subject to the following conditions:

- a) The Code Case damping will be applied to all seismic and hydrodynamic load cases analyzed by the response spectra methods. It will not be applied with time history analysis.
- b) Modal responses will be combined in accordance with Reg. Guide 1.92 and the load contribution of piping dynamic modes with natural frequencies above 33 Hz will be considered.
- c) The Code Case damping values will be used in their entirety and shall not be intermixed with Regulatory Guide 1.61 damping values.
- d) The Code Case will not be used in conjunction with energy absorber technology as discussed in element 5.
- e) When the use of these damping values results in changes to the support arrangement that increases the piping flexibility, the predicted maximum pipe displacements will be reviewed to ensure that existing clearances between adjacent structures, components or equipment are still adequate.

- f) The Code Case shall be used in combination with analysis of concurrent three directional earthquake loading and the enveloped spectra method. It shall not be used in conjunction with the Independent Support motion analysis method (element 3) pending generic NRC guidance on acceptability.
- g) This method may be used in conjunction with elements 1 and 4.

2.2. Code Case N-397:

Alternate Rules to the Spectral Broadening Procedure of N-1226.3 for Classes 1, 2 & 3 Piping Section III, Division 1.

- a) To be used on a case-by-case basis as economically justifiable.
- b) When used, it may be combined with Code Case N-411.
- c) It shall not be in connection with energy absorbers.

3. Independent Support Motion (ISM)

Where a piping system spans several elevations or structures with response spectra peaks of significantly varying amplitudes, a more realistic analysis approach using the multiple-support excitation analysis method may be considered. The use of the ISM method will be consistent with existing project commitments and the following:

- a) The group response will be calculated by absolute summation. The total piping response will be calculated by performing modal and spatial combination in accordance with Regulatory Guide 1.92.
- b) Response spectra based on Reg. Guide 1.61 damping values will be used for earthquake loads.
- c) This method will not be used in conjunction with Code Case N-411 (element 2).
- d) When applied, it can be used in combination with elements 1, 4 and 5.

4. Later ASME B&PV Code Editions

The code effective dates for SSES Seismic Cat. I piping construction are the 1971 Edition with Addenda through Winter 1972 of the ASME B&PV Section III Code. It is planned that the following provisions from later Section III code editions will be used in the snubber reduction program in accordance with the provisions of IWA-7210 and NA-1140.

- a) Rules of NB-3650 of the Section III, 1977 edition through Summer 1979 Addenda will be used for Nuclear Class 1 piping design.

- b) Rules of NC-3650 of the Section III, 1980 edition through Winter 1981 Addenda will be used for Nuclear Class 2 piping design. Rules of ND-3650 of the Section III, 1983 edition through Summer 1984 addenda will be used for Nuclear Class 3 piping design.

PP&L has determined that use of the design rules from the above mentioned code editions and addenda can be applied without affecting other related material, fabrications, examination and testing rules used in the original construction of the plant under Section III rules, or related Section XI rules.

When these design code provisions are invoked, PP&L will assure that:

1. All applicable and related design requirements from that code edition or addenda are applied in their entirety.
2. The provisions may be used in combination with any one or more of the other four program elements.

5. Energy Absorber - ASME Section III Code Case N-420

The application of energy absorbers shall be in accordance with Code Case N-420 and Attachment 3. When used the results of system analysis, fatigue design and inservice inspection plans will be submitted for staff review in accordance with Regulatory Guide 1.84 Rev. 24. The following conditions shall also apply:

1. The equivalent linear elastic analysis method described in Attachment 3 shall be used for analysis of load cases defined by response spectra. The non-linear time history analysis method shall be used for load cases defined by a force, displacement or acceleration time history.
2. Energy absorber damping values shall be added to piping material damping values in accordance with current FSAR commitments.
3. Modal and spatial combinations shall be in accordance with Reg. Guide 1.92.
4. When invoked, energy absorbers shall not be combined with Code Case N-411 (element 2).
5. Energy absorbers may be used in conjunction with elements 1, 3 and 4.