SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT ☐ 6201 S Street, Box 15830, Sacramento, California 95813; (916) 452-3211

January 6, 1983

DIRECTOR OF NUCLEAR REACTOR REGULATION
ATTENTION JOHN F STOLZ CHIEF
OPERATING REACTORS BRANCH 4
U S NUCLEAR REGULATORY COMMISSION
WASHINGTON D C 20555

DOCKET 50-312
RANCHO SECO NUCLEAR GENERATING STATION
UNIT NO 1
REACTOR CAVITY ANNULAR SEAL PLATE STORAGE

Your letter dated March 19, 1979, requested additional information on our proposed modification for storing the reactor cavity annular seal plate during reactor operation. Your letter of September 29, 1980, closed this issue based on our relocation of the seal ring to a storage area where it would not be exposed to differential pressures generated within the reactor cavity following a postulated LOCA. Your letter also stated that if we desired to perform modifications at a later date that will permit storage of the seal in an area above the reactor, the information requested should be provided to you.

We are now planning on making these modifications and attached is our response to your information request. This modification is scheduled to be completed during our next refueling outage, which is expected to begin in mid-February, 1983.

John J. Mattimoe
General Manager

Attachment

ATTACHMENT

Design Criteria Used

A. General Requirements

1. The structure shall be designed to restrain the seal ring under seismic and pipe-break loads.

2. The structure shall be designed so that the reactor closure head service structure stresses stay within allowable limits.

3. The structure shall be designed to permit movement of the stud tensioners and in-service inspection equipment with the existing chain hoists.

4. The structure shall be designed to allow for maximum of shop fabrication to reduce radiation exposures during installation.

B. Codes, Standards, and Reference Documents

The following codes, standards and documents shall be used in the design of the reactor cavity seal ring storage structure.

1. American Institute of Steel Construction (AISC) Manual for the Design, Fabrication, and Erection of Structural Steel Buildings, Eighth Edition, 1980.

2. Bechtel Design Guide C-2.44, Seismic Analysis for Structures and Equipment for Nuclear Power Plants.

3. NRC Regulatory Guides

Regulatory Guide 1.61, October 1973, Damping Values for Seismic Design of Nuclear Power Plants.

Regulatory Guide 1.92, Rev. 1, February 1976, Combining Modal Responses and Spatial Components in Seismic Response Analysis.

4. Industry Standards

Nationally recognized industry standards, such as those published by the American Society for Testing and Materials (ASTM), shall be used whenever possible to describe material properties, testing procedures, fabrication and construction methods.

C. Analysis and Design

Structural Steel - steel structures shall satisfy the following load combinations without exceeding the specified stresses:

1. 1.6S: D + L + Ess
2. 1.6S: D + L + Pa

Notes:

D = Dead loads or their related internal moments and forces.

L = Applicable live loads or their related internal moments and forces.

Ess = Loads generated by the safe shutdown earthquake (SSE).

Pa = Pressure equivalent static load generated by the postulated pipe break and including an appropriate dynamic load factor.

D. Construction Materials

Structural Steel

ASTM A36-81a fy = 36,000 psi

High Strength Bolts

1. ASTM A325-79 (Bearing type), 3/4" Ø minimum

2. ASTM A490-81 (Bearing type), 5/8" Ø minimum

Calculations and Design Information

A. General Requirements

1. The structure is designed to restrain the seal ring under seismic and pipe-break loads.

2. The structure is designed so that the reactor closure head service structure stresses stay within allowable limits.

3. The structure is designed to permit movement of the stud tensioners and in-service inspection equipment with the existing chain hoists.

B. Analysis and Design

1. The applicable loading combinations are used.

2. Safe Shutdown Earthquake (SSE) Response Spectra taken from High Point Vent Analysis Values are shown on the attached figures. These are based on a generic analysis which is conservative for Rancho Seco.

3. The pressure due to the pipe break is shown in the following table.

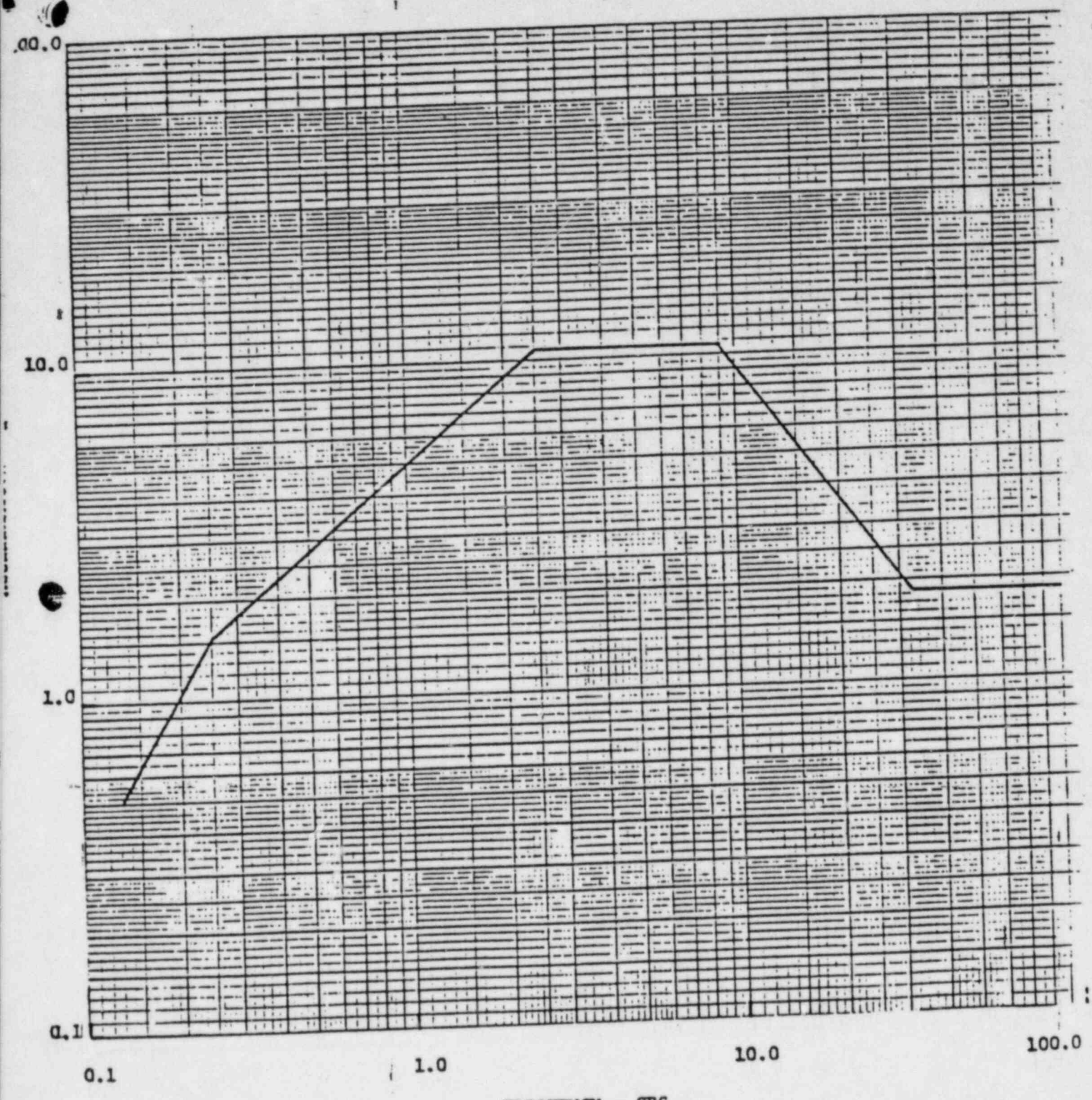
Seal Plate Height Above Plug (ft.)	Pressure Across Seal Plate (PSID)
10	3.92
12	3.80
15	3.64
16.5	3.59
20	3.50

4. Modeling techniques and analytical procedures for seismic analysis of the structure are in accordance with Bechtel Design Guide C-2.44. Damping values are in accordance with Regulatory Guide 1.61. Lumped parameter representation of the structure is used in the analysis. Combination of spatial components of earthquake forces are in accordance with Regulatory Guide 1.92.

5. Structural supports for the storage of the reactor cavity seal ring are designed not to collapse during and after an SSE, nor during and after pressure loading during the postulated pipe break.

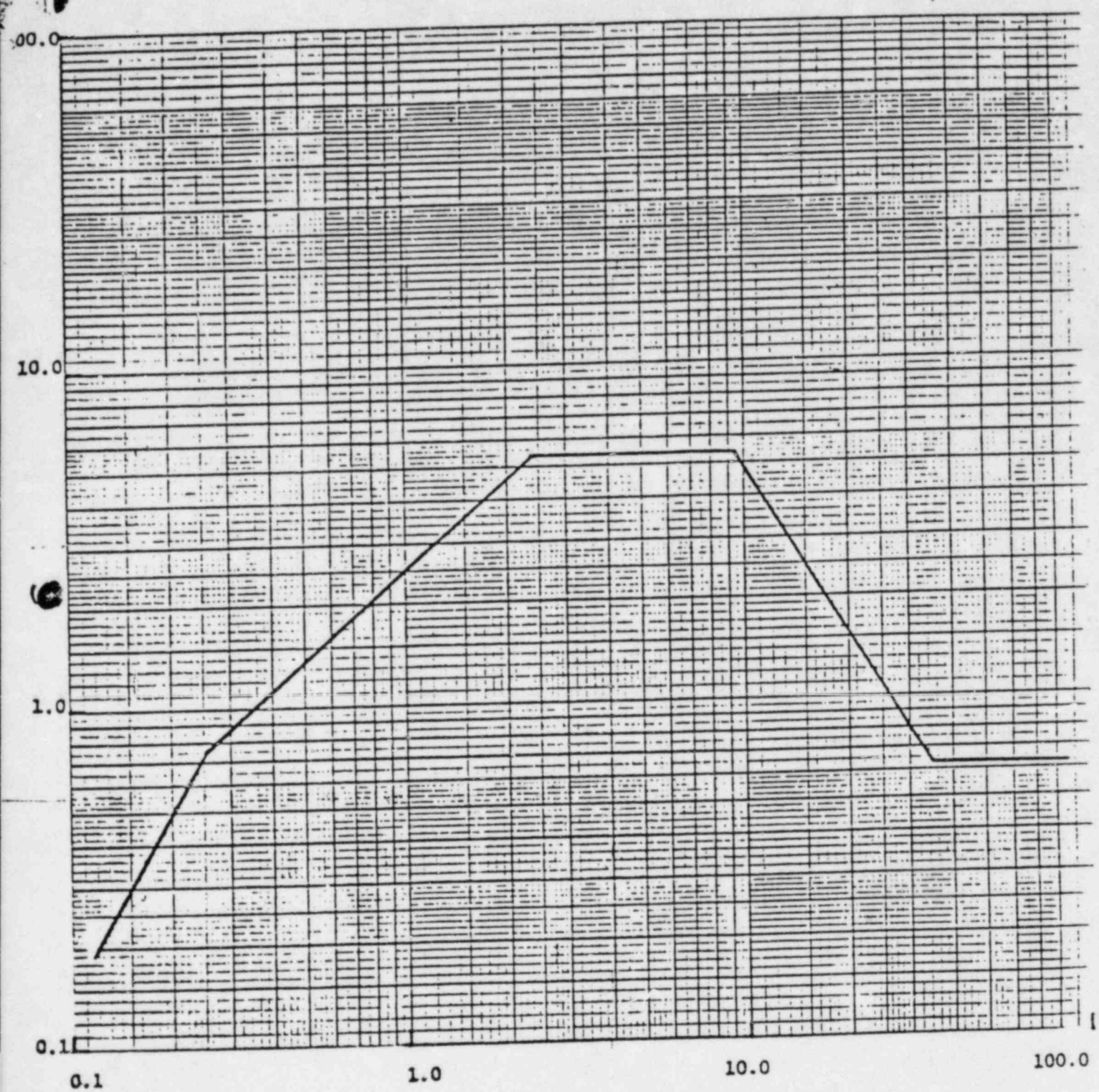
RESPONSE SPECTRA

X-DIRECTION EARTHQUAKE - SSE
2% CRITICAL DAMPING



RESPONSE SPECTRA

Y-DIRECTION EARTHQUAKE - SSE
2% CRITICAL DAMPING



Z-DIRECTION EARTHQUAKE - SSE
2% CRITICAL DAMPING