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NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD



In the Matter of)
) Docket 50-344
PORTLAND GENERAL ELECTRIC COMPANY,)
et al) (Control Building Proceeding)
)
(Trojan Nuclear Plant))

CERTIFICATE OF SERVICE

I hereby certify that on November 15, 1978:

- 1) Licensee's letter to Director of Nuclear Reactor Regulation dated November 2, 1978 and attachment, "Response to October 31, 1978 Questions from the Nuclear Regulatory Commission, dated November 1, 1978".*
- 2) Licensee's "Trojan Nuclear Plant Control Building Document Room Index", dated November 7, 1978.

have been served upon the persons listed below by depositing copies thereof in the United States mail with proper postage affixed for first class mail.

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Washington, D. C. 20555

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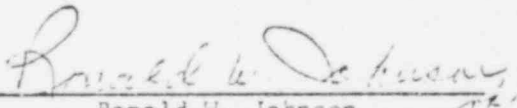
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*This document is not being served on those parties, identified by an asterisk, who received copies of it at the Trojan Control Building Evidentiary Hearing in Salem, Oregon, on November 2, 1978.


Ronald W. Johnson
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Dated: November 15, 1978

PORTLAND GENERAL ELECTRIC COMPANY

121 S W SALMON STREET
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D. J. BROEHL
VICE PRESIDENT

November 2, 1978

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Director of Nuclear Reactor Regulation
ATTN: Mr. A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Enclosed is our response, prepared by Bechtel Power Corporation, to the NRC Staff technical questions of October 31, 1978 which documents the results of analysis and review of all safety-related components, piping, and systems in the Control-Auxiliary-Fuel Building Complex (i.e., those required to prevent an accident or mitigate the consequences of an accident so as to assure that offsite releases exceeding 10 CFR 100 guidelines will not occur, such as ECCS and safe shut-down equipment).

This letter and enclosure is being served on the Atomic Safety and Licensing Board and all parties in the Control Building proceeding.

Sincerely,



RESPONSE TO
OCTOBER 31, 1978
QUESTIONS FROM THE
NUCLEAR REGULATORY COMMISSION

November 1, 1978

Response to NRC Questions

QUESTION 1

Provide the complete reference for BC-TOP-4A to verify that the techniques incorporated into your analyses are currently approved by the NRC. In addition, state the methods used for any reanalyses of the safety-related components, equipment and piping to verify that these too are currently approved by the NRC and in accordance with the appropriate FSAR criteria. If computer programs are used which do not have prior NRC approval, state how their accuracy has been verified and that they are appropriate for the analyses in which they have been used.

RESPONSE

The complete reference to BC-TOP-4A as employed in our October 27, 1978, response to Question A-4 on spectral peak broadening is "BC-TOP-4A, Seismic Analyses of Structures and Equipment for Nuclear Power Plants, Revision 3, November 1974, Section 5.2, 'Generation of Floor Response Spectra.'"

The methodology used for equipment was described in Paragraph K of the October 27, 1978, response.

The methodology of seismic analysis of safety-related piping is described in FSAR Section 3.7.3.3. The Bechtel computer program, ME-101, "Linear Elastic Analysis of Piping Systems" was employed in the analyses that confirmed the seismic capability of the piping systems. ME-101 has been verified in accordance with NRC Standard Review Plan Section 3.9.1. The verification was performed against the ASME benchmark problems, against commercially available piping computer programs, and against Bechtel computer program ME-632 which was reviewed by the NRC in Bechtel Topical Report BP-TOP-1, September 1976.

The seismic capability of the cable tray support systems was confirmed by a computer program called "CTRAY". This is a simple time share program developed to replace repetitious hand calculations. The correctness and accuracy of CTRAY has been verified by comparing its results against hand calculations.

Response to NRC Questions

QUESTION 2

State the methods by which piping and equipment support displacements have been combined with the inertial loads. Justify the adequacy of these methods. Also, state what displacements were considered and justify their adequacy.

RESPONSE

Most supports to equipment required for ECCS and Safe Shutdown are not affected by interstory structural displacements since they are base mounted. Equipment which is connected between floor and ceiling has sufficient flexibility to accommodate the interstory displacement. The method of combining primary loads (i.e. seismic inertial) with self-limiting secondary loads (i.e. displacement, thermal) and its justification is described in the FSAR (Ref. Sections 3.7.3.3.5 and 3.7.3.3.8). The displacements resulting from the STARDYNE analyses were considered in the most recent confirmation of the seismic adequacy of the ECCS and Safe Shutdown piping systems (See Response to Question 7, infra). Appendix D of the Trojan Control Building Supplemental Structural Evaluation dated September 19, 1978, contains the justification for how these displacements were derived.

Response to NRC Questions

QUESTION 3

In addition to the average floor acceleration values from both the time history and response spectrum analyses reported in Table 5, provide a comparison of the time history and corresponding response spectrum analyses derived accelerations for each of the nodal points considered on the various floors. Also, verify that the envelope of the responses at these five points on a floor system would envelop the responses at every other point on that floor system.

RESPONSE

The comparison of the maximum acceleration values obtained from the time history and the response spectrum analyses is shown in Table 3-1 for the nodal points considered for the various floors. The values shown in this table are the basis from which the average maximum floor accelerations were calculated and tabulated in Table 5 of the October 27, 1978, submittal.

Since the floor slabs within each building are quite rigid in-plane, the horizontal motions of the four corner nodes and a representative center node on each floor in each building adequately covers all major horizontal response motions of the floor. Therefore, the broadened envelope of the response spectra at these five points on a floor would envelop the responses of the floor.

TABLE 3-1 MAXIMUM ACCELERATIONS

(SSE 0.25g, 5% Damping)

| BUILDING | ELEVATION (FT) | NODE NO. | MAXIMUM ACCELERATIONS (G) | | | | |
|----------|-------------------|-------------|---------------------------|----------|-----------------|----------|-----|
| | | | N-S | | E-W | | |
| | | | TIME HISTORY | SPECTRUM | TIME HISTORY | SPECTRUM | |
| Control | 61/65 | 61 | 0.42 | .44 | 0.33 | .25 | |
| | | 25 | 0.30 | .25 | 0.27 | .25 | |
| | | 91 | 0.63 | .65 | 0.35 | .25 | |
| | | 97 | 0.32 | .25 | 0.27 | .25 | |
| | | 151 | 0.30 | .25 | 0.27 | .25 | |
| | 77 | 26 | 0.44 | .45 | 0.46 | .37 | |
| | | 32 | 0.39 | .34 | 0.40 | .28 | |
| | | 63 | 0.63 | .63 | 0.46 | .37 | |
| | | 69 | 0.48 | .42 | 0.39 | .28 | |
| | | 174 | 0.49 | .41 | 0.45 | .37 | |
| | 93 | 33 | 0.50 | .52 | 0.59 | .51 | |
| | | 39 | 0.48 | .52 | 0.51 | .40 | |
| | | 70 | 0.68 | .68 | 0.60 | .52 | |
| | | 76 | 0.63 | .61 | 0.51 | .42 | |
| | | 189 | 0.68 | .62 | 0.62 | .53 | |
| | 117 | 47 | 0.61 | .62 | 0.73 | .66 | |
| | | 90 | 0.82 | .80 | 0.65 | .58 | |
| | | 210 | 0.74 | .70 | 0.80 | .72 | |
| | Auxiliary | 61* | 20 | 0.32 | .25 | 0.25 | .25 |
| | | | 237 | 0.38 | .31 | 0.32 | .25 |
| | | | 240 | 0.32 | .25 | 0.28 | .25 |
| 340 | | | 0.28 | .25 | 0.33 | .25 | |
| 77* | | 243 | 0.40 | .33 | 0.39 | .27 | |
| | | 28 | 0.41 | .39 | 0.38 | .26 | |
| | | 358 | 0.34 | .25 | 0.40 | .28 | |
| 93* | | 35 | 0.49 | .51 | 0.50 | .41 | |
| | | 280 | 0.44 | .39 | 0.41 | .30 | |
| | | 250 | 0.40 | .31 | 0.42 | .31 | |
| | | 373 | 0.44 | .37 | 0.46 | .34 | |

Note: *Other nodes on this floor are shared with the floor of the Control Building.

TABLE 3-1
(Continued)

| BUILDING | ELEVATION (FT) | NODE NO. | MAXIMUM ACCELERATIONS (G) | | | |
|----------|-------------------|-------------|---------------------------|----------|-----------------|----------|
| | | | N-S | | E-W | |
| | | | TIME HISTORY | SPECTRUM | TIME HISTORY | SPECTRUM |
| Fuel | 61 | 419 | 0.39 | .43 | 0.43 | .52 |
| | | 434 | 0.27 | .25 | 0.26 | .25 |
| | | 462 | 0.31 | .25 | 0.42 | .49 |
| | | 468 | 0.25 | .25 | 0.26 | .25 |
| | | 521 | 0.35 | .25 | 0.31 | .25 |
| | 77 | 471 | 0.28 | .25 | 0.46 | .61 |
| | | 241 | 0.42 | .41 | 0.39 | .30 |
| | | 438 | 0.33 | .25 | 0.31 | .25 |
| | | 546 | 0.34 | .25 | 0.31 | .25 |
| | | 532 | 0.38 | .25 | 0.34 | .25 |
| | 93 | 423 | 0.46 | .50 | 0.51 | .77 |
| | | 549 | 0.52 | .63 | 0.52 | .80 |
| | | 565 | 0.47 | .45 | 0.37 | .31 |
| | | 442 | 0.37 | .25 | 0.35 | .25 |
| | | 561 | 0.44 | .32 | 0.45 | .34 |

Response to NRC Questions

QUESTION 4

Delineate and quantify the various factors (e.g. mass and material property variations) considered in the development of the response spectrum peak broadening criteria for the linear, the degraded stiffness, and the nonlinear (those considering ductility) curves to verify their adequacy to account for any uncertainties in the analytical procedures. Also, rather than the "steps" in the spectra considering the frequency shifts due to ductility, the transition should be gradual between the frequency corresponding to zero ductility and the frequency corresponding to a ductility of 1.5. Therefore, consider this and indicate the impact on your analyses. Additionally, consider the effects of the Control Building's ductility on the Auxiliary and the Fuel Building responses.

RESPONSE

The floor response spectral curves presented in Figures 11 through 30 of the October 27, 1978 submittal consist of the following three separate spectral peak widening criteria:

- a. A $\pm 10\%$ widening of the spectral peak for the base set of linear elastic floor response spectra as shown in solid lines.
- b. A further widening of the spectral peaks to the lower frequency side based on the frequency shifts calculated using the lower bound elastic stiffness degradation of the structural complex. The resulting widening curves are shown in dashed lines.
- c. A further widening of the spectral peaks to the lower frequency side for the Control Building N-S floor spectra due to possible inelastic behavior of the Control Building in the N-S direction under the SSE condition. The resulting widened curves based on an upper bound ductility ratio $\mu = 1.5$, are shown as broken lines.

The $\pm 10\%$ broadening on the base set of linear elastic floor response spectra considers the possible variation in the material strengths and the mass calculation, and the uncertainties in the analytical procedures. Since detailed weight calculations were performed in developing the STARDYNE finite element model, a high confidence level was achieved in the mass calculation and a possible $\pm 5\%$ variation in the structural mass is assumed. This leads to a possible $\pm 2.5\%$ variation in frequency. The elastic moduli used in the STARDYNE model are

RESPONSE TO QUESTION 4 (continued)

based on the design material strength of $f'_c = 5000$ psi. The actual material strengths are higher than 5000 psi. The upper bound value of f'_c is 6500 psi as shown in the May 4, 1978 submittal results in a 15% variation in the elastic modulus, and therefore a 7.2% variation in frequency. Combining the frequency variations of 2.5% and 7.2% with a minimum 5% frequency variation to account for the uncertainties in analytical procedures, and using the following combination rule in accordance with BC-TOP-4A, Rev. 3, November 1974, leads to:

$$[(0.05)^2 + (0.025)^2 + (0.072)^2]^{1/2} = 0.091$$

Thus, the $\pm 10\%$ widening used is adequate.

The steps in the Control Building N-S floor response spectra shown in broken lines correspond to the upper bound ductility ratio of $\mu = 1.5$. If the ductility ratio is assumed to vary between 1.0 and the upper bound value of 1.5, the following reduction factors in spectral peak frequency and peak magnitude result:

| DUCTILITY RATIO μ | FREQUENCY REDUCTION FACTOR $\frac{1}{\sqrt{\mu}}$ | SPECTRAL PEAK REDUCTION FACTOR $\frac{1}{\sqrt{2\mu - 1}}$ |
|--------------------------|---|--|
| 1.0 | 1.0 | 1.0 |
| 1.1 | 0.95 | 0.91 |
| 1.2 | 0.91 | 0.85 |
| 1.3 | 0.88 | 0.79 |
| 1.4 | 0.85 | 0.75 |
| 1.5 | 0.82 | 0.71 |

Using the above factors, Figures 11 through 14 of the October 27, 1978 submittal can be re-plotted. The resulting spectra are shown in Figures 4-1 through 4-4. These revised response spectra have no impact on the results of analyses.

Since the Fuel Building remains elastic under the SSS load, and since the fundamental N-S mode, which governs the response of the structural complex in the N-S direction, is basically a twisting mode pivoting about the Fuel Building, any possible inelastic behavior of the Control Building in the N-S direction will not affect the Fuel Building. However, it may have some slight influence on the Auxiliary Building which is located between the Control and Fuel Buildings.

RESPONSE TO QUESTION 4 (continued)

The upper bound ductility ratio $\mu = 1.5$ used in assessing the nonlinearity effect on the Control Building N-S floor response spectra is based upon the most highly loaded wall (Wall 1) relative to its capacity. The use of $\mu = 1.5$ for the Control Building was for conservative purposes. In reality, Wall 1 cannot behave inelastically independent of the other part of the building complex and, as soon as inelastic response occurs, the seismic load will be reduced due to energy dissipation. Thus, considering the total system behavior of the structural complex, the ductility ratio for the total system will be much smaller than the upper bound value of 1.5 derived for Wall 1. Nevertheless, for the purpose of assessing any possible effect of the Control Building inelastic behavior on the Auxiliary Building, an upper bound ductility ratio of 1.2 is assumed. This value is based on the ratio of the horizontal N-S distance of Wall 1 and the centroid of the Auxiliary Building to the centroid of the elastic Fuel Building as shown in the following relationship:

$$\mu = 1.0 + (1.5-1.0)(88/223.5) = 1.19$$

Corresponding to this upper bound ductility ratio $\mu = 1.2$, the spectral peak frequencies will shift to the lower frequency side by a factor of $1/\sqrt{\mu} = 0.91$; and the spectral peak magnitude will be reduced by a factor of $1/\sqrt{2\mu-1} = 0.85$. Based on these factors, the Auxiliary Building N-S floor response spectra can be further widened to the lower frequency side. As an example, the resulting widened spectra for the Auxiliary Building El. 93' are shown in Figure 4-5 in broken lines. As can be seen from this figure, the effect is negligibly small.

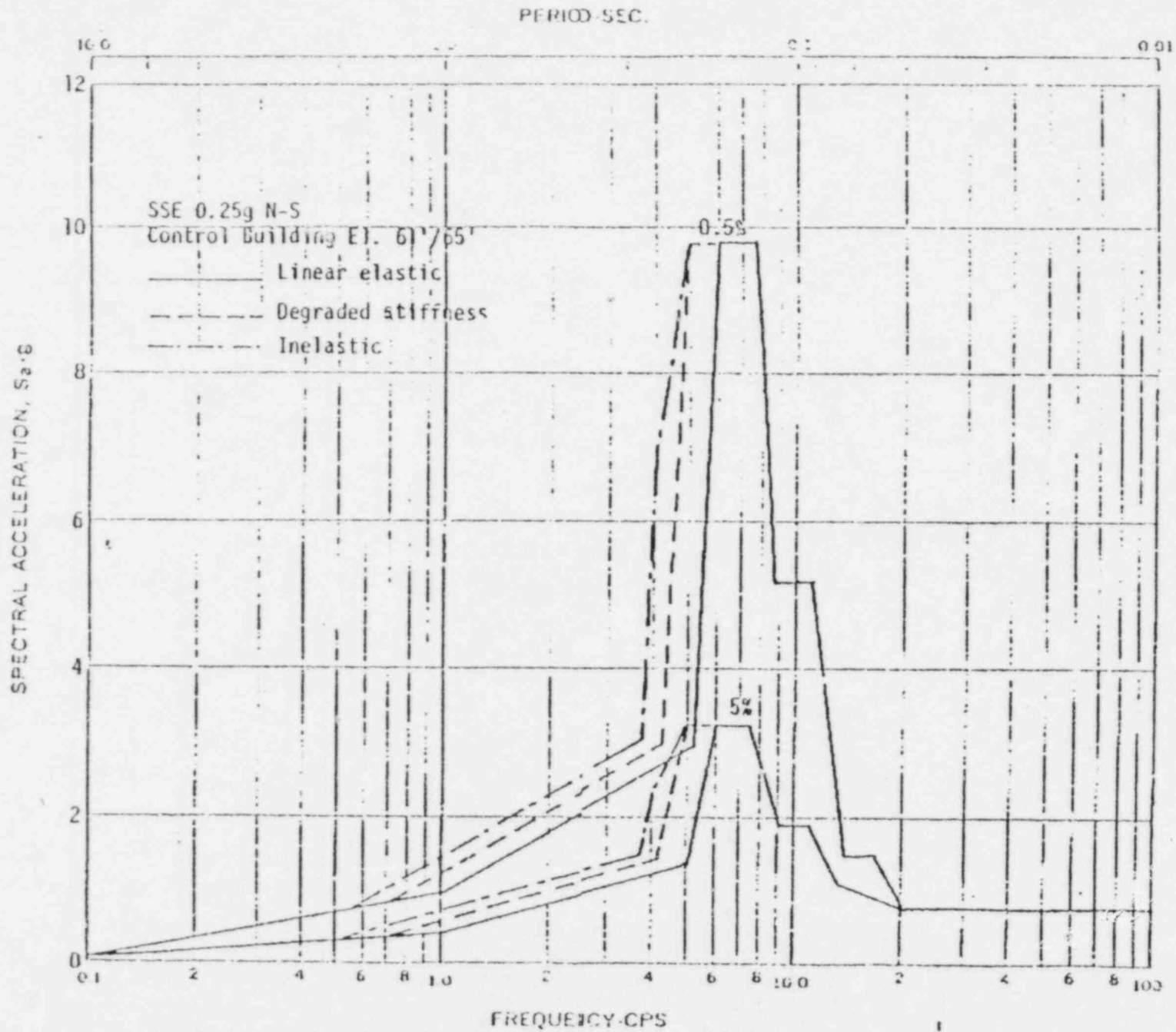


FIGURE 4-1

The 0.5% And 5% Damping Horizontal Floor Response Spectrum Curves For The Control Building Et. 61'/65', SSE 0.25g, N-S Direction

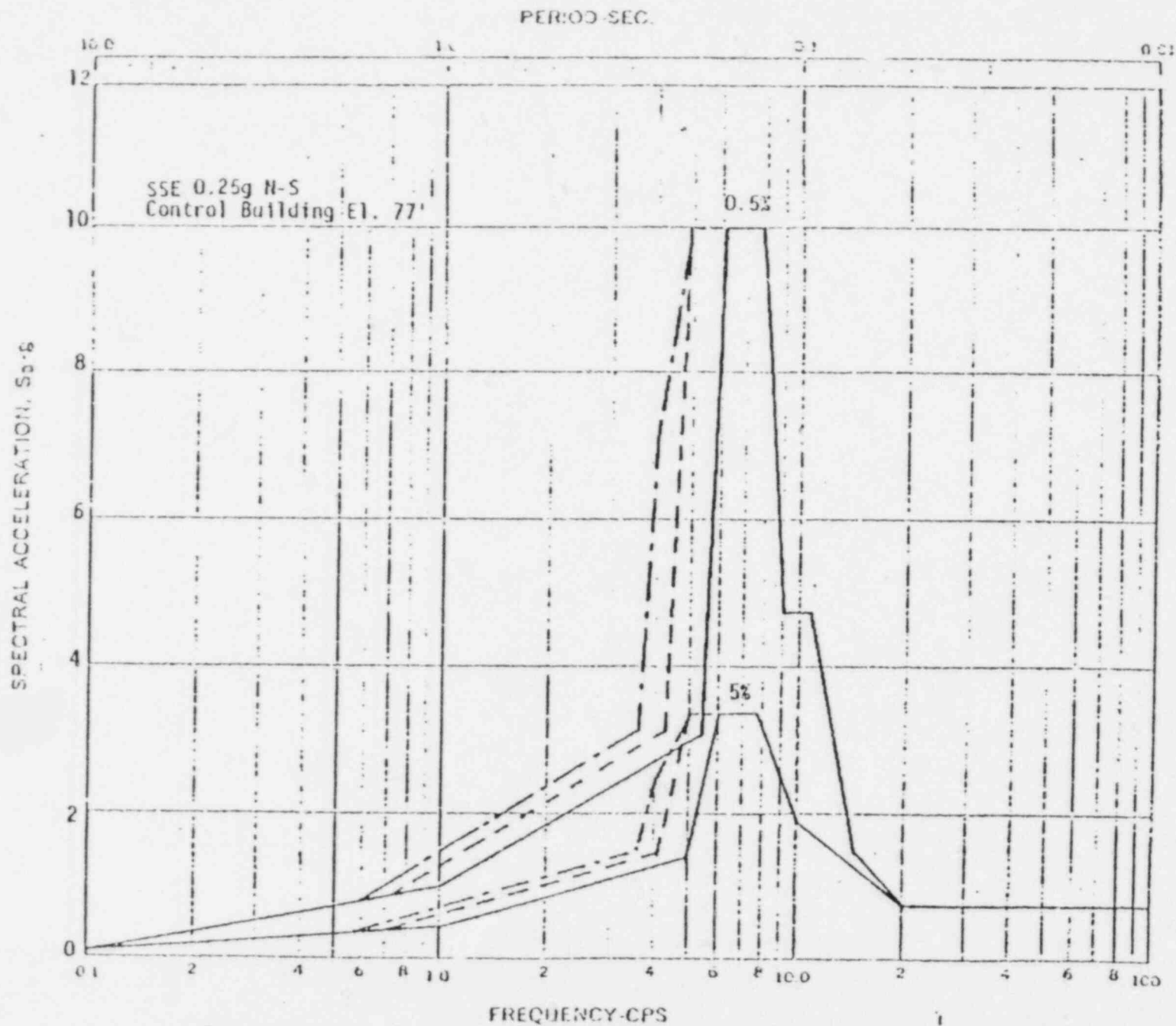
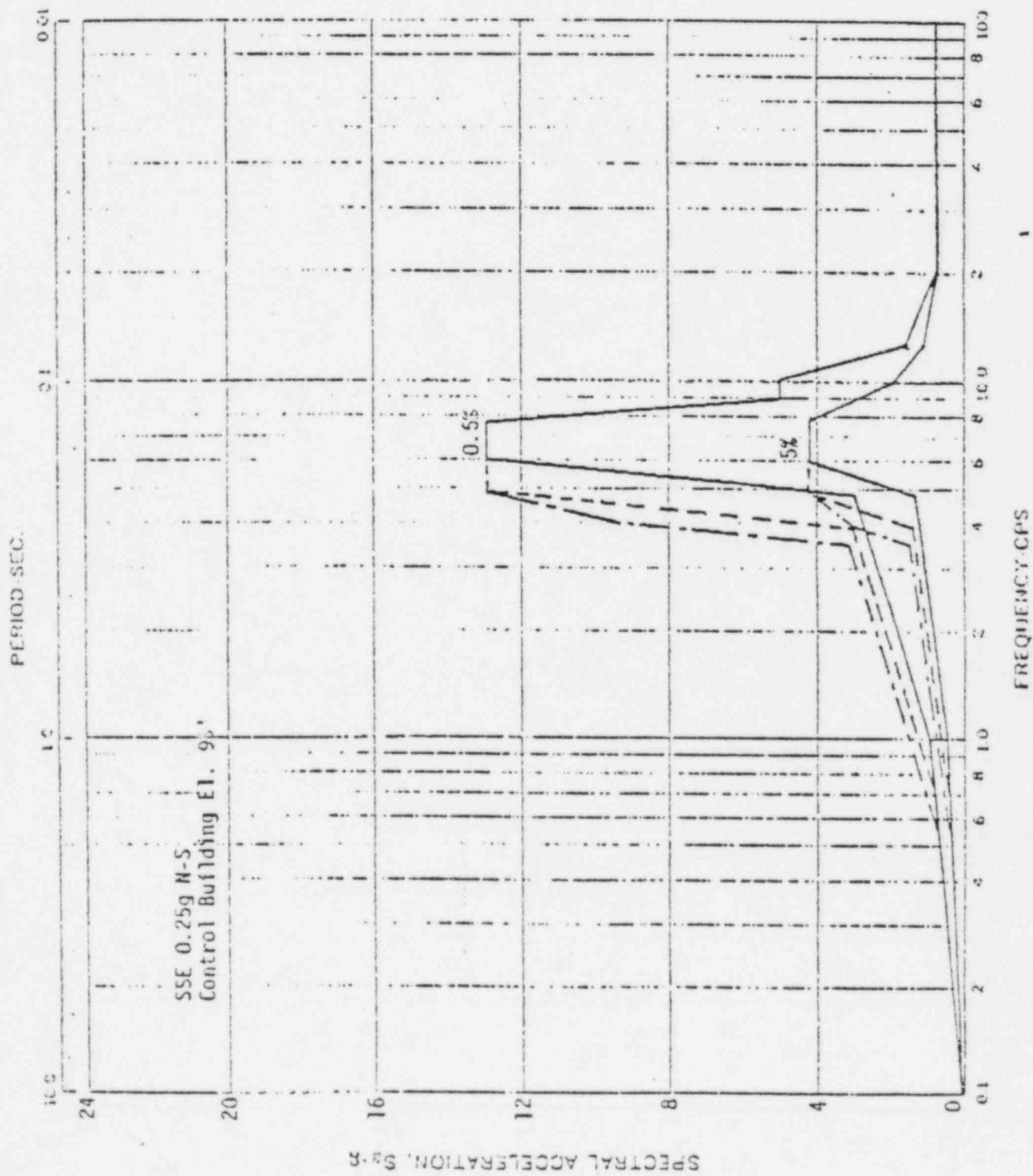


FIGURE 4-2

The 0.5% And 5% Damping Horizontal Floor Response Spectrum Curves For The Control Building El. 77', SSE 0.25g, N-S Direction

FIGURE 4-3



The 0.5% And 5% Damping Horizontal Floor Response Spectrum Curves For The Control Building El. 93', SSE 0.25g, N-S Direction

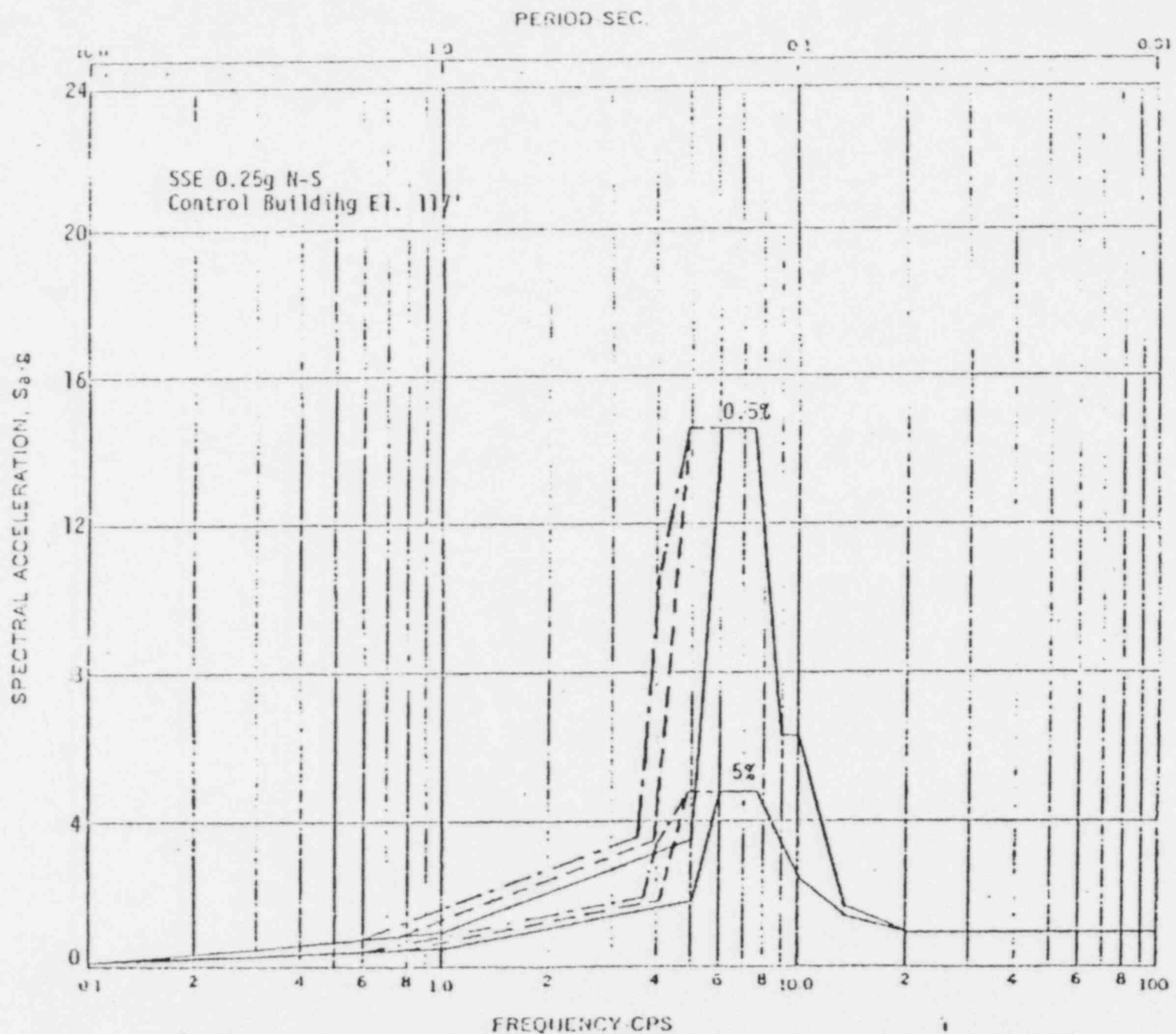


FIGURE 4-4

The 0.5% And 5% Damping Horizontal Floor Response Spectrum Curves For The Control Building El. 117', SSE 0.25g, N-S Direction

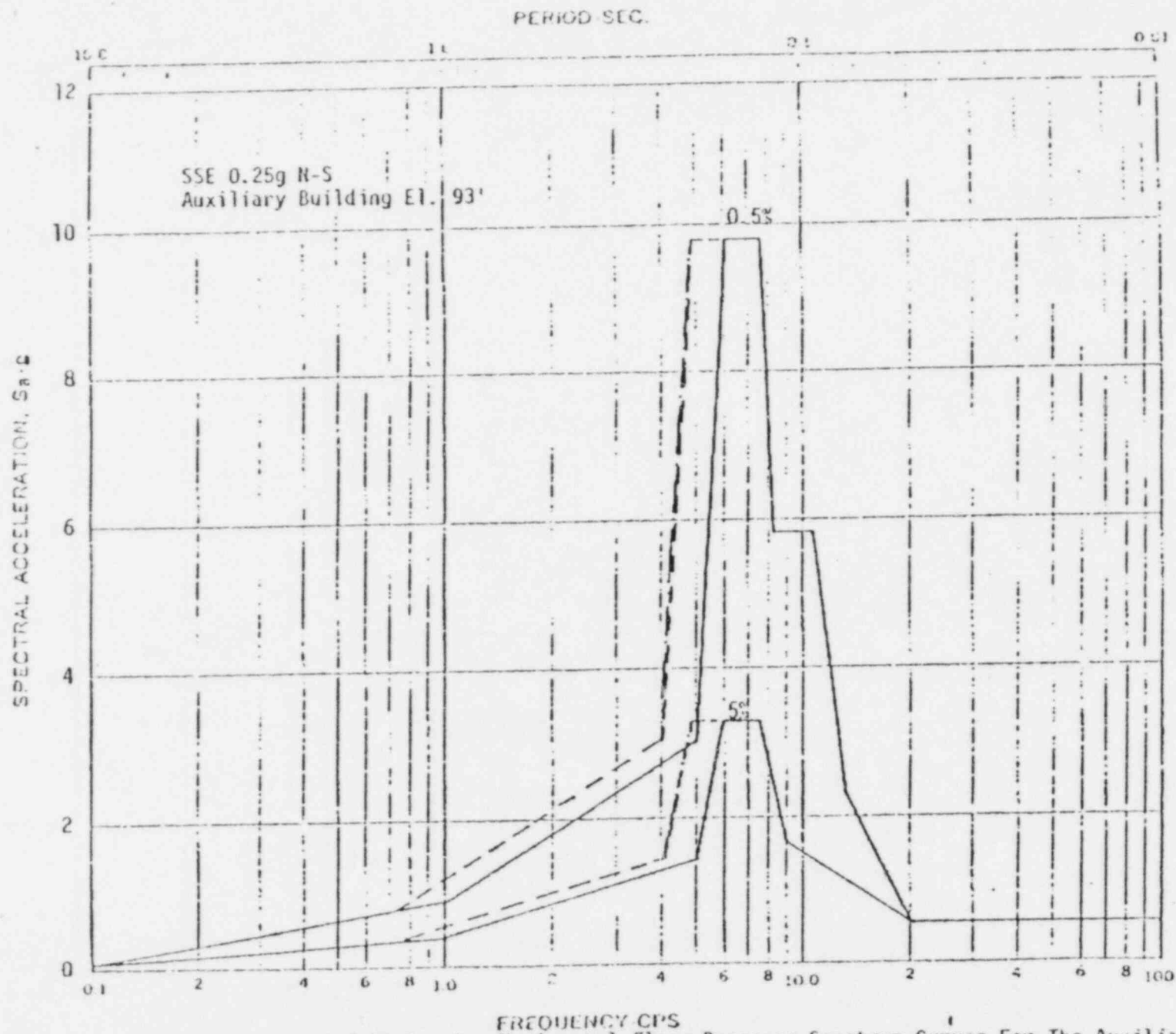


FIGURE 4-5

The 0.5% And 5% Damping Horizontal Floor Response Spectrum Curves For The Auxiliary Building El. 93', SSE 0.25g, N-S Direction

QUESTION 5

State the moduli of elasticity and the Poisson's ratios for the various floor slabs and wall types in the linear elastic STARDYNE analyses and provide your bases for these properties. Also, provide justification for the stiffness degradation factors reported in Table 4 (i.e., provide the relationships between stiffness degradation vs load for the various floor slabs and wall types corresponding to their location in the building complex) considered, and the bases for these relationships.

RESPONSE TO QUESTION 5

The moduli of elasticity used for the various floor slabs and wall types in the linear elastic STARDYNE analysis is based on ACI 318-71 relationship:

$$E = 57,000 \sqrt{f'_c} \quad (f'_c \text{ in psi})$$

The Poisson's ratio for all walls and slabs is taken as 0.25. The elastic moduli are summarized in Table 5.1.

Table 5.1 Elastic Moduli

| | |
|-----------------|--|
| Concrete Slabs | $E = 4.03 \times 10^6$ psi for $f'_c = 5000$ psi $E = 3.12 \times 10^6$ psi for $f'_c = 3000$ psi |
| Concrete Walls | $E = 4.03 \times 10^6$ psi for $f'_c = 5000$ psi |
| Composite Walls | $E = 3.67 \times 10^6$ psi |
| Block Walls | $E = 2.85 \times 10^6$ psi for 2500 psi blocks $E = 2.55 \times 10^6$ psi for 2000 psi blocks |

The maximum shear stresses averaged for the walls of an entire floor at a specific elevation are considered in determination of the stiffness reduction factors. The available experimental data indicates that the degradation of reinforced concrete is not as severe as that of masonry block walls. This is shown in Figure D-1 of Appendix D of the September 19, 1978 Supplemental Structural Evaluation. The composite stiffness was taken as the average of the reinforced concrete and masonry block stiffnesses. Considering the behavior of reinforced concrete, composite and block walls, different reduction factors are applied for walls at different elevations.

RESPONSE TO QUESTION 5, continued

For the quasi-nonlinear analysis performed, the stresses that result from the analysis are the maximum stresses the walls experience during a very short duration of the response to a time history of an earthquake. Therefore, the reduced stiffness used in the analysis is the SECANT modulus as against the instantaneous stiffness. This is shown qualitatively in Figure 5-1.

The stiffness reduction factors are determined based on these considerations. For the Control Building walls (all are composite walls) at elevation 45'-77', in the N-S direction, the maximum stress levels are given in Table 3c-1 of the September 20, 1978 response to questions. Wall 1 and Wall 4 in the N-S direction are heavily stressed as given in Table 3c-1. Referring to Figure D-1 of Appendix D of the September 19, 1978 Supplemental Structural Evaluation, the cracked stiffness value of 0.45×10^6 psi is converted to 0.6×10^6 psi when effective thickness is considered. This corresponds to a stiffness reduction factor of 0.38 (elastic $G = 1.59 \times 10^6$ psi). The levels of shear stresses between elevations 77'-117' in the N-S direction and 45'-77' in the E-W direction of the Control Building range between 50-125 psi. Therefore, the reduction factor is taken as 0.6. The stresses in the composite walls of elevation 77'-117' in the E-W direction are much less. Considering small cracks and the resulting nonlinear behavior, the reduction factor is taken as 0.8.

In the Auxiliary Building the shear stresses of Wall 5, a composite wall, are in the 150 psi range (see Table 3c-1 of September 20, 1978 response). The reduction factor is taken as 0.45. At higher elevations, the shear stresses range between 50-75 psi. Therefore, smaller reduction factors (0.6 and 0.8) are used.

The Auxiliary Building block walls are expected to show more severe degradation corresponding to the stress level. For this reason stiffness reduction factors are taken as 0.2-0.4. However, the contribution of these walls to the overall stiffness and strength capacity is insignificant.

In the Fuel Building the shear stresses in all walls are low, ranging from 9 to 65 psi. Due to inherent nonlinear behavior (caused by formation of hairline cracks) experienced for reinforced concrete, composite and masonry walls, a constant reduction factor of 0.8 is applied for all walls.

RESPONSE TO QUESTION 5, continued

No reduction was considered for the floor slabs due to the low stress levels and minor effects of the floor slab stiffness on the fundamental system frequency.

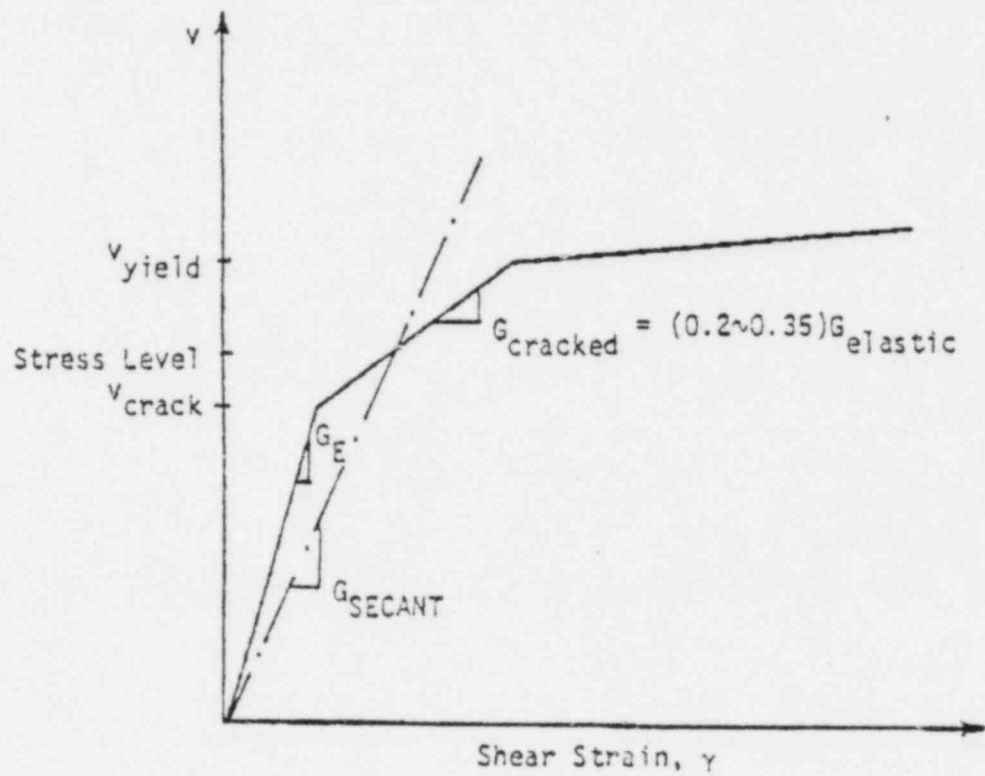


Figure 5-1 Qualitative Definition Of SECANT Modulus

Response to NRC Questions

QUESTION 6

Verify that the original vertical response spectra, considering all vertical building flexibilities, are adequate for the existing Control, Auxiliary, and Fuel Building complex. Also, verify that the vertical response spectra would not be significantly affected by the implications of the STARDYNE analyses, and any potential lateral stiffness degradation of the walls (as indicated in Appendices C and D of your September 29, 1978, submitted supplemental STARDYNE information), thereby significantly impacting the adequacy of the safety-related components, equipment, and piping in the building complex. Provide the appropriate bases for your conclusions.

RESPONSE TO QUESTION 6

The original vertical response spectra of the Control, Auxiliary, and Fuel Buildings were developed based upon the analysis of floor flexibilities. The wall systems are very rigid in the vertical direction as reflected by the high fundamental vertical frequencies: 20.7 cps for the Control Building, 24.6 cps for the Auxiliary Building, and 31 cps for the Fuel Building. At these frequencies, there is very little acceleration amplification in the design ground response spectra. Thus, the vertical response spectra are dominated by the more flexible floor responses, and the contribution due to the frequencies associated with the wall system are insignificant. The floor frequencies and the spectral peak frequency ranges of the original vertical floor response spectra are summarized as follows.

| <u>BUILDING</u> | <u>FLOOR ELEVATION (ft)</u> | <u>FLOOR FREQUENCY (cps)</u> | <u>SPECTRAL PEAK FREQUENCY RANGES (cps)</u> |
|-----------------|-------------------------------------|--------------------------------------|---|
| Control | 61/77 93 | 9.0 13.0 | 8.0 - 11.0 11.0 - 15.0 |
| Auxiliary | 77/93 | 9.1 | 8.2 - 11.4 |
| Fuel | 61 77 | 5.7 5.8 | 5.0 - 7.0 5.0 - 7.0 |

RESPONSE TO QUESTION 6, continued

As can be seen from the spectral frequency ranges shown above, the spectral peak widening is equal to or greater than $\pm 10\%$ in all cases. Therefore, the spectral peak widening is adequate. The spectral peak magnitudes of the original vertical response spectra were obtained from the time history analysis using the very conservative original synthetic time history. Therefore, the resulting SSE vertical spectra are very conservative.

The lateral stiffness degradation of walls as indicated in Appendices C and D of the September 20, 1978, submittal applies only to lateral deformations of the Control Building's N-S walls and carries no implication as regards the vertical wall stiffnesses. Since both the N-S and the E-W wall systems contribute directly to vertical stiffness of the Control Building, the vertical stiffness variation due to the lateral stiffness degradation, if any, for individual N-S walls would not significantly affect the total vertical wall stiffness of the Control Building. Furthermore, since the vertical responses are dominated by the more flexible floor responses, the effect of the vertical wall stiffness variation on the response spectra is even less.

As an illustration, considering the vertical floor response spectrum for the Control Building elevation 61 ft, and assuming that the total vertical wall stiffness is reduced by a factor of 0.8 for all elevations, the fundamental vertical frequency of the Control Building would be lower by a factor of 0.9, giving a frequency of 18.6 cps. The floor frequency for elevation 61 ft is 9.0 cps as shown previously. Thus, combining the 18.6 cps with the floor frequency of 9.0 cps gives the combined frequency for the floor at 8.1 cps as shown in the following:

$$[(1/9.0)^2 + (1/18.6)^2]^{-1/2} = 8.1$$

This is still within the original vertical spectral peak frequency range (8.0 cps to 11.0 cps).

Based on the considerations stated above, it is concluded that with some limited vertical wall stiffness reduction, the original vertical response spectra would not be significantly affected.

Response to NRC Questions

QUESTION 7

Provide the final results of your reevaluation of safety-related equipment, components, and piping. Also, indicate the number of additional restraints added to each of the safety-related systems.

RESPONSE

Our response of October 27, 1978 confirmed the seismic capability of the mechanical and electrical equipment and components including cable trays in the Control-Fuel-Auxiliary building complex. Our response of October 27, 1978, also referred to continued; detailed analyses that would more accurately define the extent of modifications to existing pipe supports and the possible addition of restraints to "tune" the piping systems natural frequencies away from the building natural frequencies based on the new spectra. These analyses have been completed.

A total of 18 additional restraints will be added to the large piping (2" and larger) in the following systems as indicated:

| | |
|-----------------------------|----------|
| Service Water | - None |
| Component Cooling Water | - Eleven |
| Safety Injection | - One |
| Residual Heat Removal | - None* |
| Auxiliary Feedwater | - None |
| Containment Spray | - Four |
| Containment Isolation | - None |
| Centrifugal Charging | - None |
| Chemical and Volume Control | - One |
| Waste Gas Decay | - None |

*A continuation isometric that takes off from RHR through a closed valve will require one restraint, but this is not part of RHR, ECCS, or required for Safe Shutdown.

The capacity of the existing 772 supports on the piping in the systems listed above have been re-evaluated based on the new response spectra. Approximately 25% of these supports whose loads are slightly higher than the original design loads have been reanalyzed to determine whether the increased load is still within the allowable capacity of the support. Calculations have confirmed that 65 supports, or approximately 8% of the total, will require some minor modification. No additional restraints need to be added to any small piping that is required for ECCS or Safe Shutdown; however, approximately 15

RESPONSE TO QUESTION 7 (Continued)

additional holddown clamps will be added to peripheral piping indirectly associated with the ECCS and Safe Shutdown functions. (These additions will be mostly to highly ductile but low code stress allowable copper piping serving such items as small room coolers).

TROJAN NUCLEAR PLANT
CONTROL BUILDING DOCUMENT ROOM

INDEX

JULY 28, 1978

REVISION 1*
AUGUST 14, 1978

REVISION 2*
AUGUST 21, 1978

REVISION 3*
SEPTEMBER 8, 1978

REVISION 4*
SEPTEMBER 26, 1978

REVISION 5*
OCTOBER 20, 1978

REVISION 6*
NOVEMBER 7, 1978

*Indicated in right-hand margin of attached pages.

INDEX FOR TROJAN CONTROL BUILDING DOCUMENT ROOM

| <u>Document File No.</u> | <u>Description</u> |
|------------------------------|--|
| 1 | Trojan Preliminary Safety Analysis Report, Volumes 1 thru 4 |
| 2 | Trojan Final Safety Analysis Report, Volumes 1 thru 9 |
| 3 | Trojan Operating License and Appendices |
| 4 | Docketed Correspondence Between NRC and PGE |
| 4A | Correspondence April 28, 1978 thru July 7, 1978 |
| 4B | Correspondence June 23, 1978 thru September 20, 1978 |
| 4C | Correspondence October 4, 1978 to present |
| 5 | Related Licensing Correspondence (Including Internal Correspondence, Meeting Notes, Telecons, etc.) |
| 6 | PGE - Bechtel Communications on Current Problems |
| 7 | Drawings |
| 8 | Transcripts of Control Building Hearings |
| 8A | Intervention Hearing, July 24 and 25, 1978 |
| 8B | Prehearing Conference, August 14, 1978 |
| 8C | Evidentiary Hearing, October 23-25, 1978, Books 1-5 |
| 8D | Limited Appearances, October 26-27, 1978, Books 1-2 |
| 8E | Evidentiary Hearing, October 30-31, 1978, November 1-3, 1978, Books 1-9 |
| 9 | Historical Files |
| 9A | Specification for Structures and Site Works (F04) Volumes 1 through 5 |
| 9B | Control Building NCRs, Letters of Inspection, Change Order Memos |
| 9C | Control Building Construction Photos |
| 9D | Control Building Technical Correspondence, Field Change Requests, Design Clarifications, and Variance Requests |
| 9E | QA Records |

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INDEX FOR TROJAN CONTROL BUILDING DOCUMENT ROOM

| <u>Document File No.</u> | <u>Description</u> | |
|------------------------------|--|-----|
| 10 | Bechtel Topical Report BC-TOP-4 (1971) | |
| 11 | Uniform Building Code UBC 67 | |
| 12 | ACI Code, ACI 318-63 (June 63) | |
| 13 | Bechtel-Supplied Documentation Volume I Original Design Calculations 1970 through 1975 Volume II Seismic Analysis May 11, 1971 Volume III As-Built Seismic Reanalysis May-June 1978 | (2) |
| 14 | Intervenor/Petitioner File | |
| 14A | Interrogatories | (3) |
| 15 | Need for Power File | |
| 16 | Reference Report and Studies | (1) |
| 17 | Trojan Plant Operating Manual | (2) |
| 18 | Trojan Environmental Report | |
| 19 | Atomic Safety and Licensing Board Correspondence | |
| 20 | Composite Shear Wall Testing Program | (5) |
| 21 | Testimony | |
| 22 | Trojan Nuclear Plant Seismic Design Spectra | (6) |
| 23 | Trojan Control Building Equipment Qualifications | |

DOCUMENT FILE 4CONTROL BUILDING DOCKET CORRESPONDENCETable of Contents

| <u>Number</u> <u>BOOK A</u> | <u>Date</u> | <u>Subject</u> |
|--------------------------------|----------------|--|
| 1 | April 28, 1978 | PGE letter to NRC informing them of nonconformance. |
| 2 | May 2, 1978 | NRC letter to PGE requesting information. |
| 3 | May 5, 1978 | Licensee Event Report (LER) 78-13. |
| 4 | May 9, 1978 | NRC memorandum, "Summary of Meeting Held on May 1, 1978 to discuss Control Building Design Criteria Nonconformance". |
| 5 | May 19, 1978 | Oregon Department of Energy letter to NRC. |
| 6 | May 24, 1978 | PGE to NRC letter, Supplemental Information to LER 78-13. |
| 7 | May 24, 1978 | Summary of meeting held on May 19, 1978 with PGE and Bechtel. |
| 8 | May 26, 1978 | PGE to NRC letter in regard to NRC memorandum of May 2 on meeting. |
| 9 | May 26, 1978 | Public Information Release, "NRC Staff to Require further Earthquake Protection Measures at Trojan". |
| 10 | May 26, 1978 | NRC Order for modification of License and Safety Evaluation. |
| 11 | June 16, 1978 | PGE petition to the NRC for an emergency order allowing temporary operation and memorandum dated June 14, 1978 supporting issuance of an emergency order allowing temporary operation. |
| 12 | June 16, 1978 | NRC letter to Oregon DOE. |
| 13 | June 23, 1978 | Letter to NRC from Public Utility Commissioner of Oregon in support of petition to operate Trojan. |
| 14 | June 20, 1978 | Letter from Bob Straub to NRC in support of petition to operate Trojan. |
| 15 | June 23, 1978 | NRC Staff response to petition for emergency order. |

DOCUMENT FILE 4CONTROL BUILDING DOCKET CORRESPONDENCETable of Contents

| <u>Number</u> | <u>Date</u> | <u>Subject</u> |
|---------------|------------------|---|
| 16 | June 20, 1978 | Letter to NRC from DOE regarding operation of Trojan. |
| 17 | June 23, 1978 | NRC memorandum on summary of meeting held on June 15, 1978 with PGE and Bechtel to discuss proposed modifications to the Control Building. |
| 18 | June 30, 1978 | Goodwin letter to Edson Case, "Proposed Schedule of Actions". |
| 19 | July 7, 1978 | NRC order denying petition by PGE to allow temporary operation of Trojan. |
| <u>BOOK B</u> | | |
| 20 | June 21, 1978 | Licensees' Petition for an Emergency Order Allowing Temporary Operation of the Trojan Nuclear Plant. |
| 21 | June 30, 1978 | Response to Licensee's Petition for an Emergency Order Allowing Temporary Operation of the Trojan Nuclear Plant. |
| 22 | July 7, 1978 | Notice and Order to Special Prehearing Conference - ASLB. |
| 23 | July 7, 1978 | NRC letter transmitting Dr. Miller's letter of June 20, 1978 - Control Building Design Errors. |
| 24 | July 21, 1978 | NRC letter to C. Goodwin setting forth proposed construction schedule. |
| 25 | July 27, 1978 | NRC-ASLB Order Concerning Requests for Hearing and Intervention Petitions. |
| 26 | July 21, 1978 | Certificate of Service - Licensees' Motion for Consolidation of Intervenors, Licensees' Motion for Prompt Consideration of Interim Operation of the Trojan Nuclear Plant, and Licensees' Proposed Agenda. |
| 27 | July 21, 1978 | Motion for Consolidation of Intervenors. |
| 28 | July 21, 1978 | Motion for Prompt Consideration of Interim Operation of the Trojan Nuclear Plant. |
| 29 | July 24-25, 1978 | Licensees' Proposed Agenda Pre-Hearing Conference. |

DOCUMENT FILE 4CONTROL BUILDING DOCKET CORRESPONDENCETable of Contents

| <u>Number</u> | <u>Date</u> | <u>Subject</u> |
|---------------|-----------------|---|
| 30 | July 28, 1978 | Licensees' Letter and Attachments to Members of the Board and Licensees' Document Room Use Instructions. |
| 31 | July 28, 1978 | NRC Notice of Hearing on Order for Modification of License and of Special Prehearing Conference. |
| 32 | July 31, 1978 | C. Goodwin letter to A. Schwencer - security perimeter barrier. |
| 33 | August 1, 1978 | NRC - Notice of Evidentiary Hearing. |
| 34 | August 2, 1978 | Certificate of Service - Licensee's Letter to the Director of Nuclear Regulation and Licensee's Attorney's Notice of Appearance. |
| 35 | August 7, 1978 | NRC Mailgram Rescheduling of Prehearing Conference on August 14, 1978. |
| 36 | August 3, 1978 | NRC Summary of Site Visit and Meeting Held on July 6, 1978, at the Trojan Site to Discuss the Trojan Control Building. |
| 37 | August 19, 1978 | D. J. Broehl letter to NRC transmitting NRC Staff Questions and Licensee Responses, August 4 through 17 plus Control Building Certificate of Service transmitting same. |
| 38 | August 21, 1978 | PGE letter to NRC transmitting final NRC Questions and our Response and supplementary information to previous responses plus Control Building Certificate of Service. |
| 39 | August 25, 1978 | NRC Staff Interrogatories to, and request for the production documents from, the Licensee. |
| 40 | August 25, 1978 | NRC Inspection of Bechtel Power Corporation Trojan Nuclear Project Conducted August 16-18, 1978 (78-15). |
| 41 | August 30, 1978 | NRC summary of meeting held on August 28, 1978, to discuss new information regarding Control Building design. |

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DOCUMENT FILE 4CONTROL BUILDING DOCKET CORRESPONDENCETable of Contents

| <u>Number</u> | <u>Date</u> | <u>Subject</u> |
|---------------|-----------------------|---|
| 42 | September 20, 1978 | Trojan Control Building Supplemental Structural Evaluation, September 19, 1978; Response to Questions from the Nuclear Regulatory Commission dated August 30, 1978; Response to Trojan Nuclear Plant Control Building to Specified SSE Event by Myle J. Holley, Jr., and Boris Bresler. |
| <u>BOOK C</u> | | |
| 43 | October 4, 1978 | D. J. Broehl letter to NRC with partial responses to the NRC staff questions of October 2, 1978. |
| 44 | October 6, 1978 | D. J. Broehl letter to NRC transmitting clarifying information and service list. |
| 45 | October 10, 1978 | Licensee's letter to Director of Nuclear Reactor Regulation forwarding clarifications in response to NRC staff questions; Licensee's letter to the ASLB identifying field work to be performed in the near future in the Fuel-Auxiliary-Control Buildings. |
| 46 | October 13, 1978 | Licensee's letter to Director of Nuclear Reactor Regulation transmitting clarifications in response to NRC staff questions of October 11 thru 13, 1978. |
| 47 | October 17, 1978 | Licensee's letter to Director of Nuclear Reactor Regulation forwarding a response to the NRC staff question received October 16, 1978. |
| 48 | October 27, 1978 | Licensee's letter to Director of Nuclear Reactor Regulation - further response to NRC staff technical questions of October 16, 1978. |
| 49 | November 2, 1978 | Licensee's letter to Director of Nuclear Reactor Regulation responding to the NRC staff technical questions of October 31, 1978. |

DOCUMENT FILE 5RELATED LICENSING CORRESPONDENCETable of Contents

| | | |
|----|----------------|--|
| 1 | April 13, 1978 | Memo - D. J. Broehl to W. J. Lindblad - potential noncompliance with design criteria |
| 2 | April 13, 1978 | Telecon - D. J. Broehl to NRC Region V and Washington - potential reportable design problem |
| 3 | May 2, 1978 | Letter from DOE to Oregon State University asking assistance in evaluating the design adequacy of the Control Building |
| 4 | May 10, 1978 | Telecon by NRC Bethesda to PGE and Bechtel - Control Building LER No. 78-13 and supplement to the Trojan Control Building report of May 5, 1978 |
| 5 | May 15, 1978 | Telecon - from the NRC to PGE - seismic design and analysis request for additional information |
| 6 | May 24, 1978 | Bob Packwood letter to Carlton C. Kammerer at the NRC - asking to be informed as to what response the NRC is making to the recent safety violation |
| 7 | June 13, 1978 | Statement of W. J. Lindblad before the EFSC |
| 8 | June 15, 1978 | Memo - S. R. Christensen to B. D. Withers - Emergency Instruction EI-7 |
| 9 | June 16, 1978 | NRC letter to Dr. Fred D. Miller, DOE, responding to letter of May 19, 1978 |
| 10 | June 23, 1978 | Telecon - C. Trammell to G. Zimmerman - informing us that the NRC staff attorneys had reviewed the NRC order of May 26, 1978 |
| 11 | June 23, 1978 | Memo - G. A. Zimmerman to D. I. Herborn - schedule of events concerning Control Building |
| 12 | June 23, 1978 | PUC letter to NRC giving their support for the petition |
| 13 | June 27, 1978 | Memo - G. A. Zimmerman to J. L. Frewing - PGE-Bechtel meeting with NRC on Control Building |
| 14 | June 29, 1978 | ASLB rule on petitions |
| | July 11, 1978 | G. A. Zimmerman memo - Control Building topical report |

DOCUMENT FILE 5RELATED LICENSING CORRESPONDENCETable of Contents

| | | | |
|----|-----------------|--|-----|
| 16 | July 12, 1978 | Telecon - H. Sager, PGE, to B. Albert, NRC, Trojan Control Building - annex | |
| 17 | July 28, 1978 | Robert Short letter to Charles Davis relating financial aspects of the shutdown of the plant | |
| 18 | August 7, 1978 | Mailgram to NRC from Bob Packwood urging the NRC to expedite proceedings regarding operation of Trojan | (1) |
| 19 | May 5, 1978 | Minutes - Plant Review Board Friday, May 5, 1978, 4:15 p.m. | |
| 20 | May 5, 1978 | Nuclear Operations Board meeting No. 65, Friday, May 5, 1978, at 3:30 p.m., Service Building 1, GLAD conference room | (2) |
| 21 | April 28, 1978 | 10 CFR 21 committee finding on the structural adequacy of the Control Building at Trojan | |
| 22 | August 22, 1978 | NRC staff statement | |
| 23 | August 22, 1978 | Lowenstein letter to Miller, Paxton, McCollom, relating that further analysis of the Control Building's structural capability will be necessary | (1) |
| 24 | August 23, 1978 | PGE press release stating it has notified the NRC that we are unable to meet the deadline for submitting testimony for a scheduled September 6 hearing | |

DOCUMENT FILE 6

PGE-BECHTEL COMMUNICATIONS ON CURRENT PROBLEM

Table of Contents

1. Conference Agenda - April 27, 1978.
2. D. J. Broehl Letter of July 12, 1978 to J. F. O'Leary Regarding Trojan Control Building Structural Support System.
3. Bechtel Letter of May 10, 1978 to W. J. Lindblad Regarding the Trojan Nuclear Power Plant - Job 11760, Control Building.
4. Bechtel Letter of May 8, 1978 to R. L. Sullivan Regarding Transmittal of Analysis of the Trojan Control Building.
5. Bechtel Letter of April 28, 1978 to W. J. Lindblad Regarding Trojan Nuclear Power Plant - Job 11760, Control Building.
6. Bechtel Statement of August 22, 1978 to PGE Confirming Results of Several Past Control Building Analysis by a Different Methodology.
7. Bechtel Letter of August 25, 1978 to PGE - Control Building Seismic Information.
8. Bechtel Letter of September 14, 1978 to D. J. Broehl - Trojan Control Building Personnel Responsibilities.
9. Bechtel Letter of October 23, 1978 to D. J. Broehl - Trojan Proposed Modification of Control Building.

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DOCUMENT FILE 7DRAWINGSTable of Contents

| <u>Number</u> | <u>Title</u> | <u>Revision Number</u> |
|---------------|--------------|------------------------|
|---------------|--------------|------------------------|

Drawing Group 1

Control Building general plan location in the Trojan Plant power block and adjacent structures' general utilization corresponding to the Control Building floor elevations:

| | | |
|-----|---|---|
| A-3 | General Plant Floor Plan, El 45' | |
| A-4 | General Plant Floor Plan, El 61', 63', 69', 77' | 8 |
| A-5 | General Plant Floor Plan, El 93' | 9 |

Drawing Group 2

Architectural Drawings illustrating the specific layout of, and details for, Control Building (wall slabs and utilization) over the height of the structure:

| | | |
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| A-29 | Control Building Floor Plan, El 45' | 13 |
| A-30 | Control Building Floor Plan, El 61' & 65' | 12 |
| A-31 | Control Building Floor Plan, El 77' | 11 |
| A-32 | Control Building Floor Plan, El 93' | 18 |
| A-33 | Control Building Floor Plan, El 102'6", 105', Intermediate Elevations | 13 |
| A-34 | Control Building Sections D-D and H-H; Details | 10 |
| A-35 | Details | 9 |
| A-38 | Details | 3 |

Drawing Group 3

Structural concrete and concrete masonry drawings for the Control Building providing the layout and details for the reinforced concrete floor slabs and lateral load carrying composite reinforced concrete block reinforced concrete core walls:

| | | |
|-------|--|----|
| C-101 | Typical Details Concrete, Sheet 1 | 7 |
| C-102 | Typical Details, Concrete, Sheet 2 | 6 |
| C-103 | Typical Details, Concrete, Sheet 3 | 8 |
| C-701 | Control Building Ground Floor Foundation Plan | 1 |
| C-702 | Control Building Ground Floor Plan of Area 6 | 5 |
| C-406 | Turbine Building Ground Floor Sections and Details, Sheet 1 | 10 |
| C-523 | Fuel and Auxiliary Buildings Floor at El 45'; Concrete Sections and Details, Sheet 1 | 7 |
| C-707 | Control Building Floors at El 61' & 65', Plan of Area 6 | 8 |

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|-------|--|----|
| C-708 | Control Building Floors at El 61' & 65'; Concrete Sections and Details | 3 |
| C-713 | Control Building Floor at El 77', Plan of Area 6 | 6 |
| C-714 | Control Building Floor at El 77', Concrete Sections and Details | 4 |
| C-719 | Control Building Operating Floor, Plan of Area 6 | 11 |
| C-720 | Control Building Operating Floor; Concrete Sections and Details | 5 |
| C-721 | Control Building Floors at El 102'6", 105'; Plan of Area 6 | 5 |
| C-722 | Control Building Floors, El 102'6", 105'; Concrete Sections and Details | 2 |
| C-723 | Control Building Roof Plan, Area 6 | 5 |
| C-724 | Control Building Roof Concrete Sections and Details | 4 |

Drawing Group 4

Structural drawings and details for the Control Building structural steel vertical load carrying space frame:

| | | |
|-------|--|---|
| C-725 | Control Building Exterior Elevations at Lines 41, 55, N & R | 6 |
| C-730 | Control Building Longitudinal Section Looking East | 5 |
| C-731 | Control Building Cross Section Looking North | 5 |
| C-734 | Control Building Floor at El 65' & 61'; Steel Framing Plan and Sections | 7 |
| C-738 | Control Building Floor at El 77'; Steel Framing Plan and Sections | 6 |
| C-742 | Control Building Operating Floor; Steel Framing Plan and Sections | 7 |
| C-746 | Control Building Roof and Mezzanine Floor; Steel Framing and Sections | 9 |
| C-750 | Control Building Columns, Schedule and Details | 6 |

Drawing Group 5

Mechanical equipment location drawings which illustrate plant systems in, and in close proximity to, the Control Building:

| | | |
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| M-7 | Equipment Location, Turbine Building; Plan Ground Floor, El 45' | 13 |
| M-8 | Equipment Location, Turbine Building; Plan Intermediate Levels, El 63' | 9 |

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|------|---|----|
| M-9 | Equipment Location Turbine Building; Plan Operating Floor, El 93' | 8 |
| M-17 | Equipment Location Reactor and Auxiliary Buildings; Plan, El 45' | 10 |
| M-18 | Equipment Location Reactor and Auxiliary Buildings Plan, El 61' | 11 |
| M-19 | Equipment Location Reactor and Auxiliary Buildings Plan, El 77' | 8 |
| M-20 | Equipment Location, Reactor and Auxiliary Buildings; Plan Operating Floor and Above | 7 |

Drawing Group 6

Concrete and Structural Drawings Illustrative of Structural Elements of Auxiliary Building, Fuel Building and Spent Fuel Pool:

| | | |
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| A-11 | General Plant Sections B-B, C-C and G-G | 4 |
| C-519 | Fuel and Auxiliary Buildings floor at El 45' 0" | 9 |
| C-534 | Fuel and Auxiliary Buildings floor at El 61' 0" | 3 |
| C-544 | Fuel and Auxiliary Buildings floor at El 77' 0" | 4 |
| C-554 | Fuel and Auxiliary Buildings floor at El 93' 0" | 11 |
| C-571 | Fuel and Auxiliary Buildings Fuel Pool Sections and Details, Sheet 1 | 5 |
| C-572 | Fuel and Auxiliary Buildings Fuel Pool Sections and Details, Sheet 2 | 5 |
| C-612 | Fuel and Auxiliary Buildings Cross-Section on Lines "F" and "C" Looking East | 4 |

Drawing Group 7

Floor Plans for Auxiliary and Fuel Buildings:

| | |
|------|---------------------------------------|
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| A-69 | Fuel Building floor plan, El 45' |
| A-70 | Auxiliary Building floor plan, El 61' |
| A-71 | Fuel Building floor plan, El 61' 0" |

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DOCUMENT FILE 7

DRAWINGS

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| C-520 | Fuel and Auxiliary Buildings floor at El 45' 0", Plan of Area 3 |
| C-533 | Fuel and Auxiliary Buildings floor at El 61' 0" and 66' 0", Plan of Area 1 |
| C-535 | Fuel and Auxiliary Buildings floor at El 61' 0", Plan of Area 3 |

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HISTORICAL FILES

Table of Contents

1. Bechtel Power Corporation and Hoffman Construction Company
Inspection Letters:

July 22, 1975 - Bechtel to Hoffman - BF-FO4-2861
June 24, 1974 - Bechtel to Hoffman - BF-FO4-2463
June 17, 1974 - Bechtel to Hoffman - BF-FO4-2448
July 11, 1975 - Hoffman to Bechtel - Fld. FO4-1253
July 7, 1975 - Hoffman to Bechtel - Fld. FO4-1254
March 24, 1975 - Bechtel to Hoffman - BF-FO4-2769
December 6, 1971 - Hoffman to Bechtel - Fld. 294

2. Bechtel Power Corporation and Hoffman Construction Company
Change Order Memorandums:

September 8, 1971 - Hoffman to Bechtel - Fld. 186

3. Bechtel Power Corporation and Hoffman Construction Company
Non Conformance Reports:

November 8, 1974 - Hoffman to Bechtel - Ptd-FO4-1792
October 24, 1973 - Hoffman to Bechtel - Ptd. 1466
October 18, 1973 - Bechtel to Hoffman - BF-FO4-1876
August 6, 1973 - Hoffman to Bechtel - Ptd 1365
August 1, 1972 - Bechtel to Hoffman - BF-FO4-1129
August 1, 1973 - Bechtel to Hoffman - BF-FO4-1727
June 20, 1973 - Bechtel to Hoffman - BF-FO4-1665
May 21, 1973 - Bechtel to Hoffman - BF-FO4-1624
March 26, 1973 - Bechtel to Hoffman - BF-FO4-1515
February 19, 1973 - Bechtel to Hoffman - BF-FO4-1450
December 7, 1971 - Bechtel to Hoffman - BF-FO4-706
May 12, 1972 - Bechtel to Hoffman - BF-FO4-1022
April 11, 1972 - Bechtel to Hoffman - BF-FO4-966
February 21, 1972 - Bechtel to Hoffman - BF-FO4-878
January 13, 1972 - Bechtel to Hoffman - BF-FO4-805
November 19, 1971 - Bechtel to Hoffman - BF-FO4-672

DOCUMENT FILE 9CCONTROL BUILDING CONSTRUCTION PHOTOSTable of Contents

| <u>Number</u> | <u>Photo</u> |
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| <u>Trojan Weekly Progress Photos</u> | |
| 136 | Control Building |
| 149 | Control Building |
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| 178 | Control Building |
| 193 | Control Building |
| 217 | Control Building |
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| 364 | Control Building |
| 402 | Control Building |
| 411 | Control Building - El. 77' |
| 421 | Control Building - El. 77' |
| 435 | Control Building at El. 77' Slab |
| 450 | Control Building - Concrete Block Wall Installation on South Side |
| 464 | Control Building |
| 520 | Control Building - El. 93' Floor |
| 525 | Control Building - El. 93' Floor |
| 562 | Control Building Roof |
| 574 | Control Building - El. 93' |
| 575 | Control Building Roof |
| 587 | Control Building - El. 93' |
| 616 | Control Building - El. 65' |
| 627 | Control Building Roof |
| 703 | Cable Tray Supports Control Building - El. 65' |
| 716 | Control Building at El. 65' |
| 733 | Control Building West Wall |
| 785 | Reactor-Auxiliary Building and Control Building |
| 803 | Control Building |
| 888 | Control Building |
| 1119 | Control Building |
| 1222 | Control Building - El. 93' |
| 1229 | Control Building - El. 93' |
| 1283 | Computer Installation in Control Building - El. 77' |
| 1284 | Control Building - El. 93' |
| 1286 | Control Building Roof |

DOCUMENT FILE 9C

CONTROL BUILDING CONSTRUCTION PHOTOS

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| <u>Number</u> | <u>Photo</u> |
|--|----------------------------------|
| <u>Trojan Weekly Progress Photos</u> | |
| 1414 (Bock 3) | Control Building - El. 93' |
| 1467 | Control Room |
| 1639 | Control Building Rm. #15 El. 45' |
| 1691 | Control Building Rm. #15 El. 45' |
| 1761 | Control Building |
| 1762 | Control Building |
| <u>Trojan Photos Progress Pictures</u> | |
| 913 | Steel for Control Building |
| 924 | Control Building |

NOTE: All photos included in this file are not listed above.

HISTORICAL FILESTable of Contents

1. Technical Correspondence:

May 12, 1973 - Telecon - Jim Koehler, Bechtel, to T. E. Bushnell, PGE, -
TEB-4-78T

March 21, 1975 - Hoffman to Bechtel - Fld.-FO4-1223

February 5, 1975 - Bechtel to Hoffman - BF-FO4-2701

November 26, 1974 - Hoffman to Bechtel - Fld-FO4-1137

June 11, 1974 - Hoffman to Bechtel - Fld. 1110

June 6, 1974 - Bechtel to Hoffman - BF-FO4-2436-R

April 11, 1974 - Hoffman to Bechtel - Fld. 1059

June 1, 1973 - Bechtel to Hoffman - BF-FO4-1645

May 2, 1973 - Bechtel to Hoffman - BF-FO4-1585

October 18, 1972 - Bechtel to Hoffman - BF-FO4-1243

May 24, 1972 - Bechtel to Hoffman - BF-FO4-1013

April 10, 1972 - Bechtel to Hoffman - BF-FO4-961

January 17, 1972 - Bechtel to Hoffman - BF-FO4-773

January 10, 1972 - Hoffman to Bechtel - Fld. 348

January 4, 1972 - Bechtel to Hoffman - BF-FO4-777

October 26, 1971 - Bechtel Meeting Notes, FO4 Construction Progress

October 15, 1971 - Bechtel FO4 Problem Areas Meeting Notes

July 2, 1971 - Bechtel to Hoffman - BF-FO4-184

May 26, 1971 - Bechtel to Hoffman - BF-FO4-080

April 1971 - Hoffman Construction Company Quality Assurance Manual
Section HQA-5, Procurement Document Control Procedure

June 4, 1969 - Gen. Itschner letter to Peter Karpa

May 26, 1969 - Memo - E. C. Itschner to A. J. Porter and
R. E. Millsap - Layout of Control Building

2. Control Building CS24:

June 30, 1978 - Letter C. Goodwin to Edson Case, NRC.

June 16, 1978 - NRC letter to Dr. Miller, DOE

June 1978 - David B. McCoy petition for Public Hearing

June 7, 1978 - Telecon - G. Zimmerman to C. Trammell -
GAZ-T35-78

May 26, 1978 - Edson Case letter to C. Goodwin - design errors

May 22, 1978 - Telecon to C. Trammell/K. Herring - GAZ-T30-78

May 10, 1978 - D. W. Halligan, Bechtel, letter to W. J. Lindblad, BP-9172

May 10, 1978 - Telecon - NRC to PGE - TEB-5-78T

May 9, 1978 - Memo - Grotenhuis to Schwencer

May 15, 1978 - Supplement to the Trojan Control Building Report of 5/5/78

May 2, 1978 - A. Schwencer letter to C. Goodwin

April 28, 1978 - D. J. Broehl letter to A. Schwencer

April 28, 1978 - D. W. Halligan, Bechtel, letter to W. Lindblad, BP-9146

April 13, 1978 - Memo - D. J. Broehl to W. J. Lindblad

August 22, 1975 - Letter S. R. Christensen to W. C. Gangloff, Westinghouse,
PW-586, SRC-1619-75

August 21, 1975 - DEX - Six Floor Seismic Response Curves

DOCUMENT FILE 9D

HISTORICAL FILES

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2. Control Building CS24 - Concluded:

August 26, 1969 - D. J. Broehl letter to Peter Karpa
August 5, 1969 - Bechtel to H. I. Taylor - BP-354
June 19, 1969 - Bechtel to H. I. Taylor
June 4, 1969 - E. C. Itschner to Peter Karpa
May 26, 1969 - A. J. Porter and R. H. Millsap Memo from E. C. Itschner

3. Field Change Request:

July 18, 1974 - No. 2130
November 21, 1973 - No. 1498
February 1, 1973 - No. 585
February 1, 1973 - No. 587
January 29, 1973 - No. 571
February 26, 1973 - No. 640
January 29, 1973 - No. 570
January 24, 1973 - No. 555
November 30, 1972 - No. 434

4. Design Clarification/Variation Requests:

December 17, 1971 - No. 151
December 10, 1971 - Bechtel to Hoffman - BF-FO4-718
November 23, 1971 - Bechtel to Hoffman - BF-FO4-677
November 15, 1971 - Bechtel to Hoffman - BF-FO4-649
October 28, 1971 - Bechtel to Hoffman - BF-FO4-605

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Quality Assurance Records

1. Quality Assurance Records Microfilm File
2. Control Building Cylinder Strength Records
3. Control Building Wall Placement Records

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Nina Bell

Request for Hearing, June 21, 1978.

PGE Answer to Petition for Hearing, July 6, 1978.

NRC Response to Request for Hearing, July 13, 1978.

PGE Steps to Expedite Discovery in this Proceeding, August 4, 1978. (1)

Objection to Order Concerning Requests for Hearing and Intervention
Petitions and Request for Revision of Order or Certification,
August 21, 1978. (5)

Notification of Change of Address and Certificate of Service,
August 25, 1978. (3)

Intervenor Bell of Consolidated Intervenors, Response to Staff's
Interrogatories Set 1, dated August 9, 1978, August 29, 1978. (5)

Protective Agreement, September 7, 1978. (6)

Ron Johnson Letter Transmitting Material to be Provided Under the
Terms of the Protective Agreement, September 11, 1978. (6)

NRC Staff's Motion for Extension of Time in Which to Respond to
Objection to Order Concerning Requests for Hearing and Intervention
Petitions filed by Gail Parson and Nina Bell, September 20, 1978. (5)

Jeannie Bellavita

Request for Limited Appearance, August 28, 1978. (5)

Peter Bergel

Limited Appearance Statement, October 21, 1978. (6)

Bonneville Power Administration

NRC Staff's Response to Petition to Intervene of BPA.

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Estelle Brotherton

Request for Limited Appearance, June 15, 1978.

PGE Answer to Letter Requesting Hearing, July 3, 1978.

Columbia Environmental Council

Request for Hearing, June 16, 1978.

PGE Answer to Petition for Hearing and to Intervene, June 28, 1978.

NRC Response to Request for Hearing, July 10, 1978.

Request for Hearing and Intervention, July 27, 1978.

PGE Steps to Expedite Discovery in this Proceeding, August 4, 1978.

NRC Staff Interrogatories to, and Request for the Production of Documents from Intervenor Columbia Environmental Council, August 9, 1978.

Motion for Evening Hearings and Hearings Held in Columbia County, August 11, 1978.

Protective Agreement signed by Gregory Kafoury, August 14, 1978.

NRC Letter Enclosing Document, entitled "Motion for Evening Hearings and Hearings Held in Columbia County", August 24, 1978.

Protective Agreement, Gregory Kafoury, August 25, 1978.

NRC Staff's Motion for Order Compelling Columbia Environmental Council to Respond to NRC Staff's Interrogatories, dated September 7, 1978.

Columbia Environmental Council's Response to NRC Staff's Interrogatories, September 27, 1978.

Columbia Environmental Council's Interrogatories to PGE, NRC Staff, and State of Oregon, October 16, 1978.

Phyllis Cribby

Request for Limited Appearance, June 16, 1978.

PGE Answer to Letter Requesting Hearing, July 3, 1978.

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(3)
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Carl L. Davis

Opinion, June 13, 1978.

John H. Enders

Request for Hearing, June 17, 1978.

PGE Answer to Letter Requesting Hearing, July 3, 1978.

NRC Response to Request for Hearing, June 29, 1978.

NRC Response to Petitioners' Letter of June 29, 1978, July 3, 1978.

Richard Engen

Request for Hearing, June 9, 1978.

PGE Answer to Letter Requesting Hearing, June 28, 1978.

Bonnie Hill

Request for Hearing, June 20, 1978.

PGE Answer to Letter Requesting Hearing, July 3, 1978.

PGE Answer to Letter Requesting Hearing, July 11, 1978.

NRC Response to Request for Hearing, July 10, 1978.

John A. Kullberg

Request for Hearing, June 4, 1978.

PGE Answer to Letter Requesting Hearing, June 28, 1978.

PGE Answer to Petition to Intervene of June 17, 1978; July 3, 1978.

NRC Staff Response to Request for Hearing, June 23, 1978.

NRC Staff Response to Supplemental Request for Hearing, July 10, 1978.

NRC Response to Petitioners' Letter of June 29, 1978; July 3, 1978.

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Marjorie Kundiger

Request for Hearing, June 10, 1978.

PGE Answer to Letter Requesting Hearing, June 28, 1978.

NRC Response to Request for Hearing, June 29, 1978.

NRC Response to Petitioners' Letter of June 29, 1978; July 3, 1978.

Request for Limited Appearance, September 13, 1978. (5)

David B. McCoy (Consolidated-Nina Bell, C. Gail Parson, David B. McCoy) (5)

Amended Petition for Public Hearing and Request to Intervene,
June 12, 1978.

Petition for Public Hearing, June 7, 1978.

PGE Answer to Petition to Intervene of June 12, 1978; June 23, 1978.

NRC Response to Petitioners' Letter of June 29, 1978; July 3, 1978.

NRC Response to Request for Hearing, July 3, 1978.

PGE Steps to Expedite Discovery in this Proceeding, August 4, 1978. (1)

NRC Staff Interrogatories to, and Request for the Production of
Documents from, Consolidated Intervenors Bell, Parson and McCoy,
August 9, 1978.

Objections to the Notice of Evidentiary Hearings (August 1, 1978) and
Request for Revision of Order or Certification, August 14, 1978. (2)

Appeal from Ruling on Petition for Leave to Intervene, August 14, 1978.

Set 1 of Interrogatories, August 14, 1978.

Protective Agreement, August 19, 1978. (3)

NRC Staff's Response to David B. McCoy Appeal from Ruling on Petition
for Leave to Intervene, August 24, 1978. (6)

Ron Johnson Letter Transmitting Material to be Provided Under the Terms
of the Protective Agreement, August 24, 1978. (5)

NRC Memorandum and Order, September 12, 1978. (5)

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NRC Staff Responses to Interrogatories of David B. McCoy and Consolidated Intervenors, September 18, 1978.

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Sharon S. McKeel

Request for Hearing, June 9, 1978.

PGE Answer to Letter Requesting Hearing, June 28, 1978.

C. Gail Parson

Request for Hearing, June 1978.

PGE Answer to Petition for Hearing and to Intervene, July 5, 1978.

NRC Response to Request for Hearing, July 13, 1978.

PGE Steps to Expedite Discovery in this Proceeding, August 4, 1978.

Interrogatories to the Applicant, August 14, 1978.

Objection to Order Concerning Request for Hearing and Intervention Petitions and Request for Revision of Order or Certification, August 21, 1978.

NRC Staff's Motion for Extension of Time in Which to Respond to Objection to Order Concerning Requests for Hearing and Intervention Petitions Filed by Gail Parson and Nina Bell, September 20, 1978.

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Charles Partch

Request for Limited Appearance, September 13, 1978.

(5)

Eugene Rosolie (Coalition for Safe Power)

Request for Hearing, June 16, 1978.

PGE Answer to Petition for Hearing and to Intervene, July 6, 1978.

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Eugene Rosolie (Coalition for Safe Power) (Concluded)

Rhys Scholes Statement of Membership in Coalition for Safe Power,
October 21, 1978.

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Stephen M. Willingham

Petition to Intervene, June 26, 1978.

PGE Answer to Petition for Hearing and to Intervene, July 11, 1978.

NRC Response to Request for Hearing, July 13, 1978.

PGE Steps to Expedite Discovery in this Proceeding, August 4, 1978.

Objections to Notice of Evidentiary Hearing and Request for Revision of
Order or Certification.

(1)

NRC Staff Interrogatories to, and Request for the Production of Docu-
ments from Intervenor Stephen Willingham, August 9, 1978.

Interrogatories, August 11, 1978.

Answer to the State of Oregon (in Opposition to Motion of Stephen M.
Willingham for a Postponement of Hearing and Request for Certification),
August 11, 1978.

(2)

Interrogatories to the Applicant, August 16, 1978.

Protective Agreement, August 21, 1978.

(3)

Ron Johnson Letter Transmitting Material to be Provided Under the
Terms of the Protective Agreement, August 30, 1978.

(6)

NRC Staff's Motion for Order Compelling Steven Willingham to Respond
to NRC Staff's Interrogatories, dated September 7, 1978.

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State of Oregon

NRC Staff Interrogatories to, and Request for the Production of Docu-
ments from, State of Oregon, August 9, 1978.

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Responses to NRC Staff Interrogatories, August 25, 1978.

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State of Oregon (Concluded)

Telegram to Marshall Miller, ASLB, from John H. Socolofsky Stating the State of Oregon Expects to be able to Serve Prepared Testimony on October 6, dated September 27, 1978.

(5)

General

NRC Letter to Intervenors Transmitting Discovery Items - Meeting of July 6, 1978 and Internal Staff Memoranda.

(2)

NRC Letter to Intervenors Stating Pleadings and Similar Documents have been Filed in the Proceeding but not Received by the NRC Staff.

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INTERROGATORIES

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-
1. August 19, 1978 - Licensee's Response to Consolidated Intervenor Interrogatories Received August 14, 1978; Licensee's Responses to Stephen M. Willingham's Interrogatories dated August 11, 1978; Affidavits of Glen E. Bredemeier, D. J. Broehl, J. L. Frewing, Ronald W. Johnson, S. R. Christensen, B. D. Withers, Richard C. Anderson and George Katanics. (3)
 2. August 31, 1978 - Licensee's Additional Responses to Consolidated Intervenor Interrogatories Received August 14, 1978; Licensee's Responses to Stephen M. Willingham's Interrogatories dated August 16, 1978; Affidavits of D. J. Broehl, J. L. Frewing, Ronald W. Johnson, Richard C. Anderson and George Katanics; Notices of Appearance for Roland F. Banks, Jr., and W. A. Jerry North.
 3. September 13, 1978 - Licensee's Answers to NRC Staff Interrogatories dated August 25, 1978; Affidavits of George Katanics and Ronald W. Johnson; Licensee's Letter to Director of Nuclear Reactor Regulation dated September 12, 1978 Correcting the Licensee's Letter of August 31, 1978; Index for Trojan Control Building Document Room dated September 8, 1978; Letter Transmitting BPA's Petition for Leave to Intervene. (4)
 4. September 25, 1978 - Licensee's Responses to Coalition for Safe Power Interrogatories To, and Request for the Production of Documents From, Applicant Portland General Electric Dated September 6, 1978; Affidavits of Glen E. Bredemeier, S. R. Christensen, John L. Frewing, Ronald W. Johnson, and Richard C. Anderson; Bonneville Power Administration's Answers to Interrogatories and Request for Production of Documents by Coalition for Safe Power; Affidavits of Kenneth D. Earls, Roy E. Reinhart, Kamilla L. Downing, and William W. Kinsey. (5)
 5. September 27, 1978 - Licensee's Supplemental Responses to NRC Staff Interrogatories dated August 25, 1978; Licensee's Supplemental Responses to Consolidated Intervenor's Interrogatories received August 14, 1978; Licensee's Supplemental Responses to Intervenor Stephen M. Willingham's Interrogatories dated August 11, 1978; Affidavits, Document Room Index.

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| 6. October 27, 1978 - | Licensee's Responses to Columbia Environmental Council Interrogatories to Licensee Dated October 16, 1978; Licensee's Responses to Columbia Environmental Council Interrogatories to Licensee Dated October 16, 1978; Licensee's Supplemental Responses to Consolidated Intervenors' Interrogatories Received August 14, 1978; Licensee's Supplemental Responses to Stephen M. Willingham's Interrogatories to the Applicant Dated August 11, 1978; Licensee's Supplemental Responses Dated October 27, 1978 to CSFP Interrogatories to Applicant PGE Dated September 6, 1978; Affidavits of John L. Frewing, D. J. Broehl, Bart D. Withers, Ronald W. Johnson, Lief W. Erickson and Richard C. Anderson. |
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NEED AND COST OF POWER

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Need of Power

1. Telecon by Jack Speer, Anaconda, to G. Bredemeier, Power Supply Situation, dated July 13, 1978.
2. Memo from G. Bredemeier to file dated July 11, 1978, Meeting with Idaho Power Company Regarding Boardman Contract.
3. Telecon by G. Bredemeier, PGE, to Cliff Bissell, Idaho Power, dated June 2, 1978, Idaho Power Company Surplus Power.
4. Telecon by G. Bredemeier, PGE, to Hec Durocher, BPA, dated June 2, 1978, Sale of West Kootenay Power.
5. Telecon by G. Bredemeier, PGE, to Bob Lisbakken, PP&L, dated June 2, 1978, PP&L Surplus Power.
6. U. S. Department of Energy - Bonneville Power Administration Power Operation Plan for Period July 21, 1978 through August 20, 1978.
7. Agreement for the Sale of Surplus Energy Between Idaho Power Company and PGE, August 6, 1978.
8. Telecon by E. F. Kaprielian, PG&E to G. E. Bredemeier, PGE, Provisional Energy, August 18, 1978.
9. Telecon by Erv Hedegaard, Montana, to W. A. Huddleston, PGE, August 31, 1978.
10. Telecon by W. A. Huddleston, PGE, to E. L. Hedegaard, Montana, September 1, 1978.
11. Telecon by Hector Durocher, BPA, to G. E. Bredemeier, PGE, Discussion of Possible Advance of Energy from BPA to PGE, September 5, 1978.
12. G. E. Bredemeier Letter to W. G. Kalley, Montana Power, dated September 8, 1978 - Agreement Between PGE and Montana to Exchange Power and Energy Under Certain Terms Listed in the Letter.
13. BPA Letter to G. E. Bredemeier dated September 12, 1978, Discussing Certain Operating and Billing Procedures to Facilitate a Purchase by PGE of Energy from IPC.
14. Memo to File from G. E. Bredemeier, Telephone Conversations Regarding Availability of Power, September 12, 1978.
15. Telecon by Bob Lisbakken, PP&L, to G. E. Bredemeier, PGE, Tentative PP&L-PGE Exchange, September 12, 1978.

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Need of Power (Concluded)

16. Telecon by G. E. Bredemeier, PGE, to Wes Williams, SCE, Proposed SCE-PGE Power Exchange, September 12, 1978.
17. Minutes of Meeting, September 12, 1978, Discussing the Possibilities That Were Being Worked on to Substitute for Trojan's Output During the Forthcoming Months.
18. BPA Letter to Frank Warren dated September 13, 1978, Discussing Possible Advance of Energy from BPA to PGE.

Cost of Power

1. PGE Cumulative Costs for Loss of Trojan Energy - Figure 1.
2. Energy Analysis w/o Trojan.
3. G. Bredemeier Letter to Hector Durocher of BPA dated May 19, 1978 Responding to Letter of May 16, 1978 Concerning Purchase of Energy from West Kootenay.
4. Power Survey - 7-5-78.
5. Telecon by Irv Hedegard/Bob Miller to W. Huddleston, dated July 7, 1978, Energy Purchase.

Sale and Purchase of Power

1. The Montana Power Company Letter Agreement of July 28, 1978 to Mr. G. E. Bredemeier to purchase excess power and energy.

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(2) (4)

DOCUMENT FILE 16REFERENCE, REPORTS AND STUDIESTable of ContentsBOOK 1

1. "A Literature Survey—Compressive, Tensile, Bond and Shear Strength of Masonry", by Ronald L. Mayes and Ray W. Clough.
2. "State-of-the-Art" in Seismic Shear Strength of Masonry - an Evaluation and Review", by Ronald L. Mayes and Ray W. Clough.
3. "Precast-Prestressed Concrete Bridges 2. Horizontal Shear Connections", by Norman W. Hanson.
4. "Shear Strength at Low Rise Walls with Boundary Elements", by Felix Barda, John M. Hanson, and W. Gene Corley, PCA 1976 Bulletin #RD 043.01D.
5. "Shear in Concrete Masonry Piers", by Robert Schneider, California State Polytechnic College, Pomona, California.
6. "Seismic Analyses of Structures and Equipment for Nuclear Power Plants", BC-TOP-4, Revision 2, June 1974 — LOCATED SEPARATELY ON SHELF.
7. "The Benefits of High-Strength Masonry", Dean D. Froerer.
8. "Seismic Research of Multistory Masonry Buildings", University of California, Berkeley, 1972 to 1977, Ronald L. Mayes, Ray W. Clough, Pedro A. Hidalgo and Hugh D. McNiven.
9. "Building Practices for Disaster Mitigation", U. S. Department of Commerce, National Bureau of Standards, Procedures and Criteria for Earthquake Resistant Design, by M. Newmark and W. J. Hall, pp. 209-236.

BOOK 2

10. "Containment Liner Plate Anchors and Steel Embedments Test Results", P. L. Chang-Lo, T. E. Johnson and B. W. Pfeifer.
11. "Design Provisions for Shear Walls", Code Background Paper, Title No. 70-23.
12. "Analysis of Small Reinforced Concrete Buildings for Earthquake Forces", Portland Cement Association (1955).
13. "Design Data, Nelson Concrete Anchor, Studs for Securing Steel to Concrete" (August 1, 1961).
14. "Current Trends in the Seismic Analysis and Design of High-Rise Structures", Nathan M. Newmark, pp. 403-423.

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REFERENCE, REPORTS AND STUDIES

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BOOK 2 (Concluded)

15. "Treatise on Dams", United States Department of the Interior, Bureau of Reclamation, Design Standards No. 2, Chapter 9 Gravity Dams --- LOCATED SEPARATELY ON SHELF.
16. "Static and Earthquake Analysis of Three-Dimensional Frame and Shear Wall Buildings", by E. L. Wilson and H. H. Dovey, Earthquake Engineering Research Center, College of Engineering, University of California, Berkeley, California, March 1972.
17. "Trojan Nuclear Plant Analyses of Seismic Strengthening Schemes" prepared by PMB Systems Engineering, Inc., dated September 25, 1978.
18. "Trojan Project Job 6478, Quality Assurance Investigation of Design Control for Control Building Shear Walls Commencing May 8, 1978", August 18, 1978 --- LOCATED SEPARATELY ON SHELF.

BOOK 3

19. ASCE-Manuals and Reports on Engineering Practice-No. 41, "Plastic Design in Steel", A Guide and Commentary, 1971 --- LOCATED SEPARATELY ON SHELF.
20. Title No. 75-42, Proposed ACI Standard: Building Code Requirements for Concrete Masonry Structures, Reported by ACI Committee 531, 1978, American Concrete Institute.
21. Journal of the Structural Division Proceedings of the American Society of Civil Engineers, Criteria for Designing Bearing-Type Bolted Joints, October 1965, pp. 129-155.
22. "Flexibility Survey Response Trojan Nuclear Plant", Survey to Determine Capability of Equipment to Withstand Building Displacements-Control Building and Surrounding Structures, September 18, 1978.
23. "Earthquake Engineering", Robert L. Wiegel, Coordinating Editor, 1970, --- LOCATED SEPARATELY ON SHELF.
24. "Seismic Analysis of Piping Systems", BP-TOP-1, Bechtel Power Corporation, April 1973.

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| July 7, 1978 | Notice and Order for special prehearing conference |
| July 18, 1978 | Letter from Robert Lowenstein to James R. Yore, Notice of Appearance of Robert Lowenstein, and Notice of Appearance of Joel W. Wight |
| July 21, 1978 | Motion for consolidation of intervenors |
| July 21, 1978 | Motion for prompt consideration of interim operation of the Trojan Nuclear Plant |
| July 27, 1978 | Order concerning request for hearing and intervention petitions |
| July 28, 1978 | Licensee's letter and attachments to members of the Board and Licensees' document room use instructions |
| July 28, 1978 | Notice of hearing on Order for modification of license and of special prehearing conference |
| August 1, 1978 | Notice of evidentiary hearing |
| August 4, 1978 | Lowenstein letter transmitting Licensees' proposed agenda for special prehearing conference |
| August 9, 1978 | Lowenstein letter discussing prehearing conference on August 14 Licensees' motion for prompt con- sideration of interim operation |
| August 16, 1978 | Amended notice of place of evidentiary hearing on September 6-8, 1978 |
| August 19, 1978 | Certificate of Service - Licensee's responses to consolidated intervenors interrogatories received August 14, 1978; Licensee's responses to Stephen M. Willingham's interrogatories dated August 11, 1978 |
| August 22, 1978 | Lowenstein letter relating that further analysis of the Control Building structural capability will be necessary and PGE will, within a few days, give a date when they might be able to submit testimony and to provide its views as to appropriate procedural steps |
| August 23, 1978 | Notice of appearance - W. A. Jerry North |

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| August 23, 1978 | Notice of appearance - Roland F. Banks |
| September 5, 1978 | Certificate of Service - Licensee's letter to the Director of Nuclear Reactor Regulation dated September 1, 1978 confirming information presented to the NRC staff on August 28, 1978 |
| September 11, 1978 | Lowenstein letter concerning preliminary results of the supplementary finite element analysis of the existing Control Building structure |
| September 13, 1978 | Ron Johnson's letter transmitting copies of the petition to intervene by BPA |
| September 20, 1978 | Certificate of Service - Licensee's letter transmitting Trojan Control Building Supplemental Structural Evaluation, September 19, 1978; response to questions from the NRC dated August 30, 1978; response to Trojan Nuclear Plant Control Building to specified SSE event |
| September 21, 1978 | Order regarding responses to interrogatories and consolidation |
| September 25, 1978 | Lowenstein letter stating certain documents pertinent to the operation of Trojan had been served on the Board |
| September 25, 1978 | Certificate of Service - Licensee's responses to Coalition for Safe Power interrogatories dated September 6, 1978 and BPA's answers to interrogatories by Coalition for Safe Power |
| September 26, 1978 | NRC letter stating they had received from the Licensee copies of the Trojan Control Building Supplemental Structural Evaluation, dated September 19, 1978; response to questions from the NRC dated August 30, 1978; response of Trojan Nuclear Power Plant Control Building to specified SSE event, dated September 20, 1978 |
| September 26, 1978 | Lowenstein letter correcting typographical error and letter of September 25, 1978 |
| September 27, 1978 | Certificate of Service - Licensee's supplemental responses to NRC staff interrogatories dated |

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| September 27, 1978 (contd) | August 25, 1978; Licensee's supplemental responses to consolidated intervenors' interrogatories received August 14, 1978; Licensee's supplemental responses to intervenor Stephen M. Willingham's interrogatories dated August 11, 1978 |
| October 2, 1978 | Mailgram - Evidentiary hearing on interim operation will commence at 10:00 a.m. on Monday, October 23 |
| October 2, 1978 | Lowenstein letter confirming that the Licensee will prefile its testimony concerning interim operation on October 3, 1978 |
| October 2, 1978 | Certificate of Service - Report titled "Trojan Nuclear Plant Analyses of Seismic Strengthening Schemes" dated September 25, 1978 |
| October 3, 1978 | Certificate of Service - Testimony of PGE; testimony of BPA |
| October 4, 1978 | Certificate of Service - Licensee's letter dated October 4, 1978 to Director of Nuclear Reactor Regulation with partial responses to NRC staff questions of October 2, 1978 |
| October 6, 1978 | Certificate of Service - Letter from D. J. Broehl to A. Schwencer transmitting clarifying information |
| October 10, 1978 | Certificate of Service - Licensee's letter to Director of Nuclear Reactor Regulation forwarding clarifications and response to NRC staff questions; Licensee's letter to the ASLB identifying fuel work to be performed in the near future in the Fuel-Auxiliary-Control Buildings |
| October 13, 1978 | Certificate of Service - Licensee's letter to Director of Nuclear Reactor Regulation transmitting clarifications in response to the NRC staff questions of October 11-13, 1978 |
| October 17, 1978 | Certificate of Service - Licensee's letter to Director of Nuclear Reactor Regulation forwarding a response to the NRC staff question received October 16, 1978, and letter of J. R. Gray forwarding the testimony of Kenneth S. Herring, regarding the supplemental STARDYNE analysis and its effect on the structural capacity. |

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Certificate of Service - Licensee's Letter with
an Attached List of Requests for Design Change
and Other Work Items.

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COMPOSITE SHEAR WALL TESTING PROGRAM

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1. Specification for furnishing test specimens for performing static tests on reinforced concrete block masonry-concrete composite shear walls, Job No. 13097-001. Specification Number 13097-C10, Rev. 1, September 11, 1978.
2. Bechtel letter to John M. Hanson, Wiss, Janney, Elstner & Associates, dated September 20, 1978, transmitted tentative test plan for the shear wall test program, including a tabulation of shear stress and horizontal force values.

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TESTIMONY

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I. Portland General Electric Company

- A. Testimony of Licensee's Witnesses Donald J. Broehl, S. R. Christensen, and Bart D. Withers, with statements of qualification;

Testimony of licensee's witnesses Richard C. Anderson, George Katanics, Theodore E. Johnson, and William H. White, with attachments and statements of qualification;

Response to Trojan Nuclear Plant Control Building to specified SSE Event to be considered as testimony of Myle J. Holley, Jr., and Boris Bresler, with statements of qualification attached;

Testimony of Glen E. Bredemeier (PGE) with statement of qualification attached.

II. Bonneville Power Administration

- A. Testimony of Hector J. Durocher.

III. Nuclear Regulatory Commission

- A. Testimony of Kenneth S. Herring, Robert T. Dodds, James E. Knight dated October 13, 1978;

Testimony of Kenneth S. Herring, Office of Nuclear Reactor Regulation, on Structural Adequacy of the Trojan Control Building for Interim Operation;

Testimony of Robert T. Dodds, Office of Inspection and Enforcement, on Inspections of Nuclear Facilities After a Seismic Event; and

Testimony of James E. Knight, Office of Nuclear Reactor Regulation, on Licensing Board's Question Regarding Effects of a Seismic Event on Features Important to the Safety of the Trojan Facility.

- B. Testimony of Kenneth S. Herring, Office of Nuclear Reactor Regulation, Regarding the Supplemental STARDYNE Analysis and Its Effect on the Structural Capacity of the Trojan Control Building.

IV. State of Oregon

- A. Direct testimony of Harold I. Laursen.

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TROJAN NUCLEAR PLANT
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Licensee's Letter of October 27, 1978 to the Director of Nuclear Reactor Regulation - Further Response to NRC Staff Technical Questions of October 16, 1978.

Licensee's Letter of November 2, 1978 to the Director of Nuclear Reactor Regulation Responding to NRC Staff Technical Questions of October 31, 1978.

Seismic Design and Analysis of Equipment and Equipment Supports,
Spec 6478-C41:

Containment
Internals
L-Shaped
Diesel
Main Steam Support

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