

ATTACHMENT 1

UNRESOLVED PROBLEMS REGARDING THE
ADEQUACY, FROM A SAFETY STANDPOINT,
OF THE PROPOSED CONTROL BUILDING
MODIFICATIONS TO BRING THE FACILITY INTO
SUBSTANTIAL COMPLIANCE WITH THE LICENSE

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

PORTLAND GENERAL ELECTRIC COMPANY,
ET AL.

(Trojan Nuclear Plant)

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Docket No. 50-344
(Control Building)

AFFIDAVIT OF KENNETH S. HERRING ON THE
UNRESOLVED PROBLEMS REGARDING THE ADEQUACY,
FROM A SAFETY STANDPOINT, OF THE PROPOSED CONTROL
BUILDING MODIFICATIONS TO BRING THE FACILITY INTO
SUBSTANTIAL COMPLIANCE WITH THE LICENSE

STATE OF MARYLAND)
COUNTY OF MONTGOMERY)SS

I, Kenneth S. Herring, being duly sworn, depose and state:

1. I am a senior structural engineer, Engineering Branch, Division of Operating Reactors, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.
2. I have prepared the statement of professional qualifications attached hereto, and, if called upon, would testify as set forth therein.
3. I have prime responsibility for that portion of the NRC Staff's review of the proposed modifications to the Trojan Control Building which deals with the structural adequacy of those proposed modifications to bring the facility into substantial compliance with the license. Within this area of my review responsibility, there are two major unresolved problems which remain as of December 7, 1979. These major unresolved problems are described in Paragraphs 4 and 5 below and have been addressed in Staff questions 5, 7 and 9 of 9/14/79, questions 1, 2, 3, 4 and 6 of 9/20/79 and in all the questions of 10/2/79. Licensee responses to questions 9, 16 and 18 of 10/2/79 were submitted on November 21, 1979 but the Staff's review of these responses has not been completed. No responses to the other structural questions listed above have been received.
4. The adequacy of the margins against seismic failure, after the modifications, of the Control Building Complex itself (i.e., the level of wall structural integrity) has not been established. Resolution of

this major unresolved problem requires the satisfactory resolution of the following items:

- (a) adequacy of grout to be used to anchor new walls to existing walls and rock - Staff question 5 of 9/14/79;
- (b) adequate inservice inspection program to assure adequate bolt tension for plates on Control Building west wall throughout plant life - Staff question 7 of 9/14/79;
- (c) adequacy of test data being relied upon to establish ultimate strengths - Staff question 9 of 9/14/79;
- (d) adequacy of Nelson stud embedment and of the shear-tension interaction relationship assumed for Nelson studs and reinforcing steel - Staff question 1 of 9/20/79;
- (e) adequacy of shrinkage strains assumed for new and existing walls - Staff question 2 of 9/20/79;
- (f) adequacy of limited shrinkage and creep values assumed for new concrete for the modifications - Staff question 3 of 9/20/79;
- (g) adequacy and conservatism of analytical method used to calculate tensile stresses from concrete shrinkage - Staff question 4 of 9/20/79;
- (h) adequacy of assumption on coefficient of friction between the steel plate and Control Building west wall in light of independent test data - Staff question 6 of 9/20/79;
- (i) basis for conclusion that reinforcing steel will not be damaged by drilling in walls and adequacy of grout to be used to fill unused holes - Staff question 1 of 10/2/79;
- (j) adequacy of values used for ultimate capacity of beam-column connections - Staff question 2 of 10/2/79;
- (k) adequacy and conservatism of the shear friction capacities at the wall-floor slab interfaces - Staff Question 3 of 10/2/79;
- (l) adequacy of coefficient of friction for shear transfer into cross walls at column lines R-55 and N-55 in Control Building - Staff question 4 of 10/2/79;
- (m) demonstration that resistance forces from shear friction that are being relied upon can be developed - Staff question 6 of 10/2/79;
- (n) appropriate factor of safety for Nelson studs - Staff question 9 of 10/2/79;

- (o) effects of temperature variations on new and existing walls - Staff question 10 of 10/2/79;
- (p) adequacy of grout to be used for other than grouting-in reinforcing steel - Staff question 11 of 10/2/79;
- (q) adequacy of load combinations used in evaluations - Staff question 13 of 10/2/79;
- (r) limitation on maximum shear resistance between wall and slab at elevation 117 - Staff question 15 of 10/2/79;
- (s) appropriate maximum vertical amplification factor - Staff question 16 of 10/2/79;
- (t) magnitude and acceptability of tension in the south wall of the Control Building - Staff question 17 of 10/2/79;
- (u) submission of capacity to force ratios for the eastern half of the Control Building Complex and bases for the values - Staff question 20 of 10/2/79;
- (v) justification for the number of stress cycles and number of UBEs analyzed - Staff question 21 of 10/2/79;
- (w) justification for assumptions made in deriving inelastic strains - Staff question 22 of 10/2/79;
- (x) adequacy of calculations to determine capacities, stiffness degradation factors, variation in stiffness degradation factors and variations in all parameters affecting these values - Staff question 23 of 10/2/79.

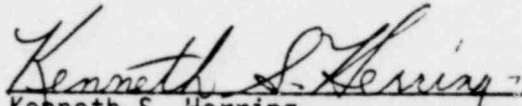
Status of Resolution. Items (n) and (s) have been addressed in the Licensee's November 21, 1979 responses to Staff questions 9 and 16 of October 2, 1979. The Staff has not yet determined whether these responses resolve items (n) and (s) above. Responses addressing the other items above have not been received as of December 7, 1979.

5. The adequacy of the stiffness assumed in the Licensee's analyses for the derivation of the floor response spectra for the modified Control Building Complex and the adequacy of the assumed variations in parameters affecting these stiffnesses used to derive peak broadening for the floor response spectra have not been demonstrated. This major unresolved problem is closely related to that identified in Paragraph 4 and is very dependent upon the overall level of structural integrity of the modified Control Building Complex and on resolution of many of the same items identified as unresolved in Paragraph 4. Resolution of the following items identified in Paragraph 4 will have

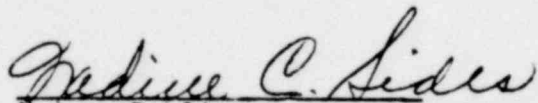
a direct bearing on resolving this unresolved problem: items (b), (c), (e), (f), (g), (h), (j), (l), (m), (o), (s), (u), (v), and (w). In addition, resolution of this major unresolved problem requires resolution of the following:

- (a) adequate accounting for the effect of the Control Building's steel frame on the stiffnesses used in STARDYNE analyses of the modified structures - Staff question 8 of 10/2/79;
- (b) generation of final, adequate SSE and OBE floor response spectra for the modified Control Building Complex - Staff question 20 of 10/2/79.

Status of resolution. Item(s) under Paragraph 4 has been addressed by the Licensee in its November 21, 1979 response to Staff question 16 of October 2, 1979. The Staff has not yet determined whether that response resolves item (s) under Paragraph 4. Responses to items (a) and (b) under this Paragraph have not been received as of December 7, 1979.


Kenneth S. Herring

Subscribed and sworn to before me
this 7th day of December, 1979.


Notary Public

My Commission expires: *July 1, 1982.*

1591 134

PROFESSIONAL QUALIFICATIONS
OF
KENNETH S. HERRING

EXPERIENCE:

- Jan. 1977 to Present U.S. Nuclear Regulatory Commission
Engineering Branch, Division of Operating Reactors
Office of Nuclear Reactor Regulation
Washington, D.C. 20555
Applied Mechanics Engineer (1/77 to 1/79)
Structural Dynamicist (1/79 to 10/79)
Senior Structural Engineer (10/79 to Present)
Responsible for the review, the analysis, and the evaluation of structural and mechanical aspects related to safety issues for reactor facilities licensed for power operation, and test reactor facilities, including the formulation of regulations and safety criteria. An emphasis is placed on seismic, impact and other dynamic loading considerations, in addition to static loading considerations; and linear and nonlinear, concrete and steel behavior.
Responsible for coordinating various outside technical assistance programs and internal tasks related to structural and mechanical applications to nuclear power plants.
- Aug. 1974 to Dec. 1976 Stone and Webster Engineering Corporation
3 Executive Campus
Cherry Hill, New Jersey
Structural Engineer in the Structural Mechanics Group
Responsible for conducting static and dynamic, including seismic, finite element analysis and design of structures in nuclear power generation facilities.
Responsible for maintaining the Structural Mechanics computer facilities at CHOC.
Fortran IV programming experience.
- Aug. 1973 to Aug. 1974 University of Illinois, Department of Civil Engineering
Urbana, Illinois 61801
Research Assistant
Responsible for conducting an investigation into the material properties of fiber reinforced concrete using quick-setting cements for the Department of Transportation, Federal Railroad Administration. A report on the outcome of the study was published.

EDUCATION:

State University of New York at Stony Brook - Bachelor of Engineering -
May 1973

University of Illinois at Urbana-Champaign - Master of Science in Civil
Engineering (Structures) - August 1974

ENGINEER-IN-TRAINING: New Jersey .

TECHNICAL SOCIETIES:

American Society of Civil Engineers - Associate Member - April 1974 to
Present.

ASME BOILER AND PRESSURE VESSEL CODE COMMITTEES:

Section XI - Subgroup on Containment - Member - January 1979 to Present.

1591 136