

Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. Box 968 3000 GEO. WASHINGTON WAY RICHLAND, WASHINGTON 99352 PHONE (509) 375-5000

Nuclear Regulatory Commission
Region V
Suite 202 Walnut Creek Plaza
1990 N. California Boulevard
Walnut Creek, California 94596

January 28, 1981
G01-81-23



Attention: Mr. R. H. Engelken, Director

Subject: WPPSS Nuclear Projects Nos. 1 & 4
Docket Nos. 50-460 and 50-513
Reportable Condition 10CFR50.55(e)
Usage of Incorrect Vertical Amplified
Response Spectra for Component Cooling
and Makeup Pump Area "HVAC" System
Train "B" Equipment

Reference:

- 1). Letter DL Renberger to RH Engelken, same subject G01-80-199 dated July 11, 1980.
- 2). Letter UE&C to Director - Office of Inspection and Enforcement, subject 10CFR21 Report of Defect Related to WPPSS Units WNP-1 and WNP-4, dated August 8, 1980

Dear Mr. Engelken:

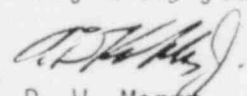
In reference 1) the Supply System informed your office of a reportable condition under 10CFR50.55(e).

In reference 2) the Supply System submitted the WPPSS Interim Report on the subject condition. UE&C in reference 2) subsequently determined that the deficiency was reportable by them under 10CFR21. A copy of the UE&C report is attached for your information.

As the UE&C report on the subject condition has been filed under 10CFR21 and identifies the corrective action, no further report by the Supply System is required.

If you have any questions or desire further information, please advise.

Very truly yours,


for D. W. Mazar
Program Director, WNP-1/4



pm

Attachment

cc: CR Bryant, Bonneville Power Administration
JR Lewis, Bonneville Power Administration
V. Stello, Director, NRC Office of Inspection and Enforcement
V. Mani, United Engineers & Constructors, Phil.

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S PDR

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7/11/80
E&C DISTRIBUTION:

J. B. SILVERWOOD

R. H. LEONARD

V. MANT



United engineers & constructors inc

30 South 17th Street
Post Office Box 8223
Philadelphia, PA 19101

RECEIVED

SEP 11 1980

W.P.P.S.S.

CERTIFIED MAIL

August 8, 1980

Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: 10CFR21 Report of Defect Related to
Washington Public Power Supply System
Units WNP-1 and WNP-4

This report is submitted to provide details of a defect reported to you by telecopier on August 5, 1980. A planned audit on the use of amplified response spectra for equipment and structural design was conducted on the subject WPPSS projects. A discrepancy was found in the response spectra which had been released to a manufacturer for use in design of certain HVAC equipment.

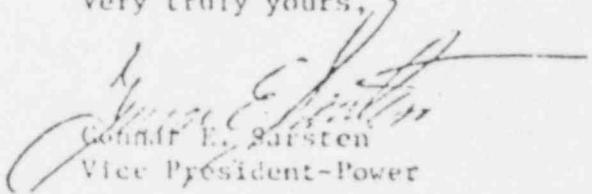
Since the equipment involved has been fabricated and delivered, corrective action will be to sufficiently stiffen the concrete floor slab on which the equipment is mounted to conform to the originally specified value of the response spectra.

The use of incorrect amplified response spectra is a defect similar to ones previously reported and continues to be under investigation by both the Seabrook and WPPSS projects. This particular defect with respect to HVAC equipment mounting on a removable concrete slab is unique to the WPPSS project.

Details as required by 10CFR21, paragraph 21.21(b) (3) are contained in the attached report.

This defect has been previously reported by the licensee in accordance with 10CFR50.55(e) on June 6, 1980 and July 7, 1980.

Very truly yours,


Conrad E. Garsten
Vice President-Power

Attachment

cc: Regional Director
Region V - USNRC

A Paytheon Company

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File w/
50.55(c) # 25
-54



Tom Hunkin

August 8, 1980
TELECOPY

Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: 10CFR21 Report of Defect
Related to Washington Public
Power Supply System
Units WNP-1 and WNP-4

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*dup of
5008280248*

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Very truly yours,

G. E. Sarsten
Vice President

GES/RHL:ps
Attachment

CC W/Attachment to:
Regional Director
U. S. Nuclear Regulatory Commission
Region V, Suite 202
Walnut Creek Plaza,
1990 North California Blvd.
Walnut Creek, California 94596

NAME AND ADDRESS OF THE INDIVIDUAL OR INDIVIDUALS INFORMING THE COMMISSION.

G. E. Sarsten. Vice President-Power
United Engineers & Constructors Inc.
30 South 17th Street
Philadelphia, Pa. 19101

IDENTIFICATION OF THE FACILITY, THE ACTIVITY, OR THE BASIC COMPONENT SUPPLIED FOR SUCH FACILITY OR SUCH ACTIVITY WITHIN THE UNITED STATES WHICH FAILS TO COMPLY OR CONTAINS A DEFECT.

Washington Public Power Supply System (WPPSS), Units WNP-1 & WNP-4; the design and fabrication of the Atmospheric Clean-Up Trains, Tag Numbers HCA-ACT-1B and 2B, and the Fan, Tag Number ACT-FAN-2B.

IDENTIFICATION OF THE FIRM CONSTRUCTING THE FACILITY OR SUPPLYING THE BASIC COMPONENT WHICH FAILS TO COMPLY OR CONTAINS A DEFECT.

Buffalo Forge Company, 490 Broadway, Buffalo, N.Y. 14204, is the firm that fabricated and supplied the fan. Mine Safety Appliances, Route 2, Evans City, Pa. 16033 is the firm that fabricated and furnished the Atmospheric Clean-Up Trains. The fan is located in a fan house designed by United Engineers & Constructors Inc., and will be constructed by University Mechanical Services, P.O. Box 700, Richland, Washington 99352. One of the design input parameters, the Amplified Response Spectra (ARS) for the design of the above basic components is generated by United Engineers & Constructors Inc., 30 South 17th Street, Philadelphia, Pa. 19101.

NATURE OF THE DEFECT OR FAILURE TO COMPLY AND THE SAFETY HAZARD WHICH IS CREATED OR COULD BE CREATED BY SUCH DEFECT OR FAILURE TO COMPLY.

The defect identified is the use of incorrect Amplified Response Spectra (ARS) for the design of the subject Atmospheric Clean-Up Trains, the Fan and the Fan Housing. This deviation, if uncorrected, could result in the failure of the subject equipment to perform the intended safety function during and after an Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE) event.

THE DATE ON WHICH THE INFORMATION OF SUCH DEFECT OR FAILURE TO COMPLY WAS OBTAINED.

August 4, 1980.

IN THE CASE OF A BASIC COMPONENT WHICH CONTAINS A DEFECT OR FAILS TO COMPLY, THE NUMBER AND LOCATION OF ALL SUCH COMPONENTS IN USE AT, SUPPLIED FOR, OR BEING SUPPLIED FOR ONE OR MORE FACILITIES OR ACTIVITIES SUBJECT TO THE REGULATIONS IN THIS PART.

- Part 1: The specific defect identified relative to the subject components pertains to the input parameter for the ARS for a unique location in the Plant. As such, the defect is not generic in nature to such components (namely, Atmospheric Clean-Up Trains and Fans) which are used in the Plant in both the safety-related and non-safety-related functions in various locations within the subject Units WNP-1 and WNP-4.
- Part 2: The ARS input which is the identified defect in this case, however, is furnished as a design input parameter to various safety-related systems, structures and components in the Plant with specific relevance to the individual locations. In this respect, the identified defect pertains to the "generation and use of ARS", which is a "basic component" in use at other areas of the plant systems, structures and components on WNP-1 and WNP-4, as well as, on Seabrook.

THE CORRECTIVE ACTION WHICH HAS BEEN, IS BEING, OR WILL BE TAKEN: THE NAME OF THE INDIVIDUAL OR ORGANIZATION RESPONSIBLE FOR THE ACTION: AND THE LENGTH OF TIME HAS BEEN OR WILL BE TAKEN TO COMPLETE THE ACTION.

Corrective Action: The corrective action is in three (3) parts:

- Part 1: Specific corrective action with respect to the subject equipment: The removable concrete slab on which the subject components are located has been stiffened to the extent that the resulting ARS is equal to or less than the Design ARS which has been used by the equipment manufacturer.
- Part 2: Generic corrective action: Follow-up evaluation and verification of the ARS values which have been used in the initial design of equipment which have been released for fabrication and delivery to the WNP-1 and WNP-4 Site has been in progress on the basis of a continuous audit program commenced late in 1977 and is expected to be complete by September, 1981.
- Part 3: On-Going Design Verification Program for Plant Structures, Systems and Components: Due to the nature of the verification program, the program cannot be concluded without the final as-built plant data. The program which is currently in progress would systematically identify the input ARS design parameters that have been used in the design for all safety-related systems, structures and components such that, should a defect be uncovered as result of the program, corrective actions can be simultaneously initiated. The corrective actions, in general, would consist of stiffening of

a floor, a column, or a beam, or reanalysis to examine design margins, or relocation of components as necessary. At the conclusion of the program, which is currently forecasted to be on 6/1/83, the "delivered design" would contain a controlled volume of the Amplified Response Spectra (ARS) that matches the as-built plant conditions (as-built systems, structures, and components).

Name of the Organization Responsible for the Corrective Action:

Project Engineering - WPPSS Project
United Engineers & Constructors Inc.
30 South 17th Street
Philadelphia, Pa. 19101

The Length of Time that will be Taken to Complete the Action:

Part 1: Verification that the correct ARS has been specified in the initial design of equipment is estimated to be complete by September 1, 1981.

Part 2: Verification that the as-built condition of plant systems, structures and components is compatible with the ARS user is expected to conclude by 6/1/83.

ANY ADVICE RELATED TO THE DEFECT OR FAILURE TO COMPLY ABOUT THE FACILITY, ACTIVITY, OR BASIC COMPONENT THAT HAS BEEN, IS BEING, OR WILL BE GIVEN TO PURCHASERS OR LICENSEES.

Report of the subject defect was made to the Licensee (Washington Public Power Supply System) in the following sequences:

- . On May 20, 1980, WPPSS was verbally notified.
- . On June 6, 1980, WPPSS was notified in writing by letter UEWP-80-585.
- . On July 7, 1980, WPPSS was given a follow-up report by UE&C letter UEWP-80-657.

It is believed that this defect has been notified to the NRC under the rules and requirements of 10CFR Part 50.55 (E).

INTERNAL DISTRIBUTION

THIS LETTER ~~S~~ SATISFIES COMMITMENT NO. None

THIS LETTER (DOES) (DOES NOT) ESTABLISH A NEW COMMITMENT.

WPPSS CORRESPONDENCE NO. G01-80-199

RA Bryans
 GK Dyekman
 JV Hansor
 LT Harrold
 AG Hosler
 FW McElwain
 DD O'Sullivan
 DL Renberger/lb
 JP Thomas
 AC Kohler
 AC Vaughn

ME Witherspoon
 Proj. Comm. Rev.
 Site QA Files 1/4
 EDC Files 1/4
 FDCC
 NS Porter
 RS Millne
 TJ Houchins/lb
 GL Sorensen

July 11, 1980
 G01-80-199

Nuclear Regulatory Commission
 Region V
 Suite 202 Walnut Creek Plaza
 1990 N. California Boulevard
 Walnut Creek, California 94596

Attention: Mr. R. H. Engelken, Director

Subject: WPPSS Nuclear Projects Nos. 1/4
 Docket Nos. 50-460 and 50-513
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 Usage of Incorrect Vertical Amplified
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 and Makeup Pump Area "HVAC" System
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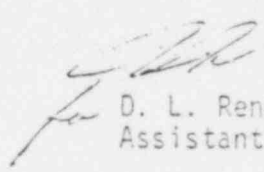
Dear Mr. Engelken:

Mr. Al Toth, US NRC Region V Resident Inspector, was verbally notified of this reportable condition on June 11, 1980 by the Supply System.

Attachment A to this letter contains the WPPSS interim report on the subject condition.

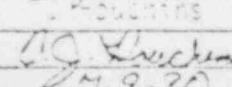
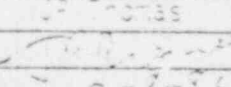
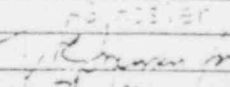
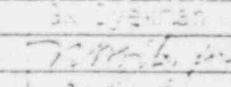
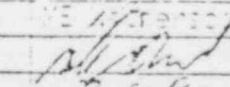
If you have any questions or desire further information, please advise.

Very truly yours,


 D. L. Renberger
 Assistant Director-Technology

jds
 Attachment

cc: CR Bryant - SPA
 J. L. McElwain - EDC
 J. L. McElwain - EDC
 AD Toth - NRC WAP-1/4
 A. Stello - Director of Inspection and Enforcement - NRC

AUTHOR	J. L. McElwain				FOR SIGNATURE OF	D. L. Renberger
SECTION						
FOR APPROVAL OF	EDC	EDC	EDC	EDC	EDC	EDC
APPROVED	    					
DATE	7-9-80					

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ATTACHMENT A

WPP-1/4

Docket Nos. 80-460 and 80-513

Reportable Condition 10CFR50.55(e)

Usage of Incorrect Vertical Amplified
Response Spectra for Component Cooling and
Makeup Pump Area "HVAC" System
Train "B" Equipment

INTERIM REPORT

Background

DEAC notified WPPSS on June 11, 1980 of a defective condition which existed in the design of the floor supporting the component cooling and makeup pump area "HVAC" system train "B" equipment. As a result of a project audit; the usage of an incorrect vertical response spectra for the train "B" HCA System equipment was discovered.

Description of the Deficiency

The Component Cooling and Makeup Pump Area is in the GSB between Column lines 1-4 and U-J at elevation 399'-0" and 421'-0". The major safety related equipment located in this area are Makeup Pumps (MUS-PMP-1A, 2B & 3C) and Shutdown Cooling Water Pumps (NSW-PMP-1A and 2B).

The Component Cooling and Makeup Pump Area HVAC System (HCA) provides heating, cooling, ventilation, humidity control and atmospheric cleanup to this area. The HCA System is safety related and consists of two redundant trains of equipment located in the GSB at elevation 455'-0" between Col. Line 1-4 and G-H. As a result of a project audit, the application of an incorrect vertical response spectra for the train "B" HCA System equipment (HCA-FAN-2B and HCA-ACT-1B & 2B) was discovered. The subject equipment is located on a removable floor area. However, the equipment was qualified per the response spectra of the adjoining floor which was lower in magnitude than that for the removable floor.

Safety Implications

The HCA system is required to maintain the temperature in the Component Cooling and Makeup Pump Area within a maximum of 95°F during normal plant conditions and within a maximum of 130°F following LOOP concurrent with SSE or LOCA concurrent with LOOP and SSE. The above temperatures are maintained by operating either HCA system train "A" equipment or train "B" equipment.

Following SSE, the HCA train "B" equipment could fail to operate due to the fact that the original design was based on the lower magnitude of vertical amplified response spectra. If so, train "A" equipment is capable of maintaining the temperature within the above limit. However, if a single failure is postulated in train "A" of the HCA system, then this would result in complete loss of HCA system.

Safety Implications (Cont'd)

With complete loss of HCA system, the temperature in the Component Cooling and Makeup Pump Area is expected to rise continuously and reach a steady state value of approximately 235°F in about 20 days. Credit is taken for the heat sink concrete present in the area in the temperature rise analysis.

The safety related pump motors (Makeup Pump Motors and Shutdown Cooling Water Pump Motors) located at the 399'-0" and 421'-0" levels would be affected by the increased space temperature. These pump motors are provided with Class "B" insulation. NEMA Standard MG-1 requires that with the maximum ambient temperature of 40°C (104°F), the temperature rise in the windings should not exceed 80°C (176°F). The temperature rise for the Makeup Pump Motors is found to be 70°C with the ambient temperature of 50°C. The temperature rise for the Shutdown Cooling Water Pump Motors is found to be 60°C with the ambient temperature of 27°C. These motors are expected to be qualified for one abnormal condition (LOOP and/or LOCA), in addition to the normal operation. For this qualification purpose, the maximum temperature in a day is 130°F (for 5 hours) and the 29 days average temperature is 117°F (45°C).

Increase in space temperature would result in increase in the motor winding temperature. As a rule of thumb, operating these motors with every 10°C higher than maximum design temperature could reduce the life of the motor insulation to half. However, operating these motors at very high temperatures could result in insulation failure.

The final steady state temperature inside the Component Cooling and Makeup Pump Area is relatively high compared to the temperature for which the safety related motors are "qualified". Assuming no alternate cooling provisions are made during the time prior to the attainment of this temperature, the "expected" life of the Makeup Pump and the SW Pump Motors may be significantly reduced and the motor windings could fail after a short period of time. This would result in loss of the makeup and/or heat removal with respect to the reactor coolant system, resulting in an inability to cool down the plant and/or to maintain the plant in a safe shut down condition.

Corrective Action

A structural frame has been designed to be installed below the removable concrete floor. This structural modification results in a modified response spectra vertical to that for which the subject HNS equipment was qualified. Final documentation and design details of the modification is scheduled for 1977-1978.