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81-02 #3

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U.S. NUCLEAR REQULATOR

COMMISSION

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Mr J G Keppler, Regional Director Office of Inspection and Enforcement US Nuclear Regulatory Commission Region III 799 Roosevelt Road Glen Ellyn, IL 60137

MIDLAND PROJECT -DOCKET NOS 50-329, 50-330 AUXILIARY BUILDING SEISMIC ANALYSIS FILE: 0.4.9.48 UFI: 73*10*01, 70*01*11*03, 45*05*20 SERIAL: 12008

Reference: CPCo letters to J G Keppler, Same Subject:

- 1) Serial No 11200, dated February 20, 1981
- 2) Serial No 11972, dated April 16, 1981

This letter, as were the referenced letters, is an interim 50.55(e) report concerning the auxiliary building seismic analysis. Attachment 1 provides a status of the planned corrective actions.

Another report, either interim or final, will be sent on or before July 31, 1981.

James a Cort

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Attachment 1: MCAR-47, Interim Report No 3, dated May 15, 1981 "Auxiliary Building Seismic Analysis"

CC: Director of Office of Inspection & Enforcement Att Mr Victor Stello, USNRC (15)

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Attachment 1 Serial 12008 81-02 #3

SUBJECT:

MCAR 47 (Issued 1/29/81)

Auxiliary Building Seismic Analysis

INTERIM REPORT 3

DATE: May 15, 1981

PROJECT: Consumers Power Company Midland Plant Units 1 and 2 Bechtel Job 7220

Description

During a seismic reanalysis associated with the 10 CFR 50.54(f) plant fill issue, it was noted that the 1977 auxiliary building seismic model considered the control tower and the main portion of the auxiliary building as an integral unit between el 614' and 659'. This assumption may not be appropriate for the north-south direction because of the connection between the control tower and the main structure, which consists primarily of reinforced concrete slabs. The auxiliary building and the control tower were structurally designed to a 1974 seismic model which included flexibility at the connection between the control tower and main structure. Equipment and systems have been seismically qualified using output from both the 1974 and 1977 seismic models.

Potential Safety Implications

This item does not have a safety impact on the stability of the auxiliary building, equipment, structural steel superstructure, or the structure of the main part of the auxiliary building. Potential safety implications have not yet been determined for the control tower, its connections to the main auxiliary building, the electrical penetration areas, or the piping systems.

Investigation

The investigation presented is limited to the new definition of the north-south, 1977 seismic model (FSAR Figure 3.7-10) initiated solely to determine the safety impact of the condition. Because the control tower and the main auxiliary building (el 614' to 659') were modeled as two separate structures connected by a flexible link, this investigation considers possible changes in the building forces and floor response spectra curves. The structural behavior in the east-west and vertical directions would not be affected by this change in the model.

The investigation presented herein does not include the model modification in process to resolve analysis necessary for the 10 FCR 50.54(f) plant fill issue.

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The investigation with this model considers:

- 1) A response spectrum analysis to develop building responses
- A time-history analysis to develop instructure floor response spectra at selected locations
- Comparison of building responses to values calculated in 1974 and 1977, and to allowable forces if necessary
- 4) Comparison of instructure floor response spectra to those generated in 1977, at selected locations, and comparison of loads in selected piping systems and equipment systems to allowable loads if necessary.

The current status of this investigation follows.

- 1) The response spectrum analysis has been completed.
- The time-history analysis and selected instructure floor response spectra have been generated.
- 3) A comparison of the building forces at the base has been made. The total building base moment and shear have increased by 2% and 1%, respectively, values that are not significant with respect to overall building stability. The greatest change in building forces was confined to the structural steel superstructure, the control tower, and the electrical penetration area at el 674'-6" and above. The moment and shear in the control tower, the electrical penetration area, the electrical penetration. By inspection, the forces in the other portions of the building are acceptable.
- 4) A comparison of the instructure response spectra curves has been made and indicates that the majority of the floor spectra curves have little or no change. The greatest changes were confined to the structural steel superstructure, control tower, and electrical penetration areas at el 674'-6" and above. The frequencies most affected by this change were between 4 and 10 cps. The maximum increase in acceleration occurred at approximately 6 cps and was 1.6 times the previous spectrum value. In other areas in the building, the new instructure response spectra did not differ significantly from the existing spectra. By inspection, these areas are acceptable.

With one exception, piping systems in the area affected were found to be acceptable. The piping systems that were selected for evaluation were located in the area where the greatest change in seismic loads occurred and where the pipe or hanger stresses were close to

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> the maximum allowable before checking the new seismic stresses. The auxiliary steam and turbine exhaust vent stack to the atmosphere is the only system found that will experience substantial increases in loadings. The three supports for the vent stack will need to be checked for an increase in seismic loads. The potential safety impact of the increased load on the hangers has not been determined.

> Equipment systems in the area affected were found to be acceptable. Equipment was selected to be checked based on its potential for change. The revised spectra were compared to the spectra used to seismically qualify the equipment, and the equipment still met acceptance criteria.

Corrective Actions Completed

- During the week ending January 23, 1981, the assumption that the control tower and the main portion of the auxiliary building is a nonintegral unit between el 614' and 659' was incorporated in a modified model of the auxiliary building. Accordingly, this action is complete.
- 2) The structural response analysis has been completed.
- The time-history analysis and corresponding in-structure floor response spectra have been generated.
- A sample of the existing equipment seismic qualification records have been reviewed and found to be adequate for the revised spectrum.
- 5) The stability of the structure is not significantly affected; therefore, it has been found to be satisfactory.
- 6) The structural steel superstructure has been checked and found to be adequate.

Corrective Actions to be Completed

- Complete the investigation of the structural design in affected areas of t e structure
- A sample of the existing piping syster has been reviewed and potential safety impact on three hangers is being investigated
- Establish whether this is "reportable" based on results of the investigation described above

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Root Cause

This omission, the magnitude and implications of which are still to be determined, was not caused by a failure to follow a procedure. All procedures pertaining to the origination, checking, review, and approval of calculations had been followed.

This omission involves a subjective technical determination of the most effective way to mathematically model a physical feature of the structure. The methods and values used were judged to be appropriate for the eastwest direction, but detailed design review revealed that the methods and values used did not adequately represent the structure in the northsouth direction.

Because these parameters are specifically and uniquely determined for each portion of the structure, this omission is believed to be a random occurrence with no generic implications. Therefore, there is no generic or process corrective action planned. To support this point, models used in the analysis of safety-related structures were visually inspected, and no geometric situation was identified which would lead to a similar model omission in development of beam properties. Due to the soils problem and foundation modifications, the other models are being reviewed and will be modified if necessary.

Other Activities Not Within the Scope of this MCAR

The scope of this MCAR, which was discussed in the preceding sections, was to define the root cause and conduct an investigation to determine the reportability of this situation. The following items are general descriptions of activities that have been previously identified in the Responses to NRC Requests Regarding Flant Fill. These items involve an extensive reanalysis which includes changes which will correct the omission identified in this MCAR. These activities will continue to be tracked by that previous effort, and are separate from the MCAR.

- Continue seismic reanalysis of the auxiliary building considering the current building configuration (e.g., tornado shield), present soil conditions, and proposed plant fill remedial action (e.g., caissons under electrical penetration areas). This analysis will incorporate the modified model described in Corrective Action 3 above.
- From Item 1 above, develop revised seismic forces, moments, and response spectra.

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- 3) Review existing structural designs, piping systems, mechanical systems, control systems, and equipment qualifications for adequacy to revised items listed in Item 2 above. If this action discloses discrepancies, corrective action measures will be implemented.
- 4) The affected FSAR Figure 3.10-7 has been identified as subject to change at a later date in the Responses to NRC Requests Regarding Plant Fill.

Reportability

This subject was reported by Consumers Power Company to the NRC as a potion 'ally reportable 10 CFR 50.55(e) item on January 21, 1981. To date, i not been established whether this item is "reportable" under the ci ria of 10 CFR 50.55(e). Reportability will be addressed in subsequent reports based on the results contained in the section envitled "Investigation", above.

Prepared by:

Approved by:

I. Swanberg

Concurrence by: