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Great Lakes QA Managers

QUALITY ASSURANCE PROGRAM
MANAGEMENT CORRECTIVE ACTION REPORT
MCAR-1

Enclosure 1
Serial 11200
81-02 #1

JOB NO.: 021159
7220

Q NO.: _____

REPORT NO.: 47

DATE: January 29, 1981

I DESCRIPTION* (Including References):

During a seismic reanalysis associated with plant fill remedial action, it was noted that the 1977 Auxiliary Building seismic model modeled the control tower and the main portion of the Auxiliary Building as an integral unit between Elevation 614 and 659. This assumption may not be appropriate due to possible flexibility at the connection between the control tower and main structure. The structural design of

RECOMMENDED ACTION* (Optional):

1. Continue seismic reanalysis of the Auxiliary Building considering the current building configuration (e.g., tornado missile shield), present soil conditions, and proposed plant fill remedial action (e.g., caissons under electrical penetration area(s)), and state forecasted date of completion.
2. From Action (1) develop revised seismic forces, moments and response spectra.

REFERRED TO: Engineering Construction QA Management _____
 Procurement

ISSUED BY: Andis E. Bui 1/29/81
Project QA Engineer Date
for: M.A. Dietrich

II REPORTABLE DEFICIENCY:

NO

POTENTIAL

YES

NOTIFIED CLIENT: 1-21-81
Date

[Signature] 1/30/81
Date

III CAUSE:

CORRECTIVE ACTION TAKEN:

AUTHORIZED BY: _____
Date

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FORMAL REPORT TO CLIENT
(If Section II Applies) _____
Date

CORRECTIVE ACTION IMPLEMENTED

VERIFIED BY _____
Project QA Engineer Date

*Describe in space provided and attach reference document.

021159

DESCRIPTION CONT.

the Auxiliary Building and the control tower was done to a 1974 seismic model which modeled these structures reflecting the structural interconnection.

This matter has been conveyed by the Consumers Power Company to the NRC on January 21, 1981 as a "potentially reportable" 10 CFR 50.55(e) item.

RECOMMENDED ACTION CONT.

3. Review existing structural designs and equipment qualifications for adequacy to revised items listed in Action (2). If this action discloses discrepancies, state corrective action measures that will be implemented.

The above 3 actions duplicate the commitments presented in the response to question 13 of 50.54(f). As such, these actions will be tracked under the 50.54(f) effort.

4. Coordinate and issue a status report by February 5, 1981.

Bechtel Associates Professional Corporation

022353

SUBJECT: MCAR 47 (Issued 1/29/81)
Auxiliary Building Seismic Analysis

INTERIM REPORT 1

DATE: February 17, 1981

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

Description

During a seismic reanalysis associated with plant fill remedial action, 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 due to the connection between the control tower and the main structure which consists primarily of reinforced concrete slabs. The structural design of the auxiliary building and the control tower was designed to a 1974 seismic model which modeled these structures in a manner which included the flexibility at the connection between the control tower and main structure. Equipment and systems have been seismically qualified using both the 1974 and 1977 seismic models.

Potential Safety Implications

Based on preliminary findings, this item does not have a safety impact on the stability of the auxiliary building as a whole. However, potential safety implications remain indeterminate at this time for the structural design of the control tower, structural steel superstructure, and electrical penetration areas (all of which are above el 659'), and equipment and systems supported within the auxiliary building.

Investigation

An investigation into the north-south 1977 seismic model (FSAR Figure 3.7-10) has been initiated to determine the possible changes in the building forces and the floor response spectra curves due to modeling the structural connections between the control tower and the main auxiliary building (el 614' to 659') and separating the structural properties for each portion (Figure 47-1). The east-west and vertical dynamic models are not affected.

The investigation with this model as shown in Figure 47-1 considers:

- 1) A response analysis to develop building forces

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- 2) A time-history analysis to develop in-structure floor response spectra
- 3) Comparison of building forces to values calculated in 1974 and 1977
- 4) Comparison of in-structure response spectra curves to curves generated in 1977

The current status of this investigation follows.

- 1) The response analysis has been completed.
- 2) The time-history analysis and corresponding in-structure 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, which is insignificant in respect to the overall building stability. The moment and shear in the control tower, structural steel superstructure, and electrical penetration areas are still being investigated.
- 4) A comparison of the in-structure response spectra curves has been made and indicates that the majority of the floor spectra curves have little or no change as shown by Figures 47-2 and 47-3. The greatest changes were confined to the structural steel superstructure, control tower, and electrical penetration areas above el 659' as shown by Figures 47-4, 47-5, and 47-6. The potential safety impact of these changes is being evaluated for selected piping systems and equipment located in these areas. These piping systems and equipment were selected based upon the potential for greatest change.

Corrective Action

- 1) Complete the actions described in Investigation, above.
- 2) Establish whether this is "reportable" based on the results of the investigation described above.
- 3) 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 into a modified model of the auxiliary building. Accordingly, this action is complete.

Related Activities Not Within the Scope of This MCAR

The following actions are commitments presented in the Responses to NRC Requests Regarding Plant Fill. As such, these actions will continue to be tracked under the 10 CFR 50.54(f) effort, and are separate from this MCAR.

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1. 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.
- 2) From Item 1 above develop revised seismic forces, moments, and response spectra.
3. Review existing structural designs 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 10 CFR 50.54(f) submittals.

Reportability

This subject was reported by Consumers Power Company to the NRC as a potentially reportable 10 CFR 50.55(e) item on January 21, 1981. To date, it has not been established whether this item is "reportable" under the criteria of 10 CFR 50.55(e). Reportability will be addressed in subsequent reports based on the results of the "Investigation" above.

Submitted by: B. Charles McConnell

Approved by: ^{SS} L. H. Curtis

Concurrence by: K. D. Bailey

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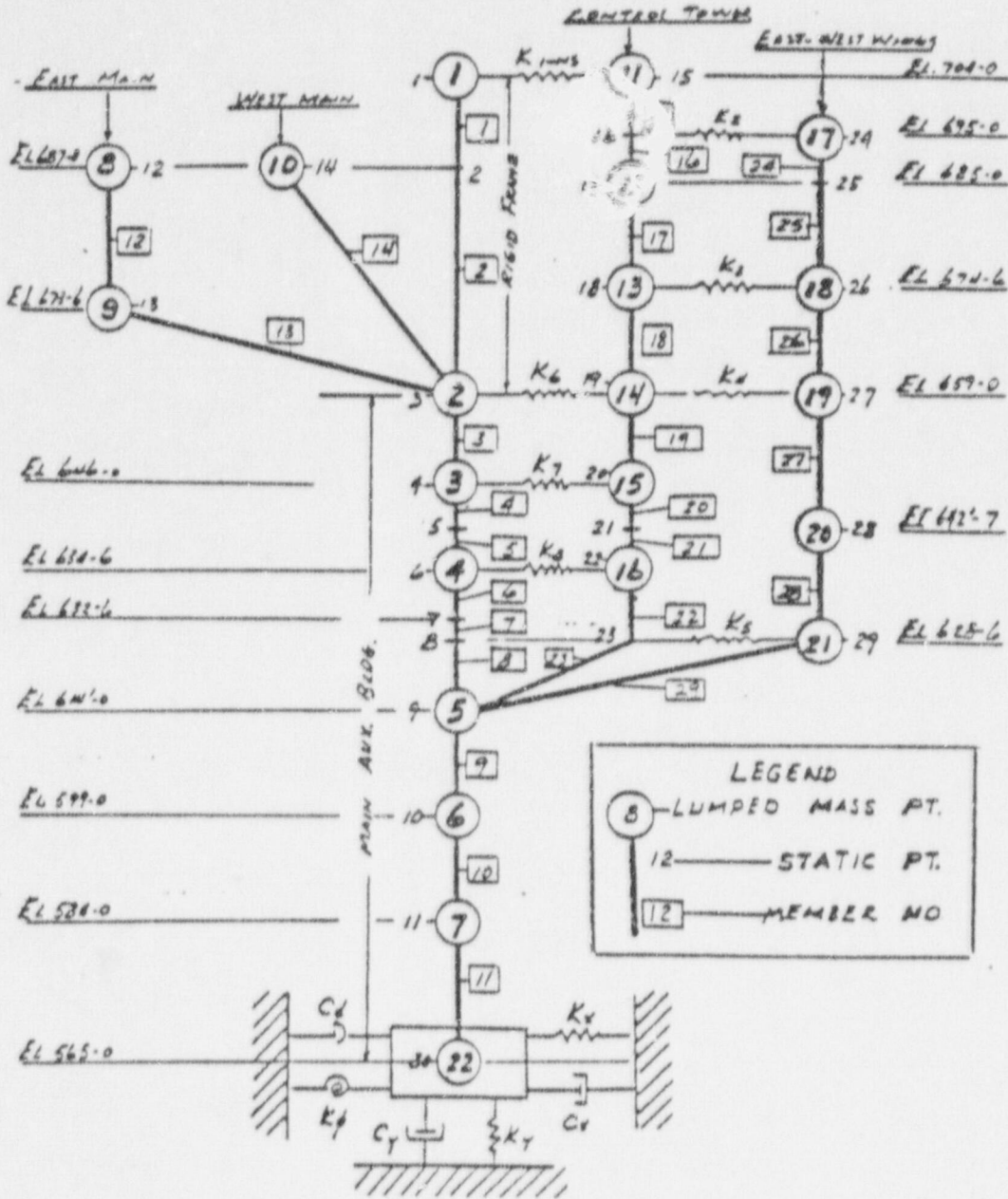
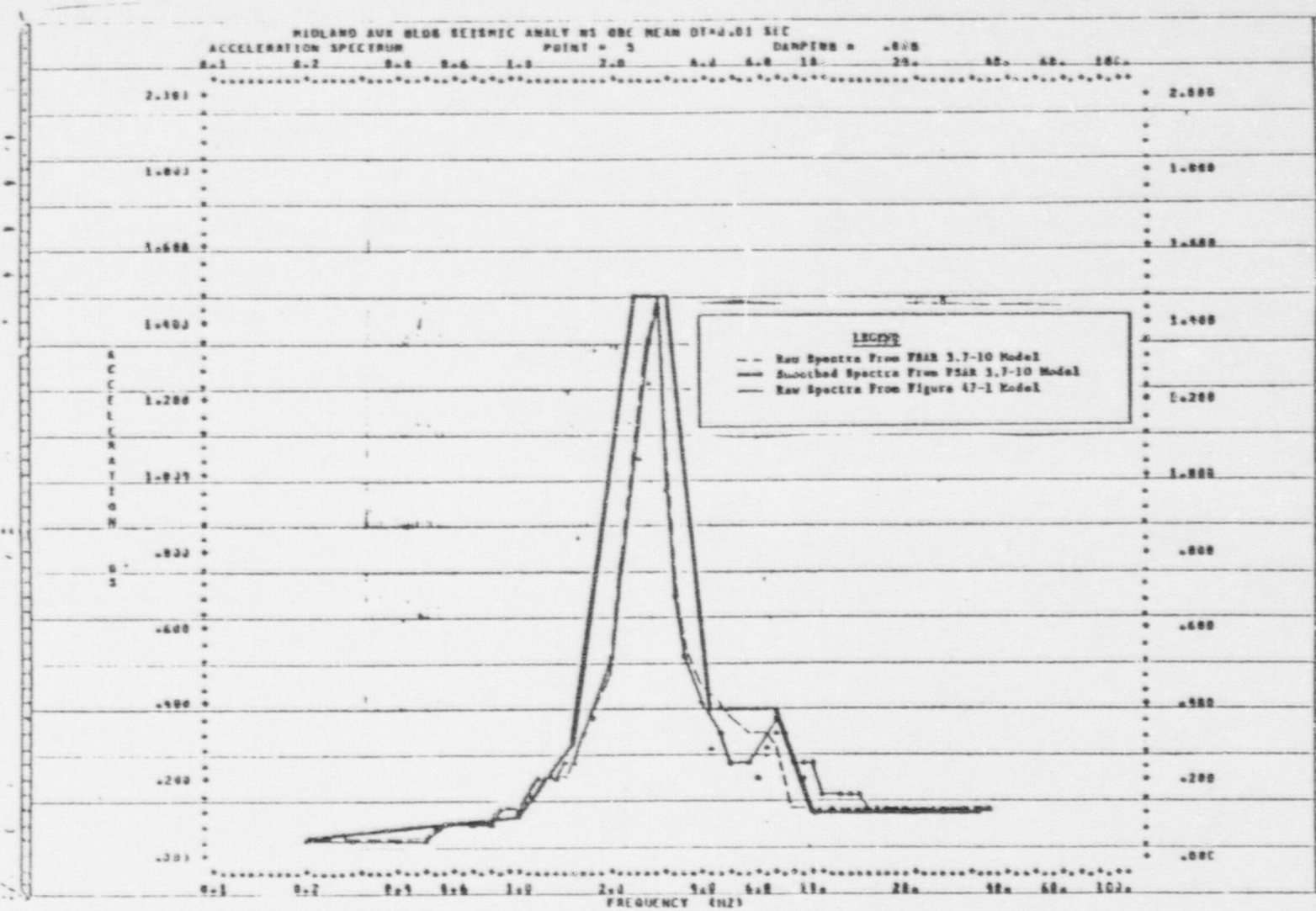


FIGURE 47-1
 REVISED LUMPED MASS MODEL OF
 THE AUXILIARY BUILDING FOR THE
 NORTH-SOUTH EARTHQUAKE
 MIDLAND PLANT UNITS 1&2
 CONSUMERS POWER COMPANY

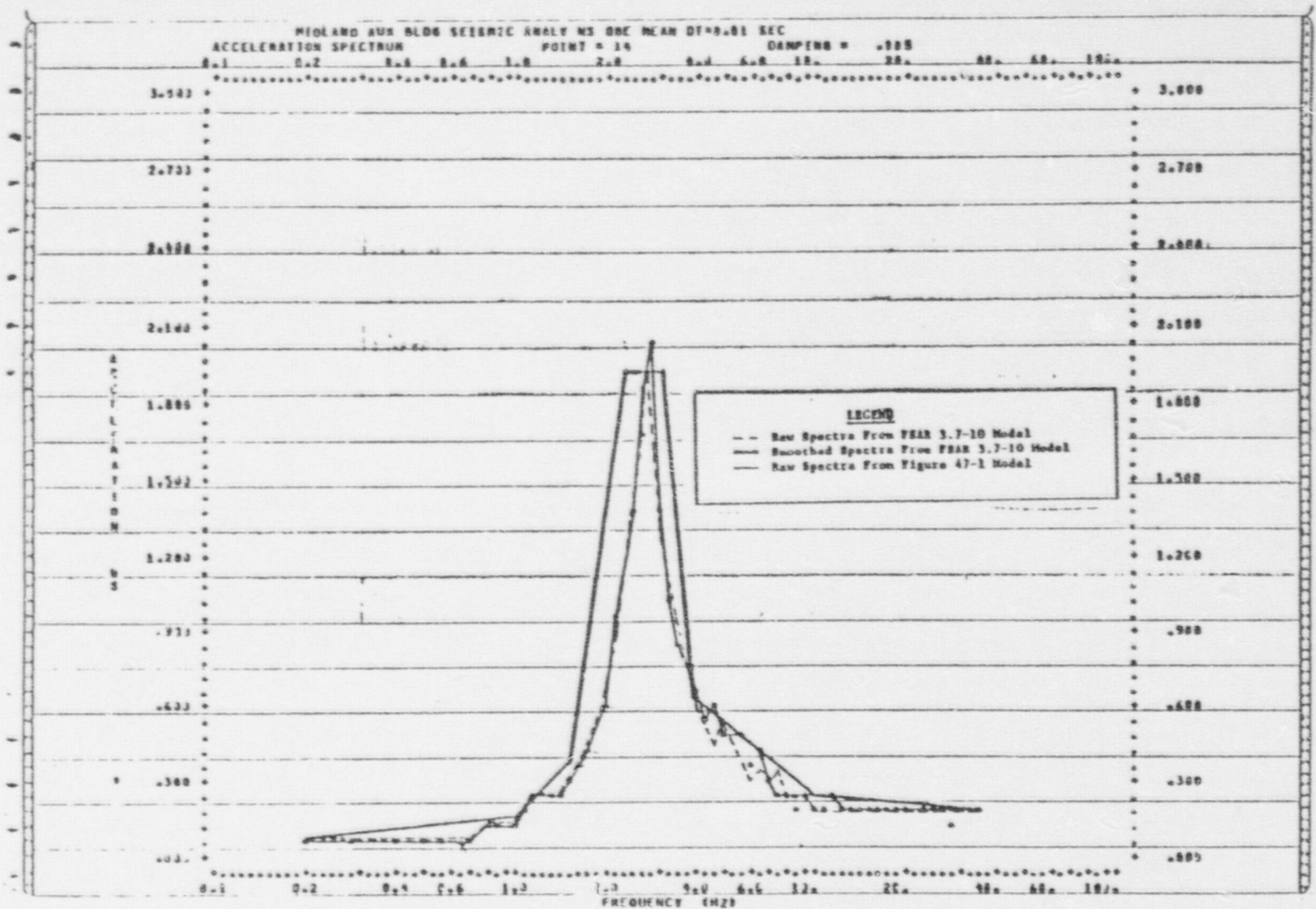
POOR ORIGINAL



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FIGURE 47-2

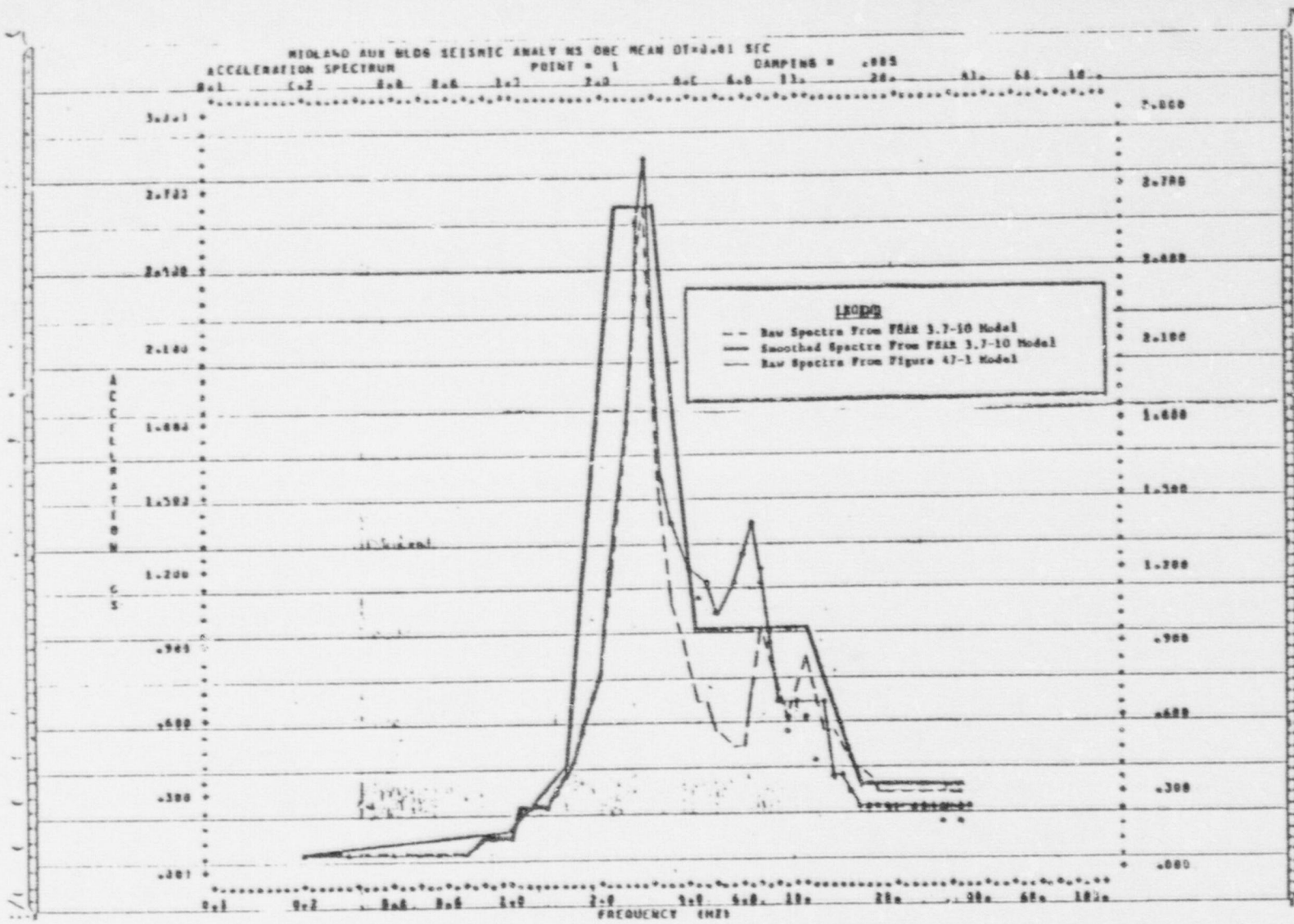
AUXILIARY BUILDING FLOOR
RESPONSE SPECTRA FOR NORTH-
SOUTH EARTHQUAKE (OBE) MASS
POINT 5 ELEVATION 614'-0"
MIDLAND PLANT UNITS 1 & 2
CONSUMERS POWER COMPANY



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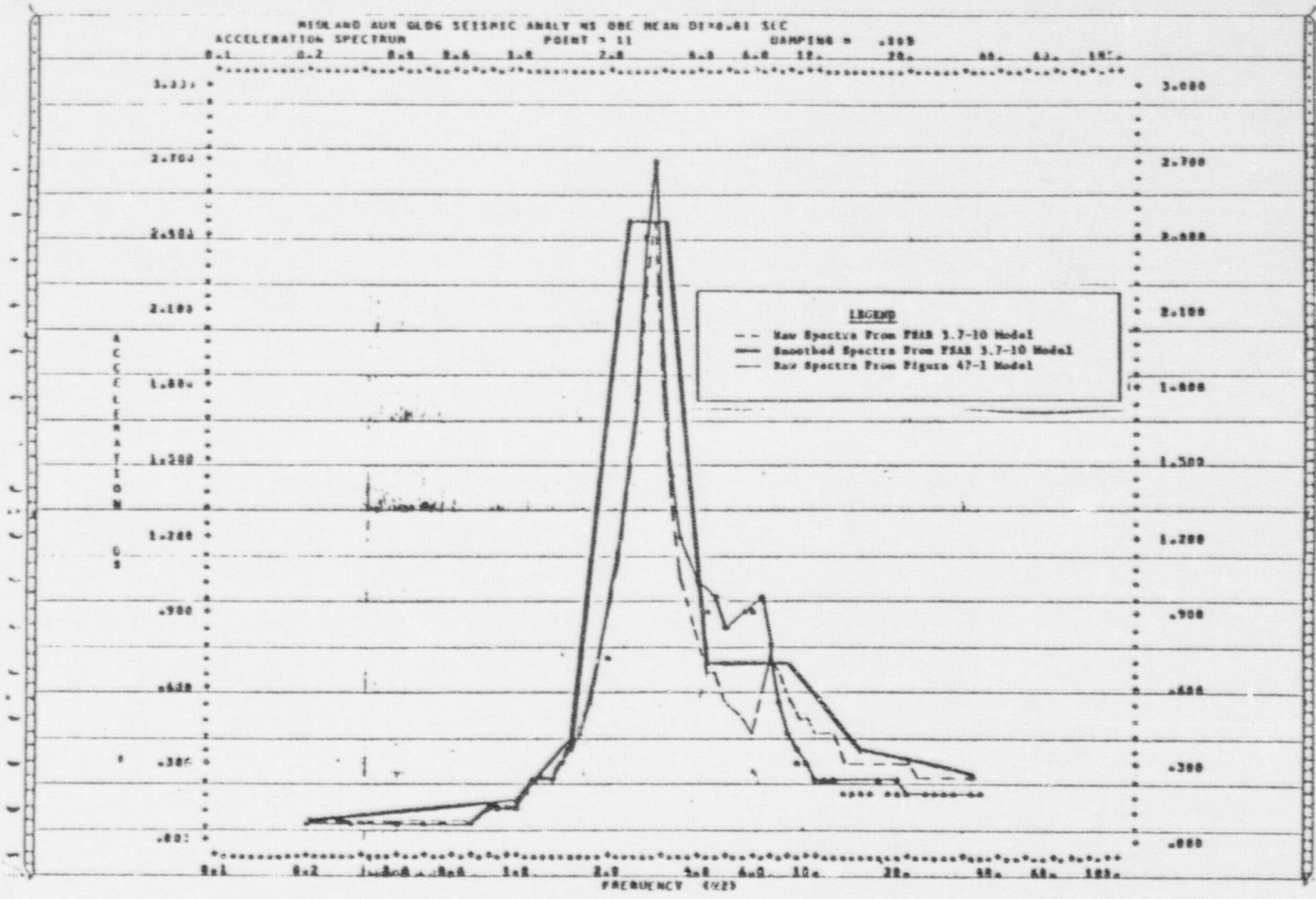
FIGURE 47-3

AUXILIARY BUILDING FLOOR
RESPONSE SPECTRA FOR NORTH-
SOUTH EARTHQUAKE (OBE) MASS
POINT 14 ELEVATION 659'-0"
MIDLAND PLANT UNITS 1&2
CONSUMERS POWER COMPANY



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FIGURE 47-4
 AUXILIARY BUILDING FLOOR
 RESPONSE SPECTRA FOR NORTH-
 SOUTH EARTHQUAKE (OBE) MASS
 POINT 1 ELEVATION 704'-0"
MIDLAND PLANT UNITS 1&2
 CONSUMERS POWER COMPANY



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FIGURE 47-5
 AUXILIARY BUILDING FLOOR
 RESPONSE SPECTRA FOR NORTH-
 SOUTH EARTHQUAKE (OBE) MASS
 POINT 11 ELEVATION 704'-0"
MIDLAND PLANT UNITS 1&2
 CONSUMERS POWER COMPANY

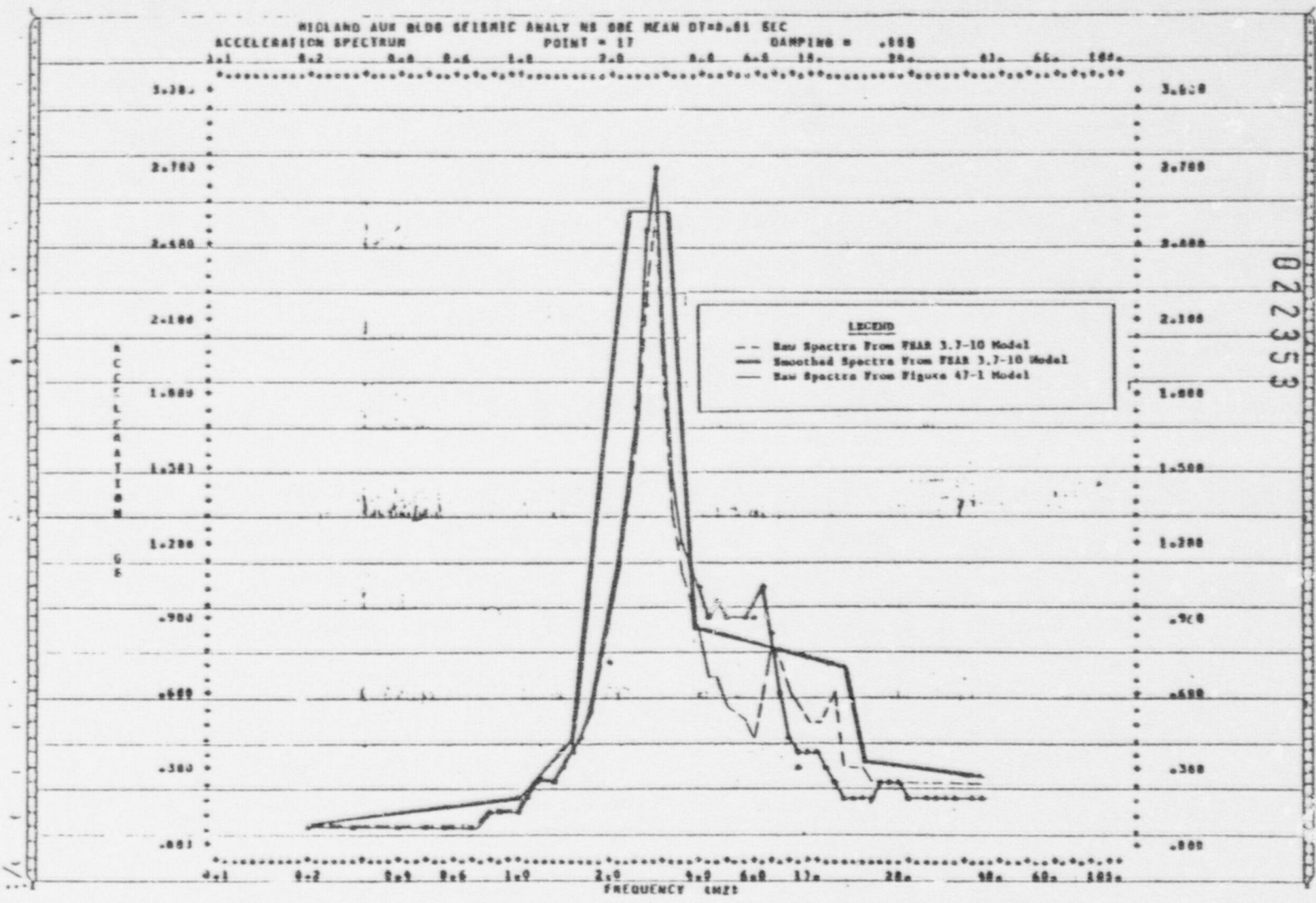


FIGURE 47-6
 AUXILIARY BUILDING FLOOR
 RESPONSE SPECTRA FOR NORTH-
 SOUTH EARTHQUAKE (OBE) MASS
 POINT 17 ELEVATION 695'-0"
MIDLAND PLANT UNITS 1&2
 CONSUMERS POWER COMPANY