

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moho 05000410  
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 MANGAN,C.V. Niagara Mohawk Power Corp.  
 RECIP.NAME RECIPIENT AFFILIATION  
 SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards evaluation on vertical floor flexibility, closing  
 out SER Open Item 27.

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	NRR/DSI/RSB 23	1 1	<u>REG FILE</u> 04	1 1
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	NRC PDR 02	1 1	NSIC 05	1 1
	NTIS	1 1	PNL GRUEL,R	1 1

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Encls.To:

Nilesh Chokshi - 2

M. Haughey - 4

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2. The second part of the document is a list of names and addresses, which are arranged in a columnar fashion. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and the second section containing addresses. The names are listed in alphabetical order, and the addresses are listed in a more random order. The list is a record of the names and addresses of the people who were present at the meeting on the 1st of January, 1880.

3. The third part of the document is a list of names and addresses, which are arranged in a columnar fashion. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two main sections, with the first section containing names and the second section containing addresses. The names are listed in alphabetical order, and the addresses are listed in a more random order. The list is a record of the names and addresses of the people who were present at the meeting on the 1st of January, 1880.

January 7, 1985  
(NMP2L 0318)

Mr. A. Schwencer, Chief  
Licensing Branch No. 2  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Mr. Schwencer:

Re: Nine Mile Point Unit 2  
Docket No. 50-410

Enclosed please find ten copies of our evaluation of vertical floor flexibility in accordance with SER Open Item No. 27. This report was prepared to close out this Safety Evaluation Report item.

Very truly yours,

*C. V. Mangin*

C. V. Mangin  
Vice President

Nuclear Engineering & Licensing

NLR:ja

Enclosure

xc: R. A. Gramm, NRC Resident Inspector  
Project File (2)

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*Limit*  
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Encls To:  
~~W. Chokshi~~  
Nirosh Chokshi - 2  
M. Haughey - 4  
Reg File - 1  
Per - 1  
LOR - 1  
NSIC - 1

NINE MILE POINT UNIT 2

A REPORT

ON

VERTICAL FLOOR FLEXIBILITY

SO-410  
85D1090299

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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## INTRODUCTION

During the Nine Mile Point Unit 2 structural design audit, the NRC requested Niagara Mohawk to review the effect of vertical floor flexibility in the analysis of equipment and floor designs. This report addresses this concern, as described in our letter dated October 25, 1984.

## METHOD

To assess the effects of vertical floor flexibility, the lumped mass model of the control building used to develop the design basis was modified as shown in Figure 1. The control building model was chosen as a result of a review of NMP2 Category I structures. This review indicated that floors in the control building have lower vertical natural frequencies than those in other Category I structures. Any adverse effects caused by vertical floor flexibility would be most pronounced in this structure.

As shown in Figure 1, one lumped mass (at el 306'-0") of the seismic model was separated into two masses, one to represent the overall building at that elevation and one to represent a floor. The total mass of the structure is unchanged. The system represented by node 8 and spring 58 is a 1 degree of freedom representation of the floor. The frequency of this system was assumed to be 15 Hz in previous study presented to the NRC staff in the meeting at Bethesda, Maryland. This frequency was chosen based on several calculations which estimated the frequency of a typical control building floor in this range. To account for possible variations in floor frequency, this study considers two additional frequencies, a lower bound estimate of 9 Hz and an intermediate value of 12 Hz. Results provided herein are thus given for three floor frequencies (i.e., 9, 12 and 15 Hz).

The results of the present study should be reviewed in view of the following:

The response at node 5 is an estimate of the response at el 306 at points near the walls. The response at node 8 is an estimate of the response at points near the center of a floor slab. These responses are not meant to be exact predictions of actual response, but are useful to identify the effects of varying parameters used in the analysis.

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1994

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Q. What is the purpose of the test?

$$f_{\alpha} = \frac{1}{2} \left( \frac{1}{\alpha} + \frac{1}{\alpha^2} \right)$$

This study uses six of the ten actual ground motion records used in developing the site-specific response spectrum at the Limerick site. These records are not scaled to 0.15 g. The list of these ten Limerick earthquake records is given in Table 1. Since previous studies dealt with only the horizontal components, four of these records do not have corrected vertical components available in the public domain. As a result, this study is performed using six of the ten records in Table 1. Table 2 gives the peak vertical acceleration of the six records used and of the four not used.

The results of this study present amplified response spectra (ARS) for 2 percent and 4 percent equipment damping and 7 percent structural damping. They are compared with the NMP2 design basis ARS at 2 percent equipment damping and 7 percent structural damping.

## RESULTS

- A. Figures 2 through 7 show the responses of node 8 and node 5 of the revised model for 2 percent damping, compared with the design basis at 2 percent damping, for the 15 Hz floor for individual earthquakes.

Figures 8 through 13 compare the results for 4 percent damping with the design basis at 2 percent damping, for the 15 Hz floor.

- B. Figure 14 shows the results at node 8 for 2 percent damping, compared with the design basis, for the 15 Hz floor. This plot is the result obtained by taking (at each frequency) the mean of the six accelerations plus one standard deviation.

Figure 15 shows the results at node 8 for 4 percent damping, compared to the design basis, for the 15 Hz floor, incorporating the results for six earthquakes in the same manner.

- C. Figures 16 and 17 present results similar to those of B, but with the floor frequency changed to 12 Hz.
- D. Figures 18 and 19 present results similar to those of B, but with the floor frequency changed to 9 Hz.



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- E. Figure 20 presents results for the 9 Hz floor at node 5 for 2 percent damping, compared with the design basis.

### DISCUSSION

It can be seen from the results provided above that the responses for the actual earthquake records compare well within the engineering accuracy.

The following points also must be noted:

1. The study results for 2 percent damping considers only one of the many conservatisms in the analysis/design process. All that is changed is the input ground motion. Other factors such as increased structural damping and system nonlinearity would reduce responses even further.
2. The ARS curves for 4 percent damping are almost completely enveloped by the NMP2 design basis ARS curves.
3. The minor exceedances encountered for individual earthquake records are very sharp (i.e., over a narrow band of frequency range). For most other frequencies, the results are significantly lower (i.e., by a factor of 3 to 4). Also, these results are an approximation of responses at the middle of the floor. Responses near the wall are much lower than the design basis, as shown in Figure 20 for the worst case (i.e., 9 Hz).
4. This study uses 7 percent structural damping. Based on NUREG/CR-1161 (10) 10 percent structural damping can be used at sea level.

Figure 21 shows that with 10 percent structural damping and 5 percent equipment damping, the ARS curve for actual earthquakes is enveloped by the NMP2 design basis ARS curve, when peak spreading is considered.

5. This study addresses only vertical accelerations. Factors such as actual earthquake time histories and/or increased structural and equipment damping will also reduce the horizontal responses. Since the equipment

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design is based on combined responses (i.e., two horizontal and one vertical), any possible increase in the vertical response due to the vertical floor flexibility will be more than compensated by a corresponding decrease in the horizontal response(s). Therefore, the equipment design basis remains adequately conservative.

#### CONCLUSION

Based on the discussion above, it is concluded that the present NMP2 design basis ARS have sufficient conservatism to account for variation in floor responses due to flexibility of the floor and that equipment and floors would function satisfactorily as designed.



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TABLE 1

<u>Earthquake</u>	<u>Date</u>	<u>Time</u>	<u>Recording Station</u>	<u>Magnitude</u>
Oroville	08/08/75	(0700)	Station 6	4.9
Oroville	09/27/75		Station 8	4.6
Oroville	09/27/75		Station 9	4.6
Parkfield	06/27/66		Temblor	5.5
Lytle Creek	09/12/70		Allen Ranch	5.4
Friuli	09/11/76	(1631)	S. Roco	5.5
Cape Mendocino	06/07/75		C. Mendocino	5.3
Helena	10/31/35		Carroll College	5.7
Helena	11/28/85		Federal Building	5.0
Oroville	08/01/75		Seismograph Station	5.7



TABLE 2

<u>Records Used</u>	<u>Peak Acceleration(g)</u>
Parkfield	.132
Lytle Creek	.060
Cape Mendocino	.039
Helena - Carrol College	.089
Helena - Federal Building	.032
Oroville Seismic Station	.115

Mean	.078
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<u>Records Not Available</u>	<u>Peak Acceleration*</u>
Oroville Station 6	.0663
Oroville Station 8	.0392
Oroville Station 9	.0637
Friuli	.0198

\* From uncorrected data



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## REFERENCES

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5. Insitu Vibration Tests Joyo Plant Japan. Proceedings of U.S. DOE/PNL Specialist Exchange Meeting on Seismic Piping Test held at Advanced Reactors Division dated September 20 and 21, 1982
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10. US NRC NUREG/CR-1161, Recommended Revisions to Nuclear Regulatory Commission - Seismic Design Criteria, Lawrence Livermore Laboratory, May 1980

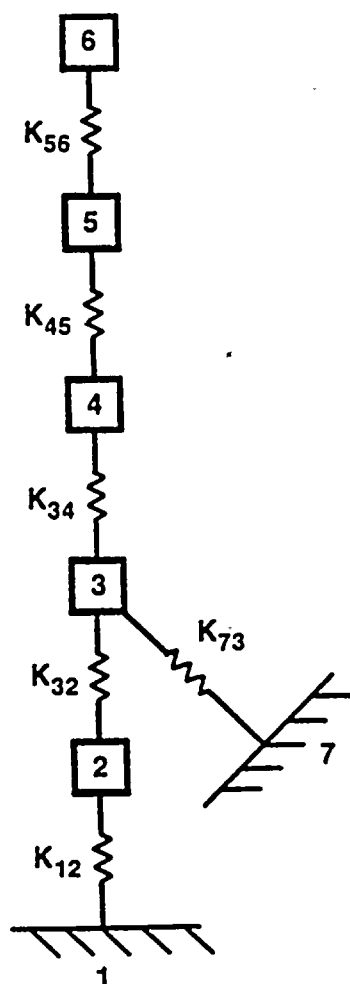


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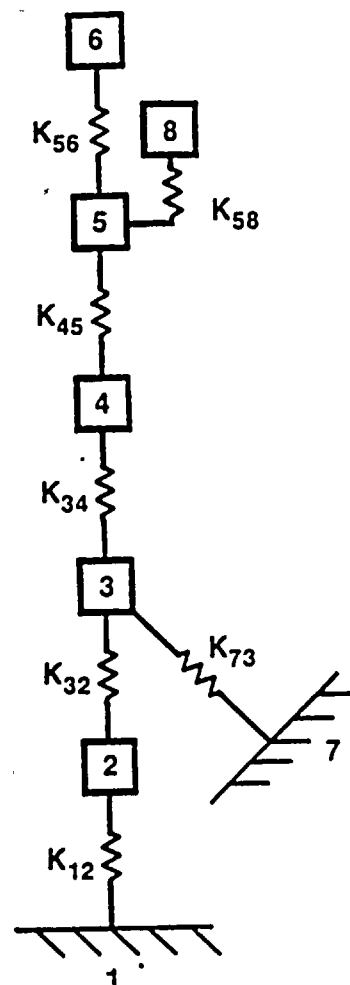
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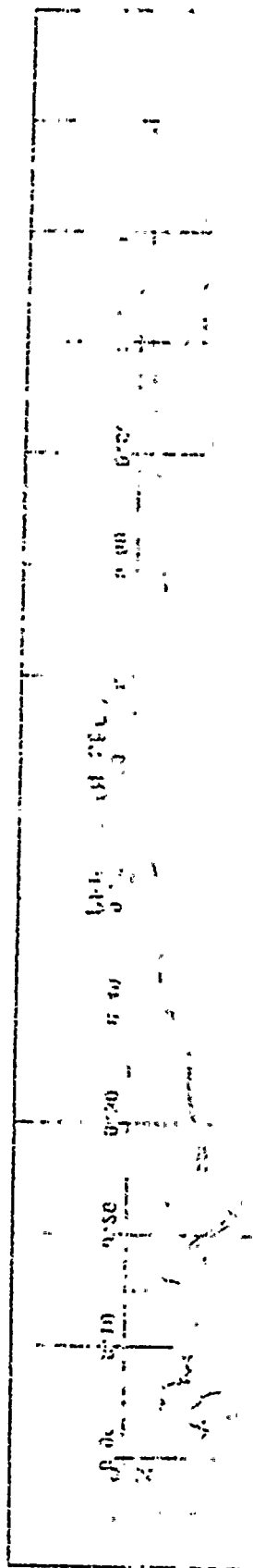


**PRESENT MODEL**  
 USED IN SEISMIC ANALYSIS  
 OF THE STRUCTURE WITH NMP2  
 DESIGN BASIS EARTHQUAKE



**MODIFIED MODEL**  
 USED IN VERTICAL FLOOR  
 FLEXIBILITY STUDY

**FIG. 1**  
**SEISMIC MODELS**  
 CONTROL BLDG EL 306



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B.E. EBBESON

DATE OF RUN

15 OCT 1984

0.020 OSCILLATOR DAMPING  
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0.020 OSCILLATOR DAMPING

CONTROL BLDG. E. 306. REFINED MODEL FREQ = 3 HZ  
PARKFIELD-TREMBLOR

REVISION 0

ACCELERATION G

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2.50  
2.00  
1.50  
1.00  
0.50  
0.00

NODE 8

1 NMPE DESIGN BASIS

NODE 5

PERIOD IN SECS

FIG 2



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 305.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

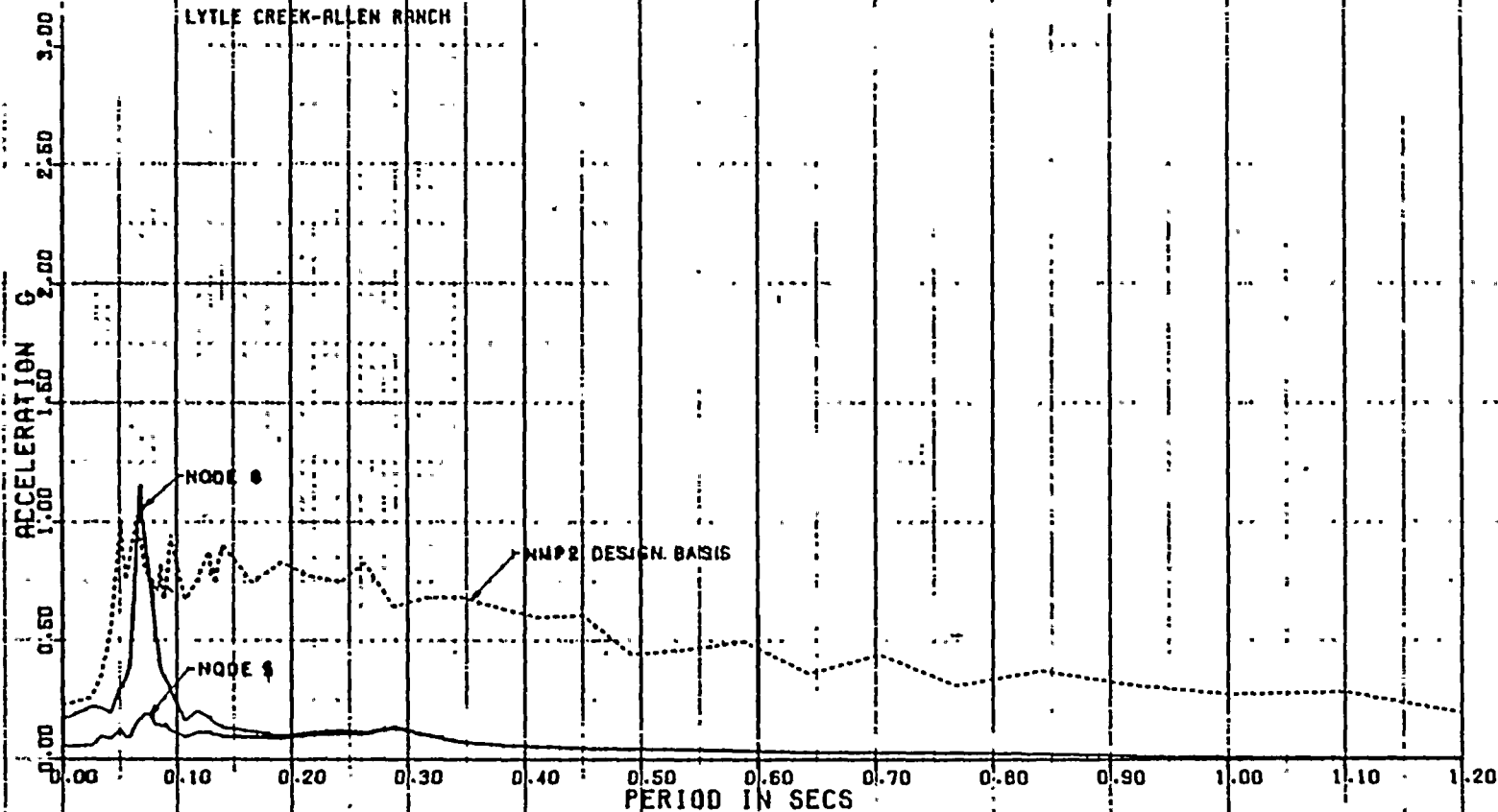
B.E. EBBESON

DATE OF RUN 15 OCT 1984

0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING

CONTROL BLDG. ELEV. 305. REFINED MODEL FREQ. = 5 HZ  
LYTLE CREEK-ALLEN RANCH

REVISION 0







NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B.E. EBBESON

DATE OF RUN 15 OCT 1984

0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING

CONTROL BLDG. E.L. 306. REFINED MODEL FREQ. 15HZ  
CAPE MENDOCINO

REVISION 0

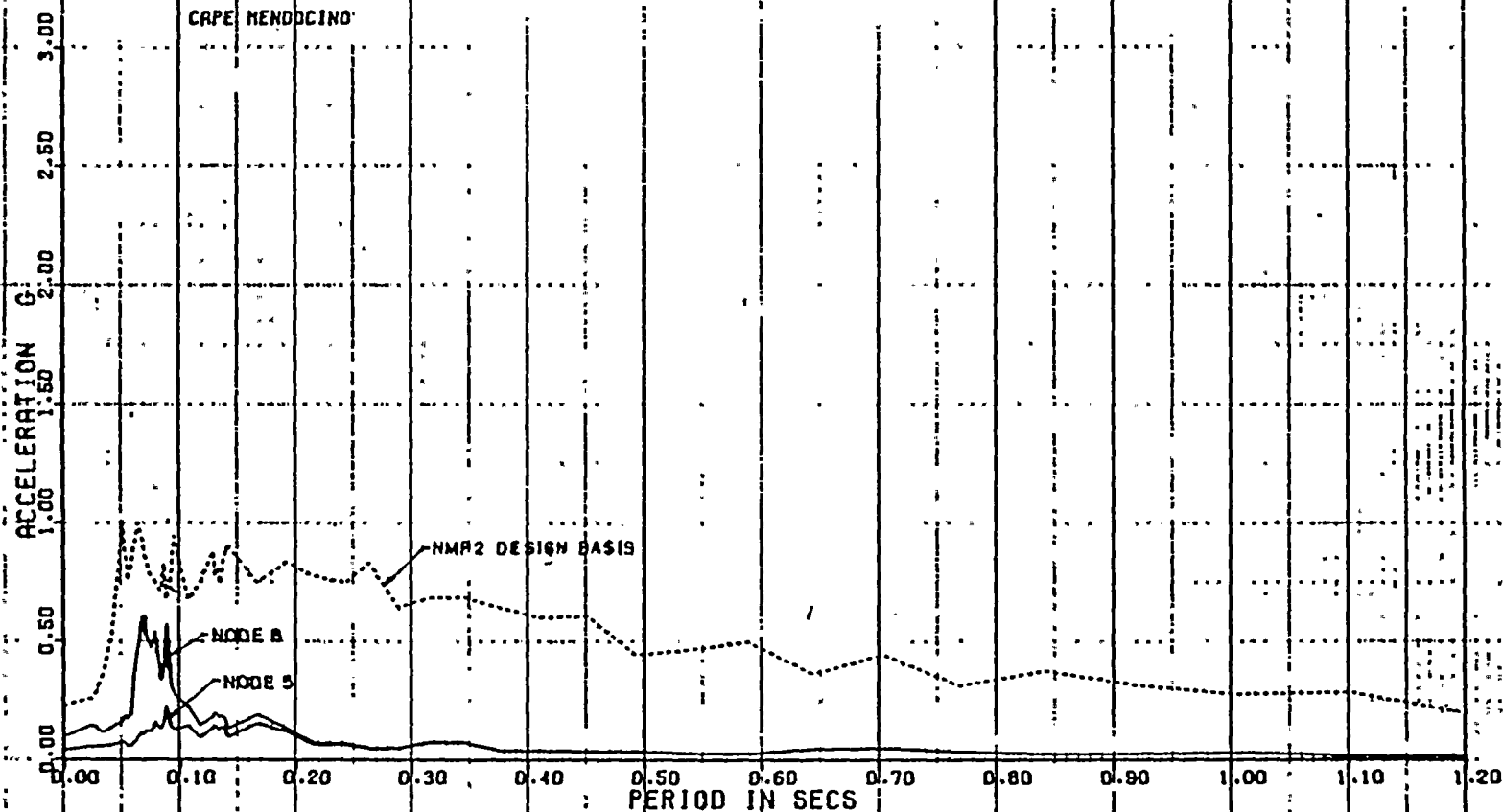


FIG 4



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NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-12-84

B.E. EBBESON

DATE OF RUN

12 OCT 1984

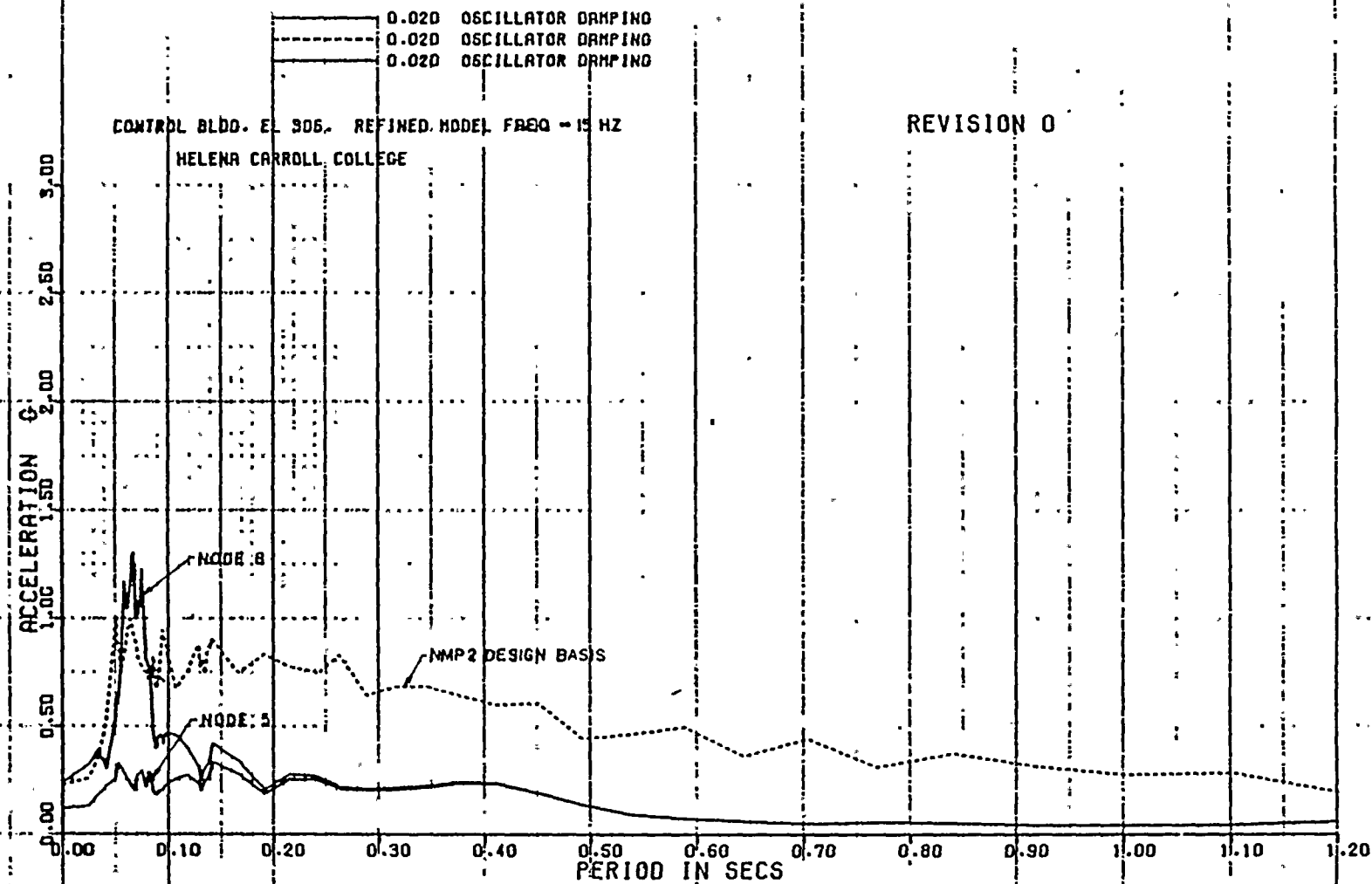


FIG 5



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-12-84

B.E. EBBESON

DATE OF RUN 12 OCT 1984

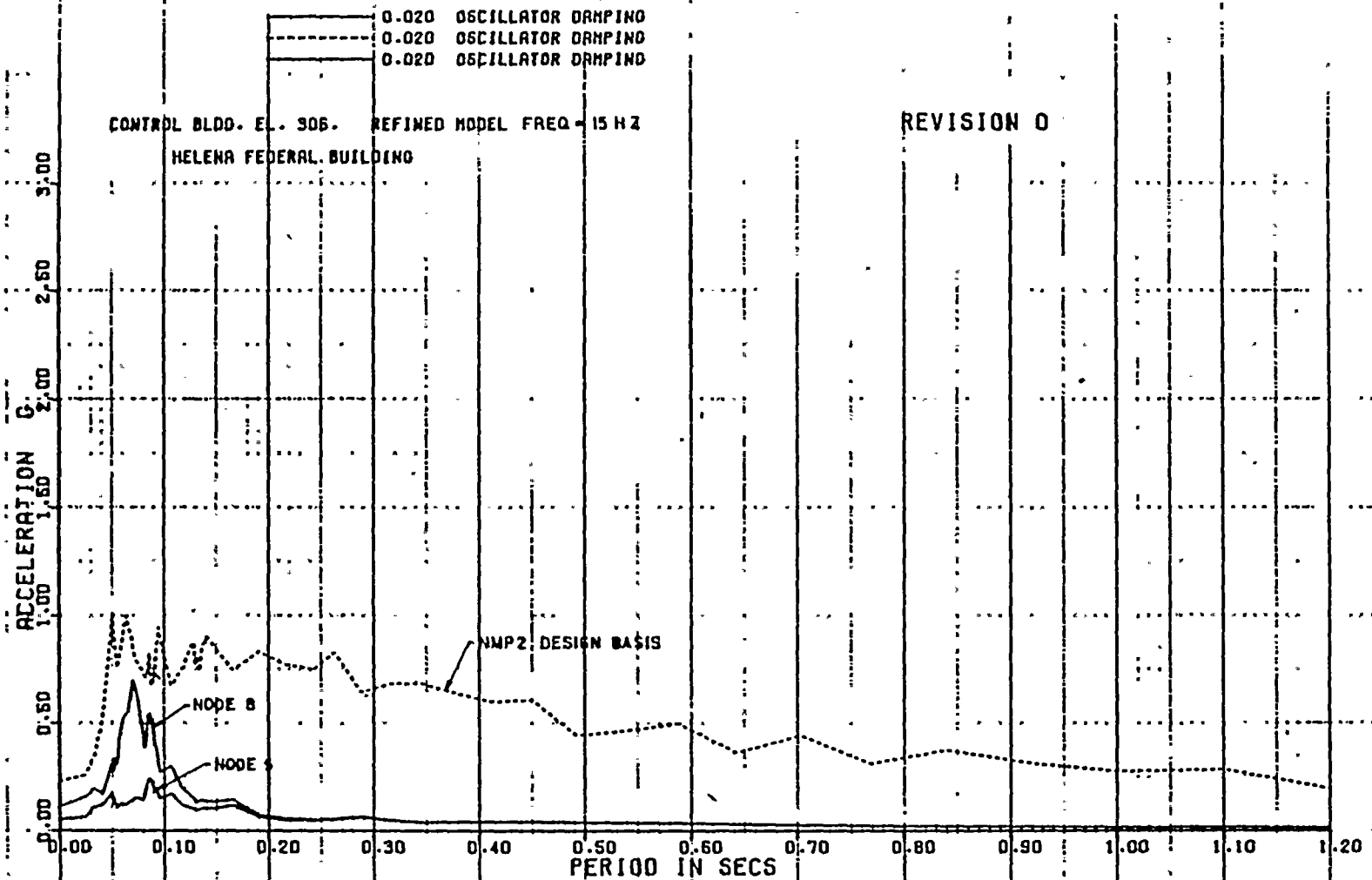


FIG 5

[illegible]

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84 B. E. EBBESON

DATE OF RUN 5 OCT 1984

0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. REFINED MODEL FREQ. 15 HZ,  
DROVILLE SEISMIC STATION

REVISION 0

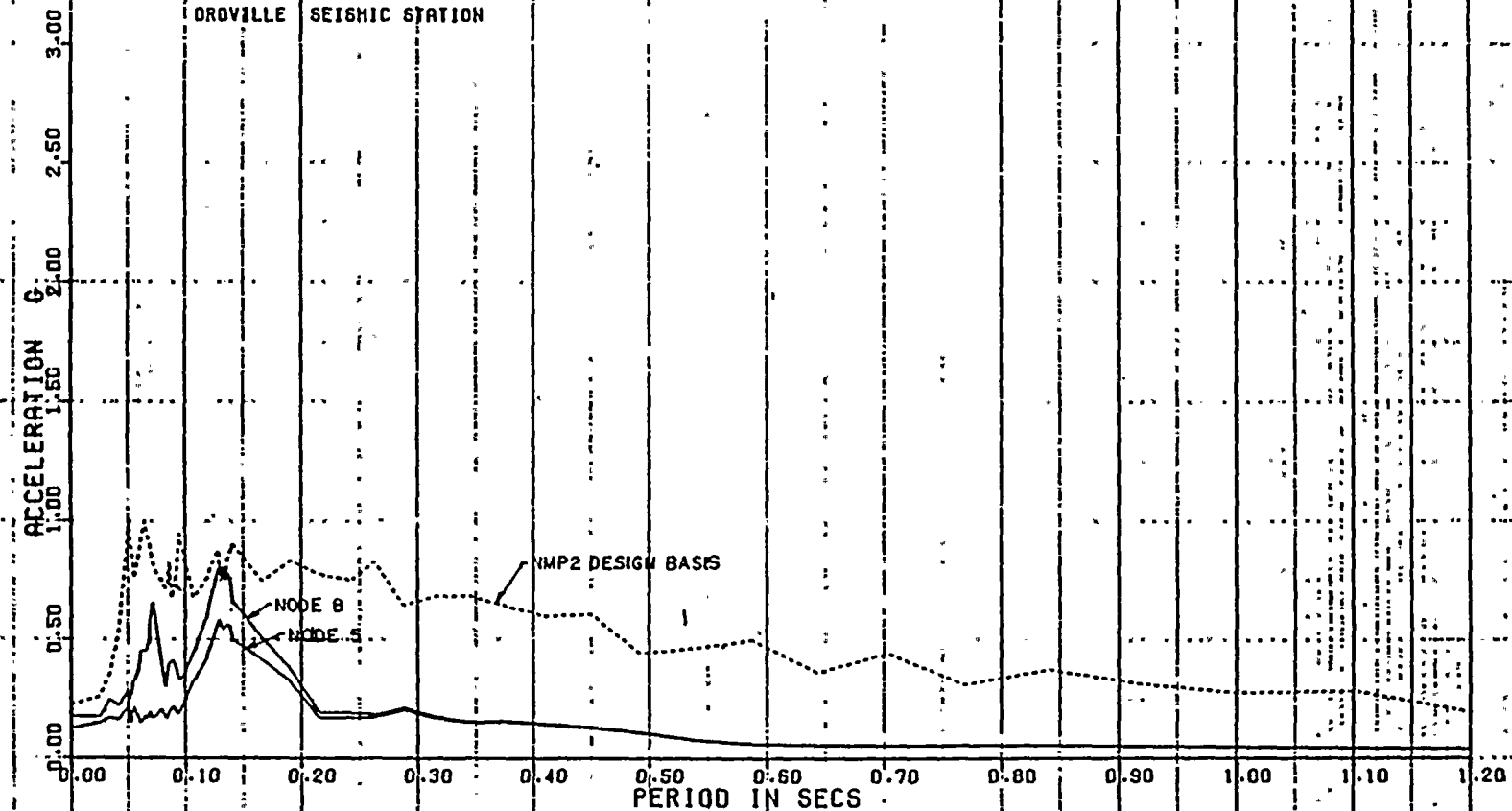


Fig 7





NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B. E. EBBESON

DATE OF RUN 15 OCT 1984

0.040 OSCILLATOR DAMPING  
 0.020 OSCILLATOR DAMPING  
 0.040 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. REFINED MODEL FREQ 15 HZ

REVISION 0

PARKFIELD TREMBLOR

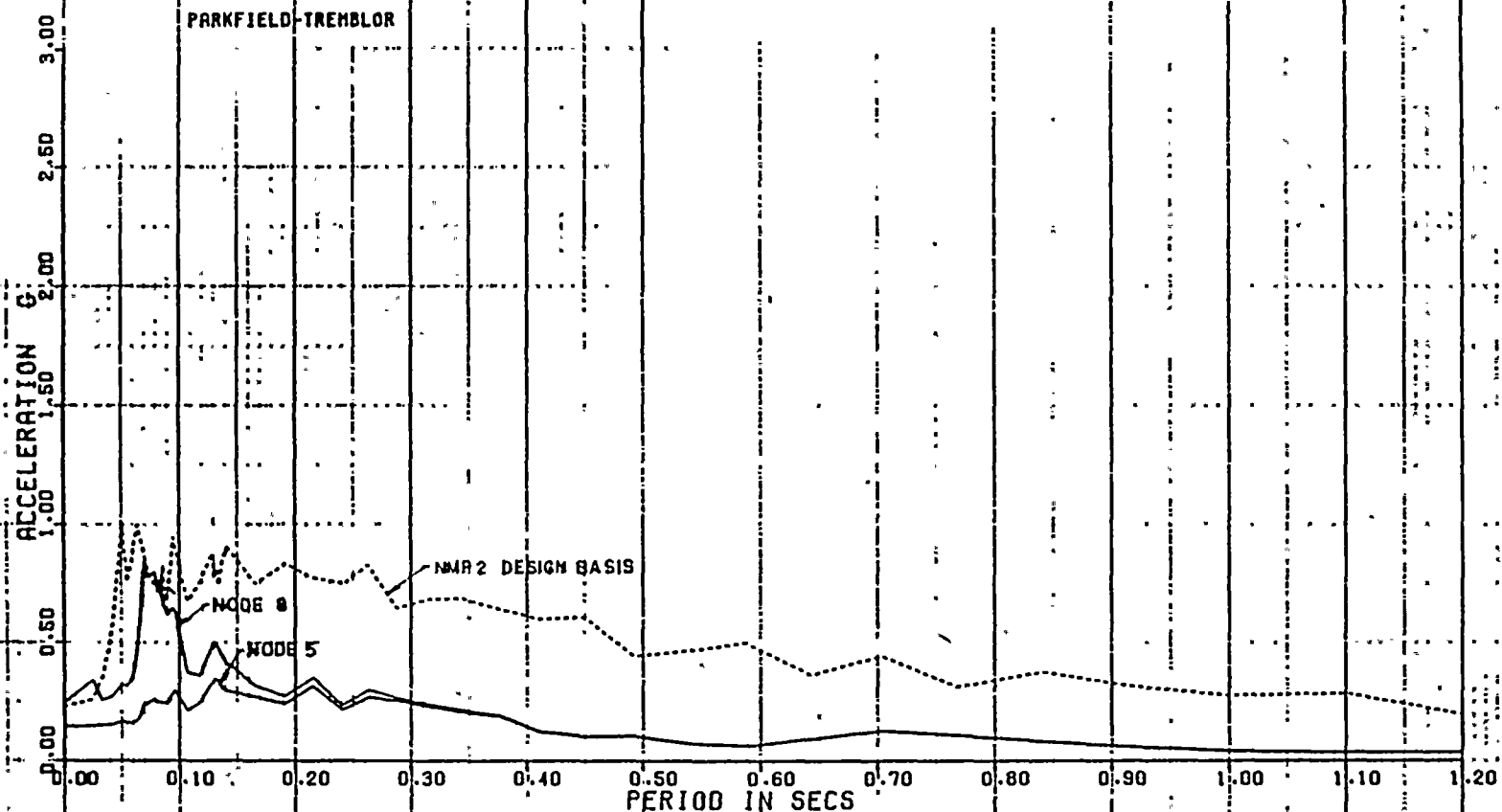


FIG 8



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B.E. EBBESON

DATE OF RUN

15 OCT 1984

- 0.040 OSCILLATOR DAMPING
- - - 0.020 OSCILLATOR DAMPING
- 0.040 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. REFINED MODEL FREQ. 415 HZ

REVISION 0

LYTLE CREEK-ALLEN RANCH

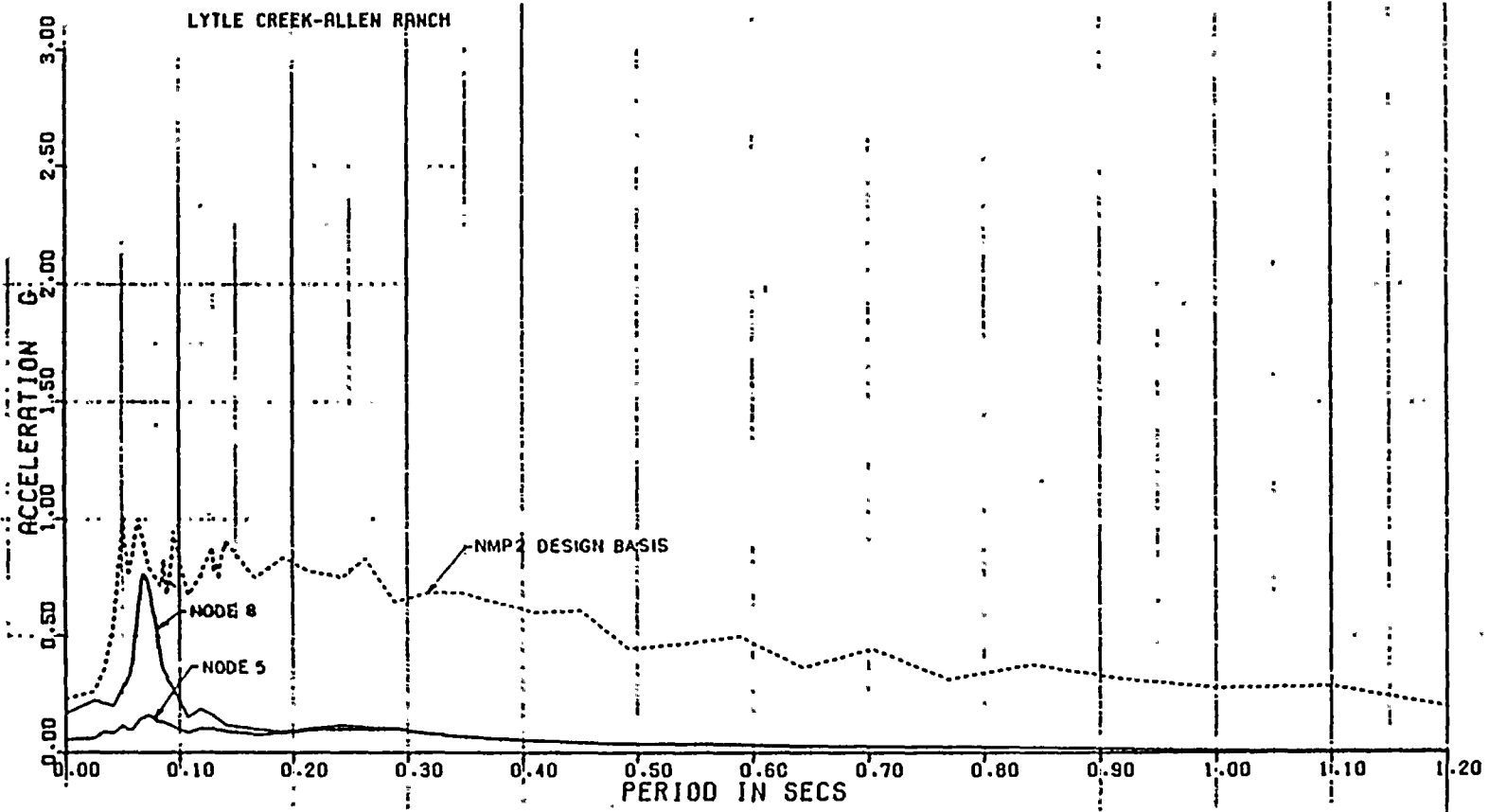


FIG 9



1. The first part of the document is a list of names and addresses. The names are written in a cursive script, and the addresses are written in a more formal, printed style. The list is organized into two columns, with names on the left and addresses on the right. The names are: John A. Smith, James B. Jones, William C. Brown, and Thomas D. White. The addresses are: 123 Main Street, New York, NY 10001; 456 Elm Street, New York, NY 10002; 789 Oak Street, New York, NY 10003; and 101 Pine Street, New York, NY 10004.

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B.E. EBBESON

DATE OF RUN

15 OCT 1984

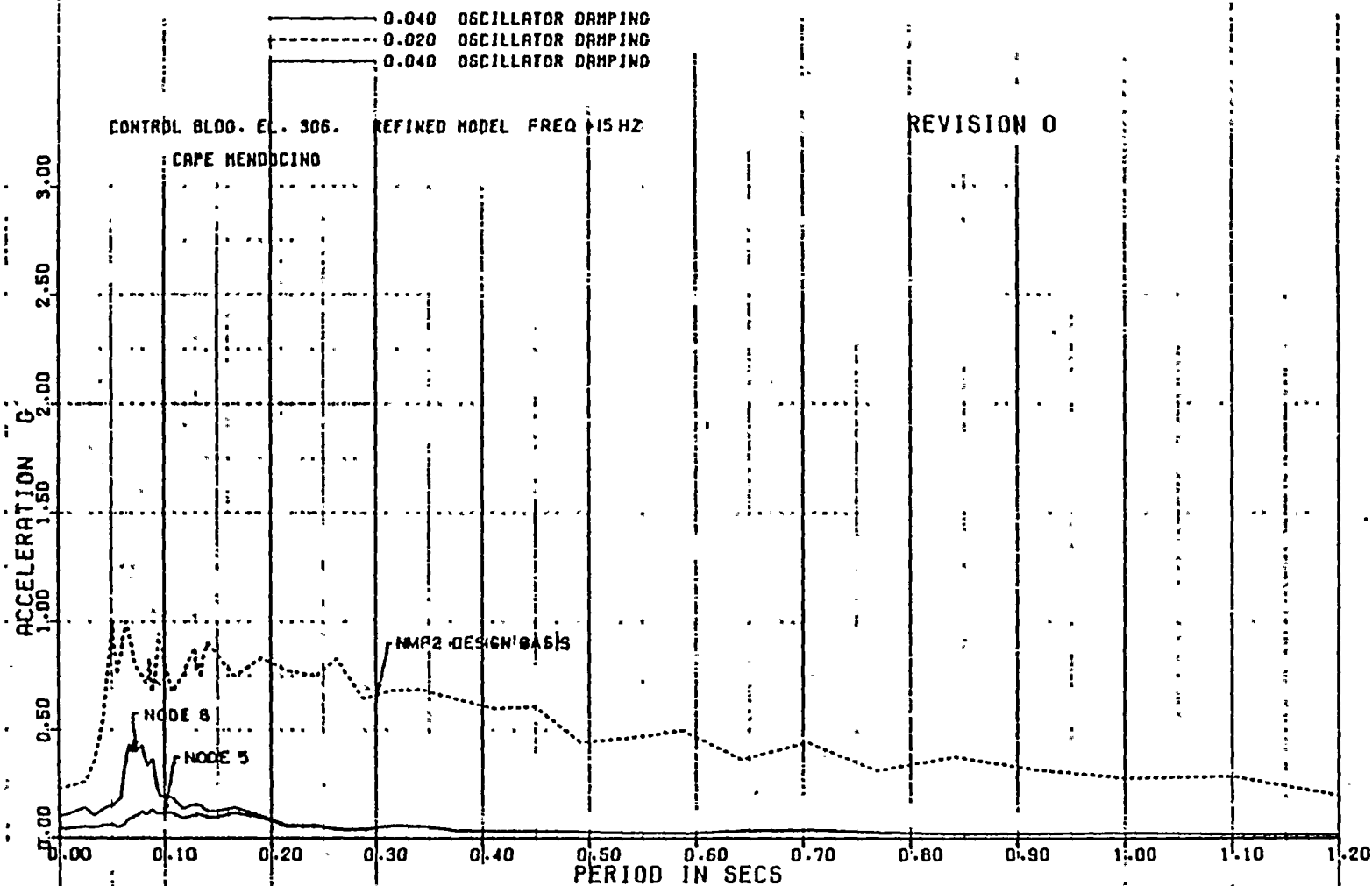


FIG 10



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-12-84

B.E. EBBESON

DATE OF RUN

12 OCT 1984

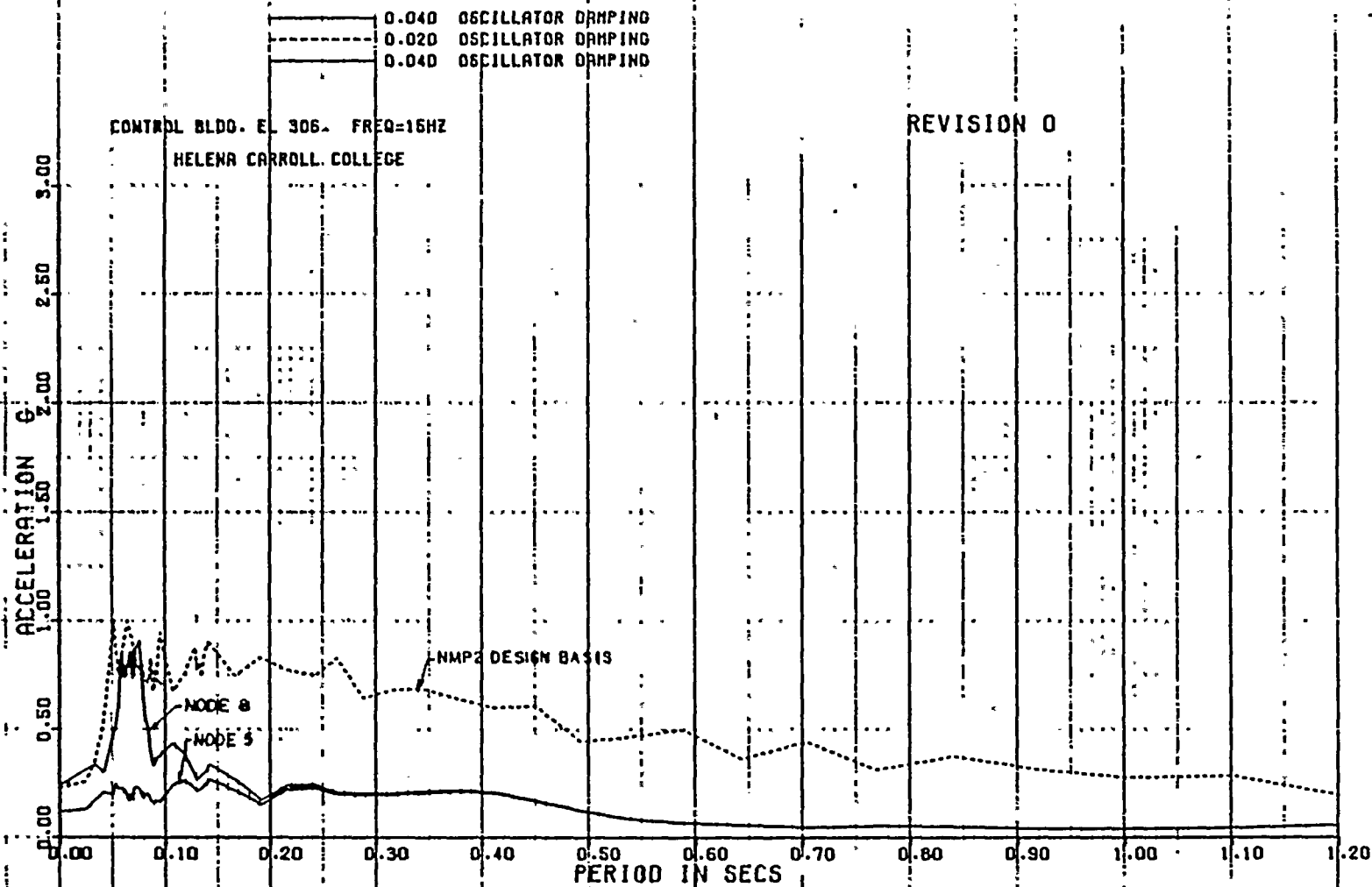


FIG II





NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-12-84

B.E. EBBESON

DATE OF RUN 12 OCT 1984

0.040 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING  
0.040 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. REFINED MODEL FREQ = 15 HZ  
HELENA FEDERAL BUILDING

REVISION 0

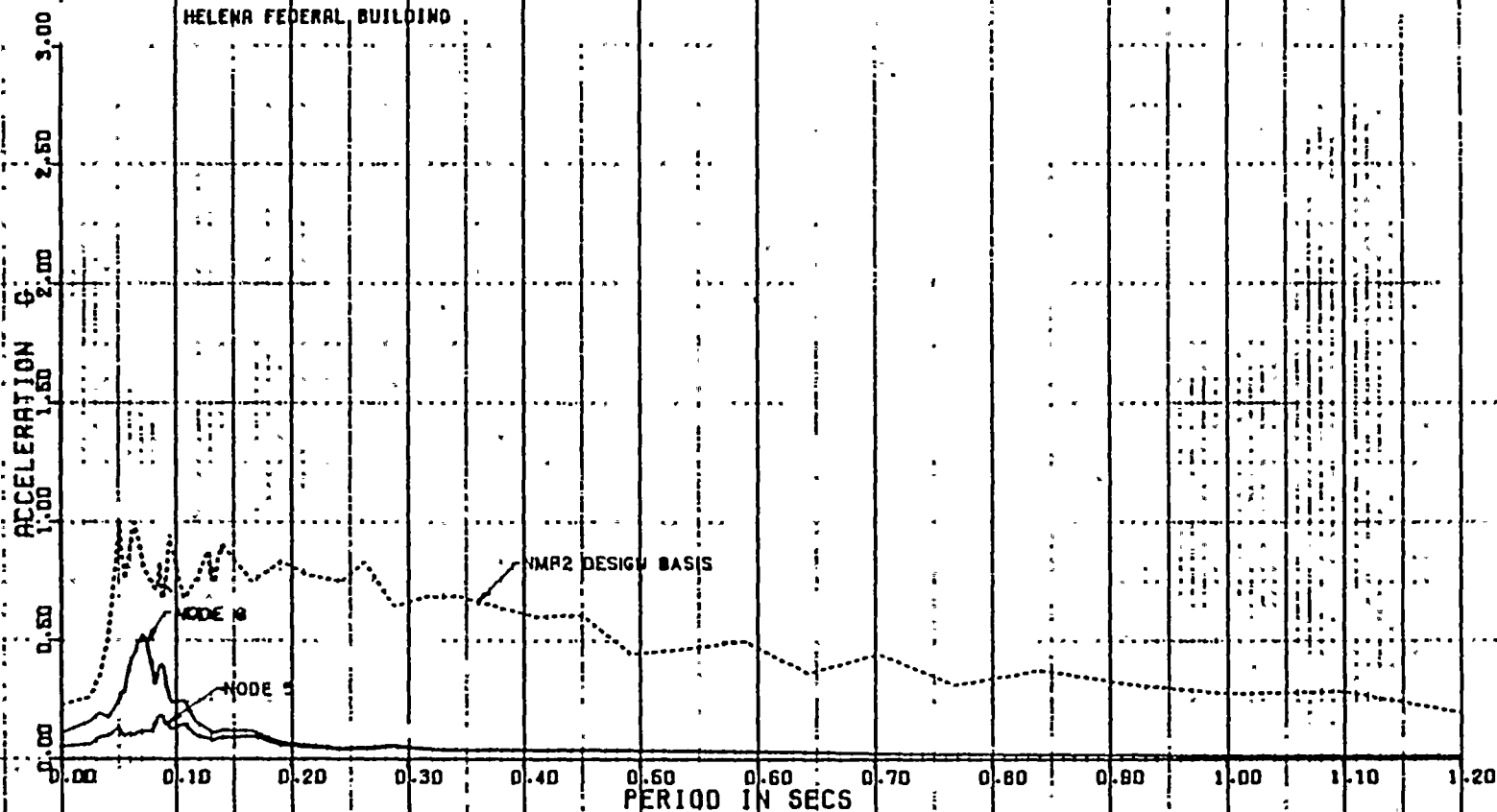


FIG 12



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-15-84

B. E. EBBESON

DATE OF RUN 15 OCT 1984

0.040 OSCILLATOR DAMPING  
0.020 OSCILLATOR DAMPING  
0.040 OSCILLATOR DAMPING

CONTROL BLDG. E. 306. REFINED MODEL FREQ 15HZ  
ORDVILLE SEISMIC STATION

REVISION 0

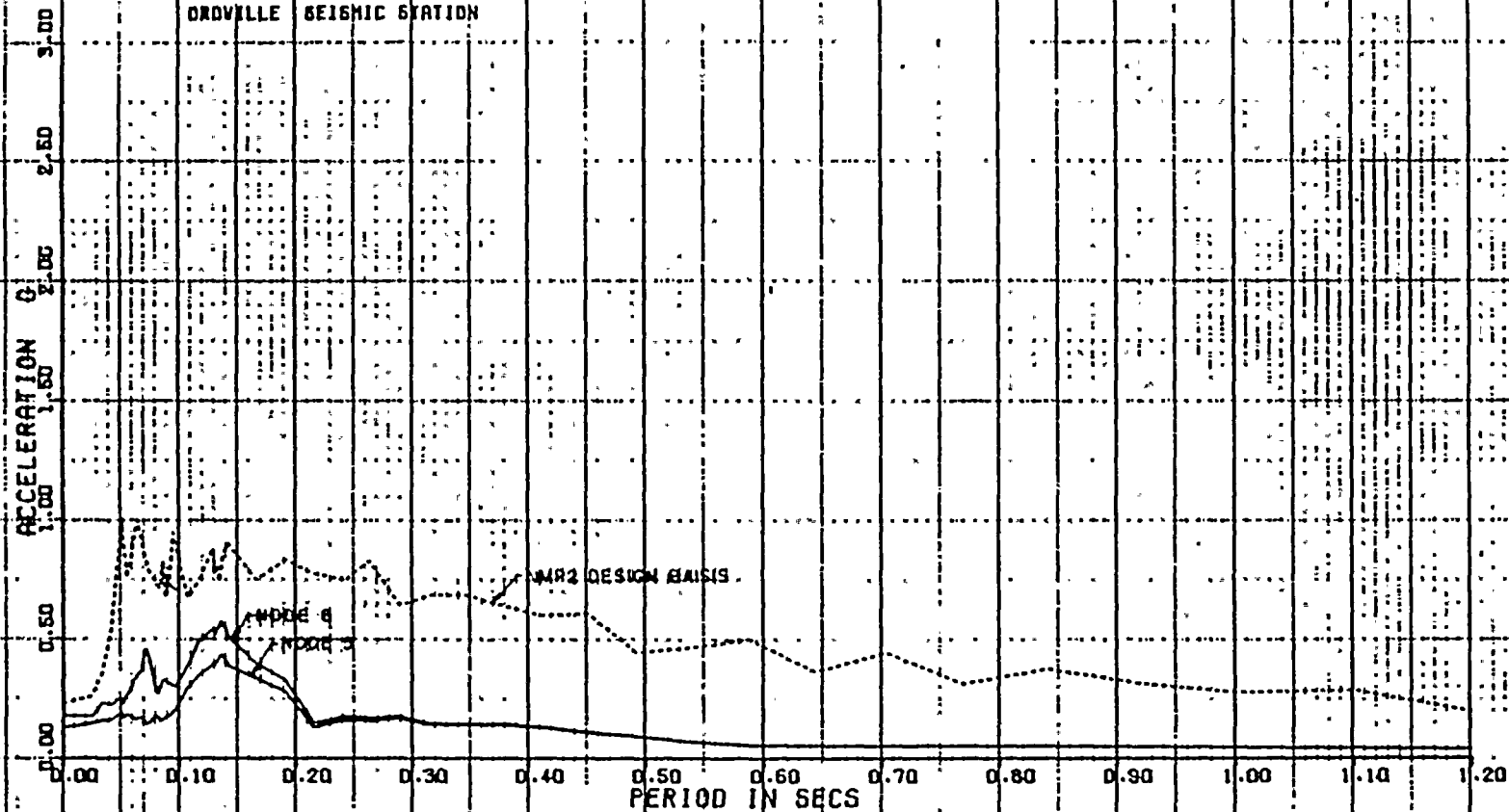


FIG 1



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-16-84

B.E. EBBESON

DATE OF RUN 16 OCT 1984

0.020 OSCILLATOR DAMPING

0.020 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. FREQ=15 HZ  
84TH PERCENTILE VS. DESIGN

REVISION 0

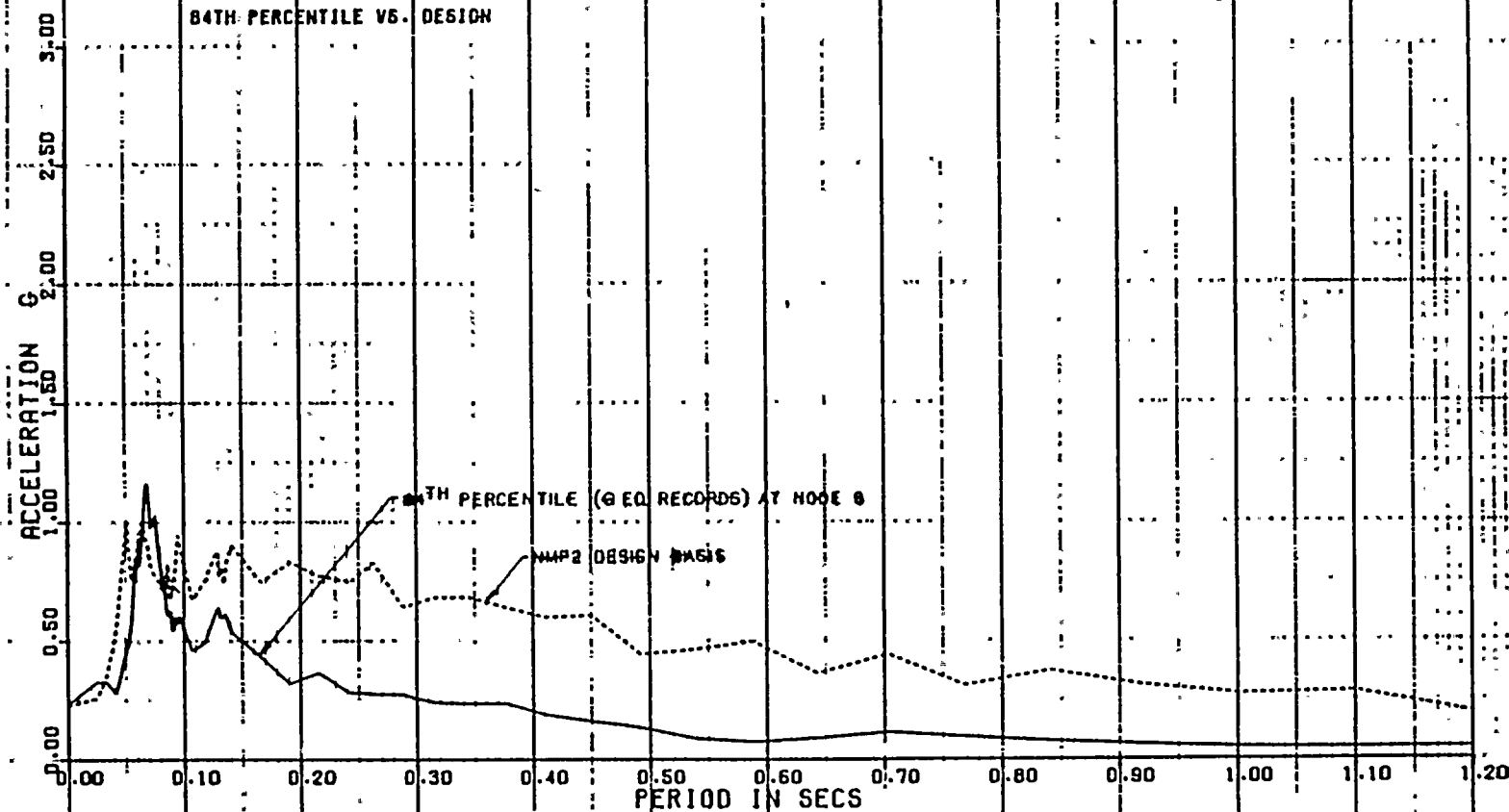


FIG 14



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

10-16-84

B.E. EBBESON

DATE OF RUN

16 OCT 1984

0.040 OSCILLATOR DAMPING

0.020 OSCILLATOR DAMPING

CONTROL BLDG. EL. 306. FREQ=15 HZ

84TH PERCENTILE VS. DESIGN

REVISION 0

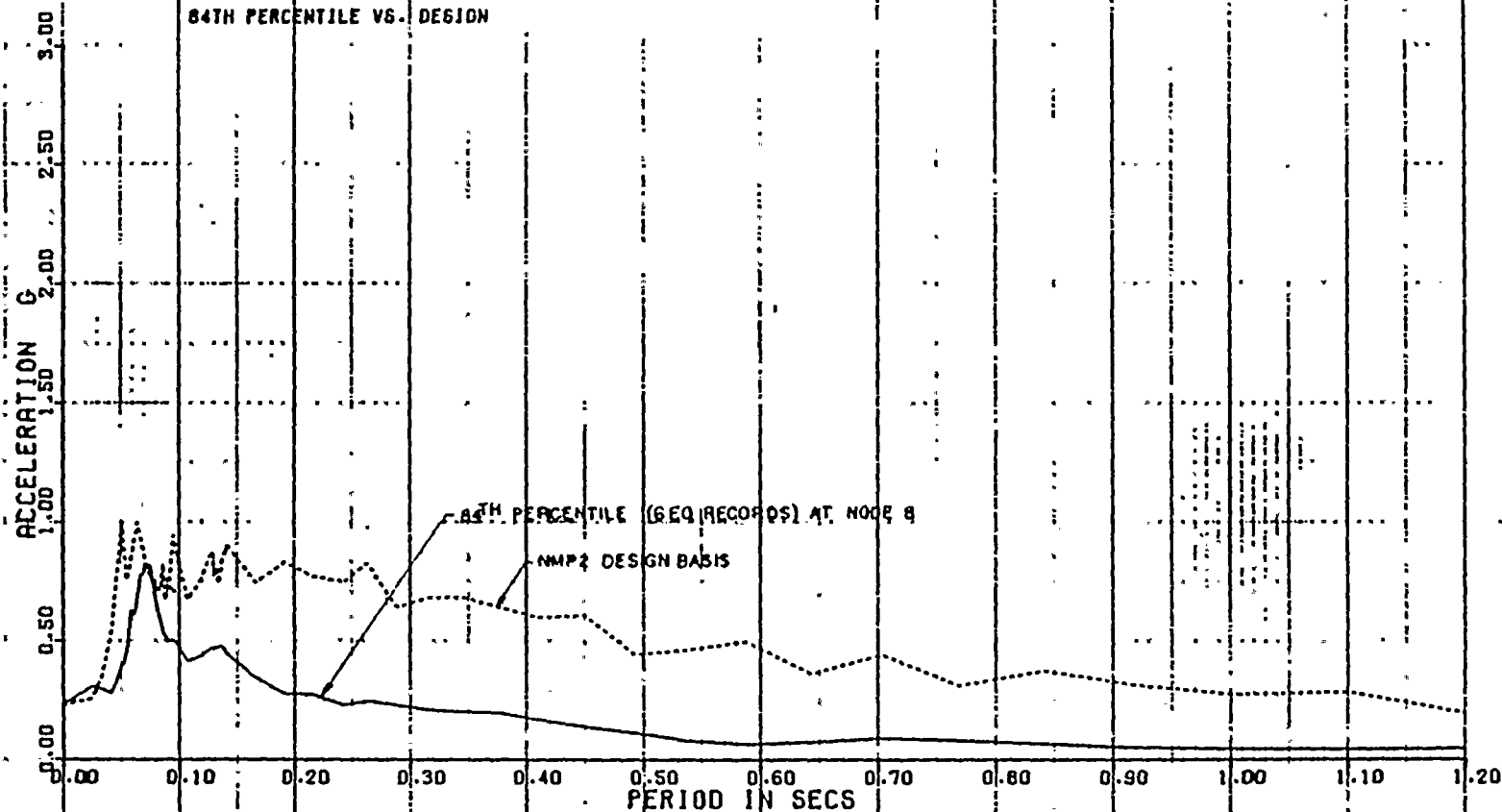


FIG 15





NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-06-84

B.E. EBBESON

DATE OF RUN

6 NOV 1984

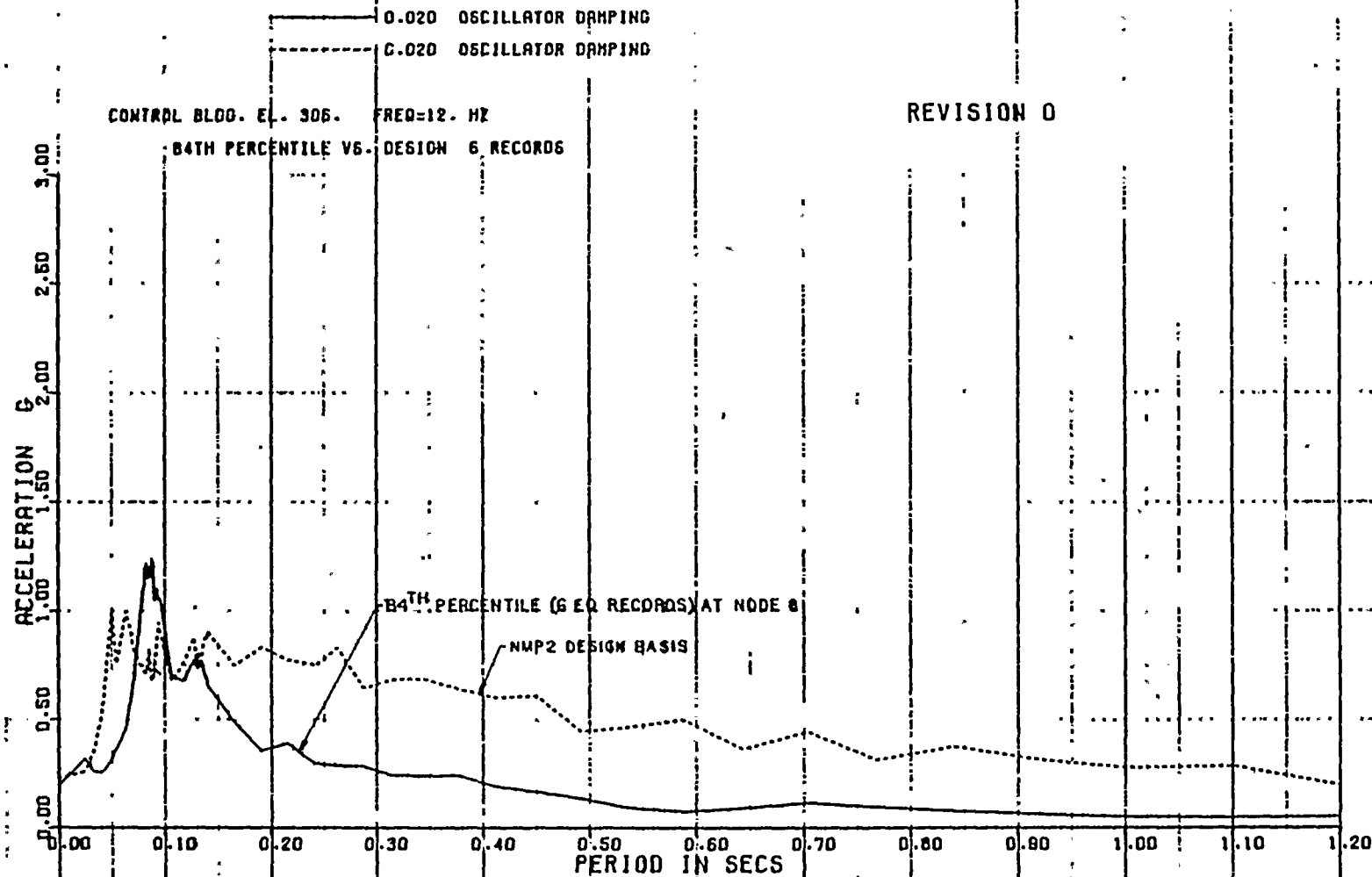


FIG 16



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-06-84

B.E. EBBESON

DATE OF RUN

6 NOV 1984

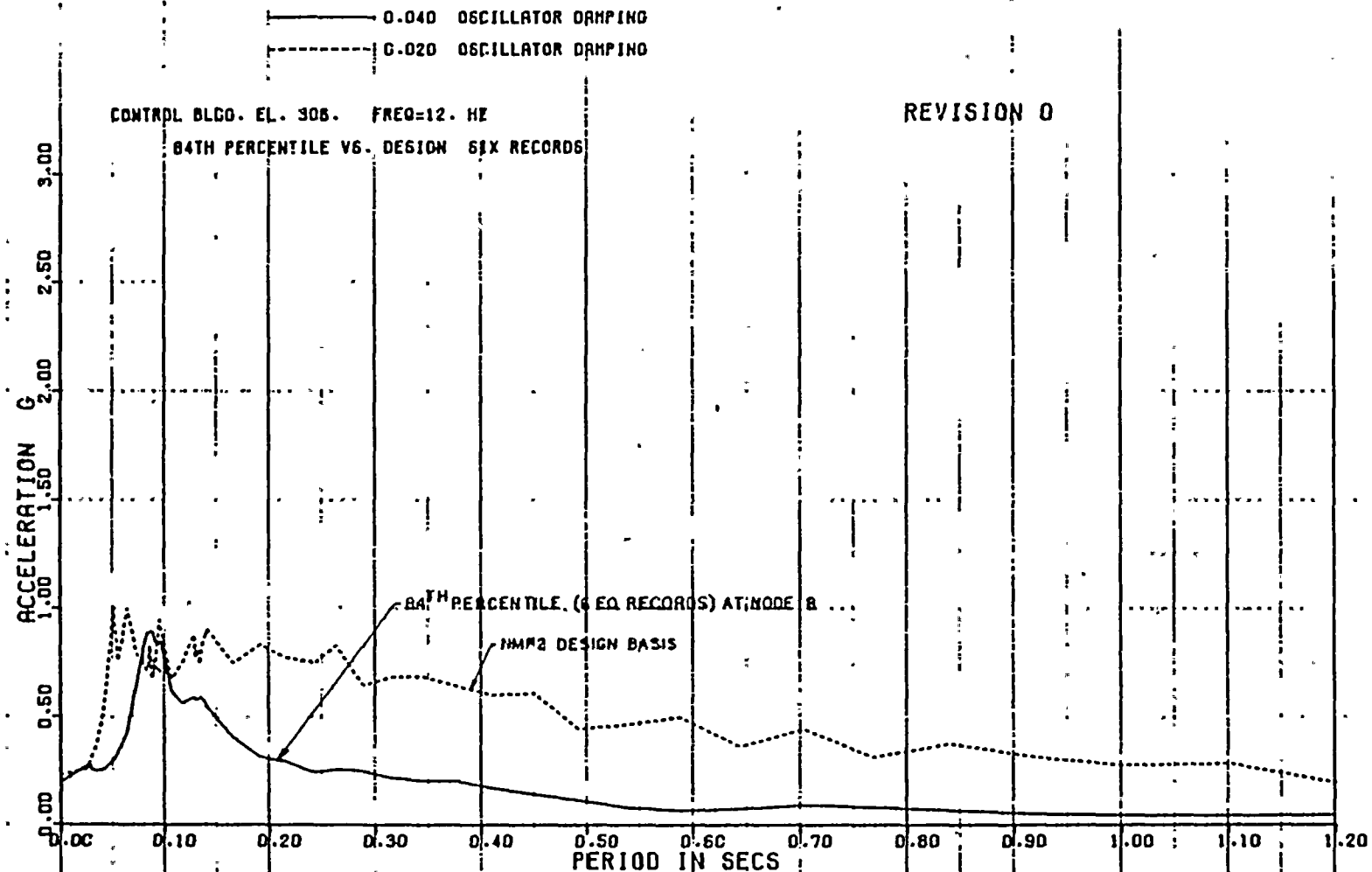


FIG 17



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-07-84

B.E. EBBESON

DATE OF RUN

7 NOV 1984

0.020 OSCILLATOR DAMPING

0.020 OSCILLATOR DAMPING

CONTROL BLDG. ELEV. 306. FREQ=9. HZ

84TH PERCENTILE VS. DESIGN SIX RECORDS

REVISION 0

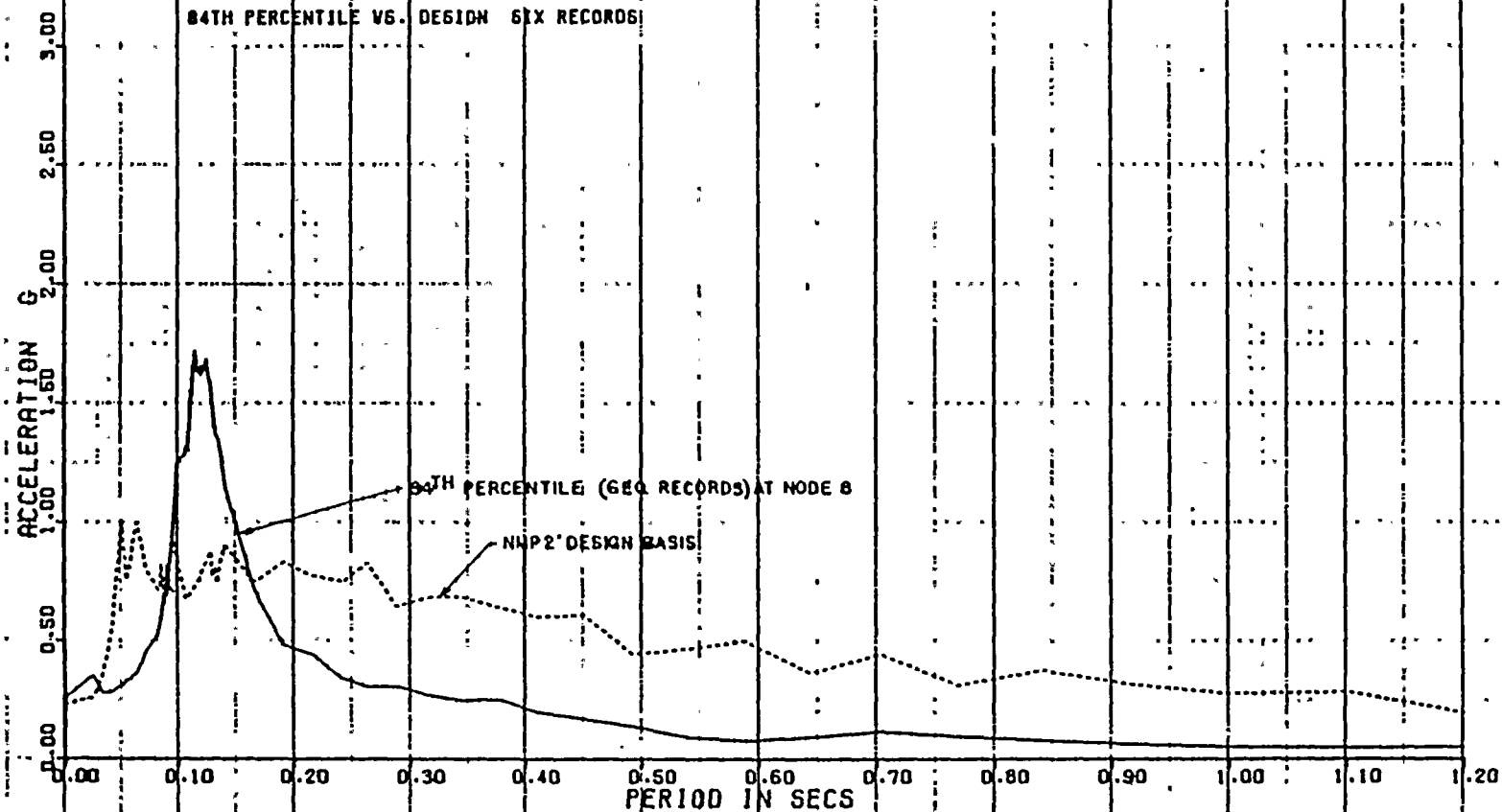


FIG 18



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
 CONTROL BLDG. AT ELEV. 306.00' SSE VERT  
 AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-07-84

B.E. EBBESON

DATE OF RUN

7 NOV 1984

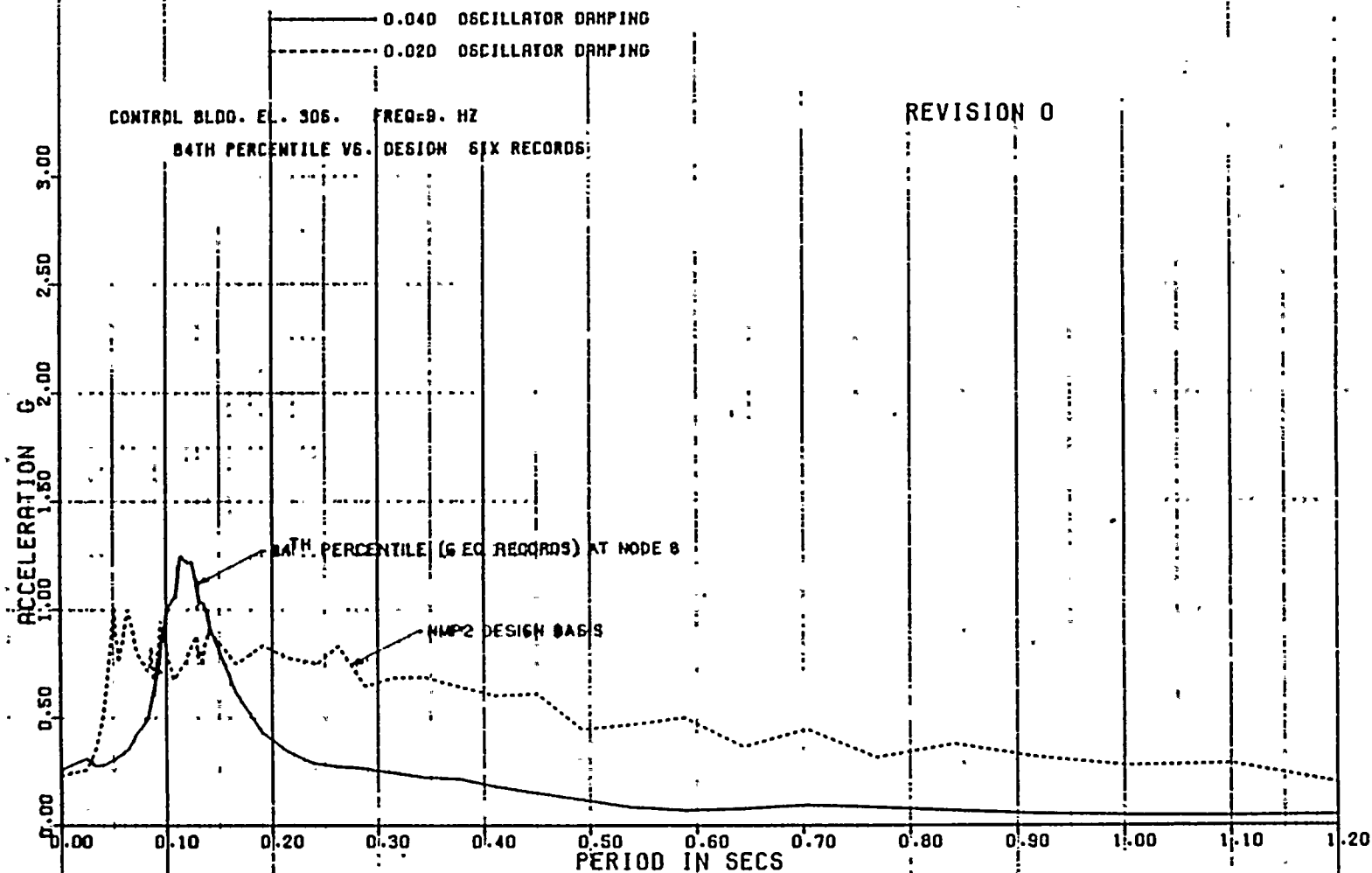


FIG 19



[illegible]

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT NODE 5 SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-06-84

B.E. EBBESON

DATE OF RUN

6 NOV 1984

D.02D OSCILLATOR DAMPING

D.02D OSCILLATOR DAMPING

CONTROL BLDG. EL. 505... FREQ=9. HZ

84TH PERCENTILE VS. DESIGN SIX RECORDS

REVISION 0

ACCELERATION G

3.00  
2.50  
2.00  
1.50  
1.00  
0.50  
0.00

NMP2 DESIGN BASIS

84TH PERCENTILE (6 EQ RECORDS) AT NODE 5

PERIOD IN SECS

FIG 20

0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10 1.20

2000 4 15 15 30 15 45 15 55 16 05 16 15 16 25 16 35 16 45 16 55 17 05 17 15 17 25 17 35 17 45 17 55 18 05 18 15 18 25 18 35 18 45 18 55 19 05 19 15 19 25 19 35 19 45 19 55 20 05 20 15 20 25 20 35 20 45 20 55 21 05 21 15 21 25 21 35 21 45 21 55 22 05 22 15 22 25 22 35 22 45 22 55 23 05 23 15 23 25 23 35 23 45 23 55 24 05 24 15 24 25 24 35 24 45 24 55 25 05 25 15 25 25 25 35 25 45 25 55 26 05 26 15 26 25 26 35 26 45 26 55 27 05 27 15 27 25 27 35 27 45 27 55 28 05 28 15 28 25 28 35 28 45 28 55 29 05 29 15 29 25 29 35 29 45 29 55 30 05 30 15 30 25 30 35 30 45 30 55 31 05 31 15 31 25 31 35 31 45 31 55 32 05 32 15 32 25 32 35 32 45 32 55 33 05 33 15 33 25 33 35 33 45 33 55 34 05 34 15 34 25 34 35 34 45 34 55 35 05 35 15 35 25 35 35 35 45 35 55 36 05 36 15 36 25 36 35 36 45 36 55 37 05 37 15 37 25 37 35 37 45 37 55 38 05 38 15 38 25 38 35 38 45 38 55 39 05 39 15 39 25 39 35 39 45 39 55 40 05 40 15 40 25 40 35 40 45 40 55 41 05 41 15 41 25 41 35 41 45 41 55 42 05 42 15 42 25 42 35 42 45 42 55 43 05 43 15 43 25 43 35 43 45 43 55 44 05 44 15 44 25 44 35 44 45 44 55 45 05 45 15 45 25 45 35 45 45 45 55 46 05 46 15 46 25 46 35 46 45 46 55 47 05 47 15 47 25 47 35 47 45 47 55 48 05 48 15 48 25 48 35 48 45 48 55 49 05 49 15 49 25 49 35 49 45 49 55 50 05 50 15 50 25 50 35 50 45 50 55 51 05 51 15 51 25 51 35 51 45 51 55 52 05 52 15 52 25 52 35 52 45 52 55 53 05 53 15 53 25 53 35 53 45 53 55 54 05 54 15 54 25 54 35 54 45 54 55 55 05 55 15 55 25 55 35 55 45 55 55 56 05 56 15 56 25 56 35 56 45 56 55 57 05 57 15 57 25 57 35 57 45 57 55 58 05 58 15 58 25 58 35 58 45 58 55 59 05 59 15 59 25 59 35 59 45 59 55 60 05 60 15 60 25 60 35 60 45 60 55 61 05 61 15 61 25 61 35 61 45 61 55 62 05 62 15 62 25 62 35 62 45 62 55 63 05 63 15 63 25 63 35 63 45 63 55 64 05 64 15 64 25 64 35 64 45 64 55 65 05 65 15 65 25 65 35 65 45 65 55 66 05 66 15 66 25 66 35 66 45 66 55 67 05 67 15 67 25 67 35 67 45 67 55 68 05 68 15 68 25 68 35 68 45 68 55 69 05 69 15 69 25 69 35 69 45 69 55 70 05 70 15 70 25 70 35 70 45 70 55 71 05 71 15 71 25 71 35 71 45 71 55 72 05 72 15 72 25 72 35 72 45 72 55 73 05 73 15 73 25 73 35 73 45 73 55 74 05 74 15 74 25 74 35 74 45 74 55 75 05 75 15 75 25 75 35 75 45 75 55 76 05 76 15 76 25 76 35 76 45 76 55 77 05 77 15 77 25 77 35 77 45 77 55 78 05 78 15 78 25 78 35 78 45 78 55 79 05 79 15 79 25 79 35 79 45 79 55 80 05 80 15 80 25 80 35 80 45 80 55 81 05 81 15 81 25 81 35 81 45 81 55 82 05 82 15 82 25 82 35 82 45 82 55 83 05 83 15 83 25 83 35 83 45 83 55 84 05 84 15 84 25 84 35 84 45 84 55 85 05 85 15 85 25 85 35 85 45 85 55 86 05 86 15 86 25 86 35 86 45 86 55 87 05 87 15 87 25 87 35 87 45 87 55 88 05 88 15 88 25 88 35 88 45 88 55 89 05 89 15 89 25 89 35 89 45 89 55 90 05 90 15 90 25 90 35 90 45 90 55 91 05 91 15 91 25 91 35 91 45 91 55 92 05 92 15 92 25 92 35 92 45 92 55 93 05 93 15 93 25 93 35 93 45 93 55 94 05 94 15 94 25 94 35 94 45 94 55 95 05 95 15 95 25 95 35 95 45 95 55 96 05 96 15 96 25 96 35 96 45 96 55 97 05 97 15 97 25 97 35 97 45 97 55 98 05 98 15 98 25 98 35 98 45 98 55 99 05 99 15 99 25 99 35 99 45 99 55 100 05 100 15 100 25 100 35 100 45 100 55 101 05 101 15 101 25 101 35 101 45 101 55 102 05 102 15 102 25 102 35 102 45 102 55 103 05 103 15 103 25 103 35 103 45 103 55 104 05 104 15 104 25 104 35 104 45 104 55 105 05 105 15 105 25 105 35 105 45 105 55 106 05 106 15 106 25 106 35 106 45 106 55 107 05 107 15 107 25 107 35 107 45 107 55 108 05 108 15 108 25 108 35 108 45 108 55 109 05 109 15 109 25 109 35 109 45 109 55 110 05 110 15 110 25 110 35 110 45 110 55 111 05 111 15 111 25 111 35 111 45 111 55 112 05 112 15 112 25 112 35 112 45 112 55 113 05 113 15 113 25 113 35 113 45 113 55 114 05 114 15 114 25 114 35 114 45 114 55 115 05 115 15 115 25 115 35 115 45 115 55 116 05 116 15 116 25 116 35 116 45 116 55 117 05 117 15 117 25 117 35 117 45 117 55 118 05 118 15 118 25 118 35 118 45 118 55 119 05 119 15 119 25 119 35 119 45 119 55 120 05 120 15 120 25 120 35 120 45 120 55 121 05 121 15 121 25 121 35 121 45 121 55 122 05 122 15 122 25 122 35 122 45 122 55 123 05 123 15 123 25 123 35 123 45 123 55 124 05 124 15 124 25 124 35 124 45

U.S. DEPARTMENT OF AGRICULTURE

DATE: 11/11/2011 11:11:11 AM

10-1

3

Table 1. *Salmonella* serotypes and phage types isolated from the 1997-1998 salmonellosis outbreak in the Netherlands

5100

[illegible]

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains.

3.

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22 Oct 1994

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2

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY  
CONTROL BLDG. AT NODE 5 SSE VERT  
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

11-20-84

S. RAMAMURTHY

DATE OF RUN

20 NOV 1984

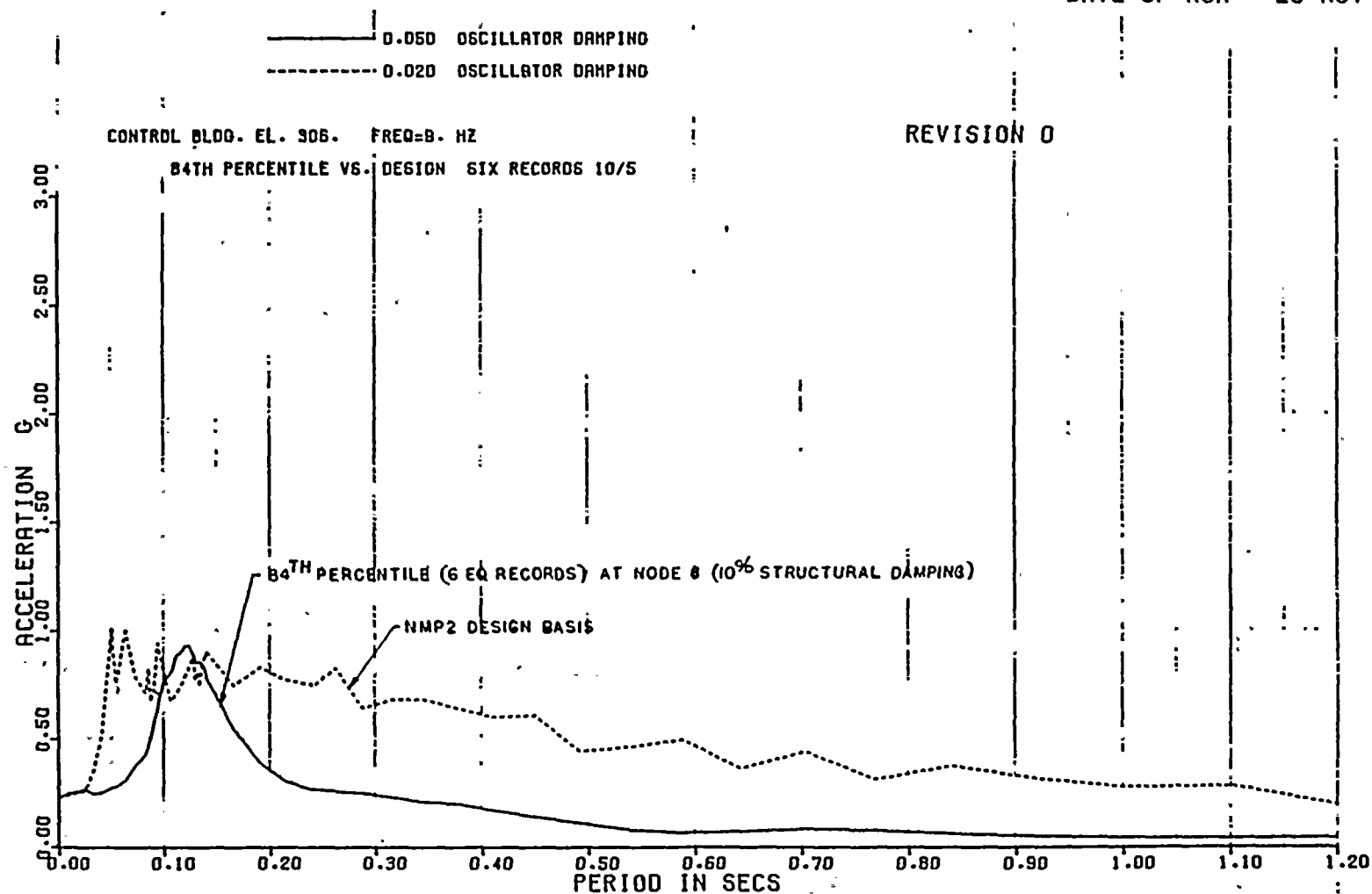


FIG 21

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