REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8501090299 DOC.DATE: 85/01/07 NOTARIZED: NO DOCKET #
FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
AUTH.NAME AUTHOR AFFILIATION
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. See ltr

DISTRIBUTION CODE: B001D COPIES RECEIVED:LTR 1 ENCL 10 SIZE: 31
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
	NRR/DL/ADL		1	0	NRR LB2 BC		1	0
	NRR LB2 LA		1	0	HAUGHEY,M	01	1	1
INTERNAL:	ACRS	41	6	6	ADM/LFMB		1	0
	ELD/HDS3		1	0	IE FILE		1	1
	IE/DEPER/EPB	36	1	1	IE/DQASIP/QAB	21	1	1
	NRR ROE,M.L		1	1	NRR/DE/AEAB		1	0
	NRR/DE/CEB	11	1	1	NRR/DE/EHEB		1	1
	NRR/DE/EQB	13	2	2	NRR/DE/GB	28	2	2
	NRR/DE/MEB	18	1	1	NRR/DE/MTEB	17	1	1
	NRR/DE/SAB	24	1	1	NRR/DE/SGEB	25	1	1
	NRR/DHFS/HFEB	40	1	1	NRR/DHFS/LQB	32	1	1
	NRR/DHFS/PSRB		1	1	NRR/DL/SSPB		1	0
	NRR/DSI/AEB	26	1	1	NRR/DSI/ASB		1	1
	NRR/DSI/CPB	10	1	1	NRR/DSI/CSB	09	1	1
	NRR/DSI/ICSB	16	1	1	NRR/DSI/METB	12	1	1
	NRR/DSI/PSB	19	1	1	NRR/DSI/RAB	22	1	1
	NRR/DSI/RSB	23	1	1	REG FILE	04	1	1
	RGN1		3	3	RM/DDAMI/MIB		1	0
EXTERNAL:	BNL(AMDTS ONLY)		1	1	DMB/DSS (AMDTS)		1	1
	FEMA-REP DIV	39	1	1	LPDR	03	1	1
	NRC PDR	02	1	1	NSIC	05	1	1
	NTIS		1	1	PNL GRUEL,R		1	1

Limited Dist. Encls. To:
Nilesh Chokshi - 2
M. Haughy - 4
Reg File - 1
PDR - 1
LPDR - 1
NSIC - 1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 53 ENCL 45

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

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. Mangan
Vice President
Nuclear Engineering & Licensing

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

Limited Dist
Bool 1/10

Encls To:
~~Nilesh Chokshi~~
Nilesh Chokshi - 2
M. Haughey - 4
Reg File - 1
PDR - 1
LPDR - 1
NSIC - 1

NINE MILE POINT UNIT 2

A REPORT

ON

VERTICAL FLOOR FLEXIBILITY

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.

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.

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

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.

TABLE 1

Earthquake	Date	Time	Recording Station	Magnitude
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

Records Used	Peak Acceleration(g)
Parkfield	.132
Lytle Creek	.060
Cape Mendocino	.039
Helena - Carrol College	.089
Helena - Federal Building	.032
Oroville Seismic Station	.115
Mean	.078

Records Not Available	Peak Acceleration*
Oroville Station 6	.0663
Oroville Station 8	.0392
Oroville Station 9	.0637
Friuli	.0198

* From uncorrected data

REFERENCES

1. USAEC Regulatory Guide 1.61, Damping Values for Seismic Design of Nuclear Power Plants, October 1973

2. Newmark, N. M. and Rosenblueth, E., Fundamentals of Earthquake Engineering, Englewood Cliffs, NJ, Prentice Hall, 1971

3. Stevenson, J. D., Structural Damping Values as a Function of Dynamic Response Stress and Deformation Levels, Paper K11/1, presented at the 5th International Conference on Structural Mechanics in Reactor Technology, Berlin; August 1979

4. ASME Paper No. 83-PVP-18, Seismic Evaluation of Electrical Raceway Systems, F. Elsabee, S. Anagnostis and W. Djordjevic

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

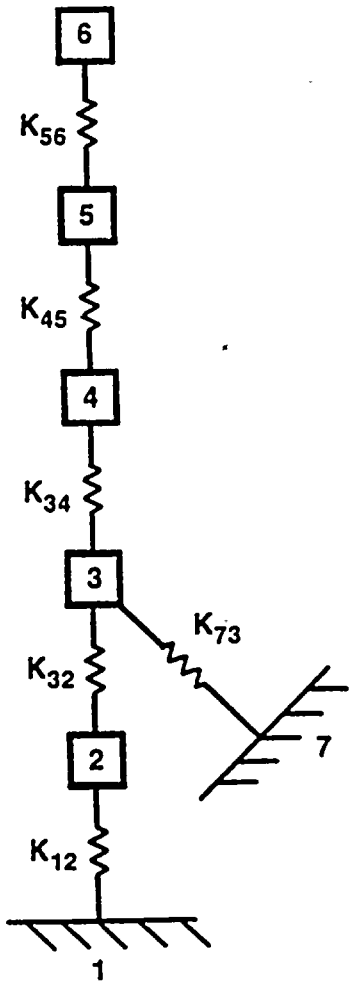
6. L. K. Severud, D. A. Barta and M. J. Anderson, Small Bore Piping Seismic Test Findings, ASME Pressure Vessel and Piping Conference June and July 1982, Vol. 67, Special Applications in Piping Dynamic Analysis, pp 29-41

7. Seismic Design Technology, Monthly Technical Progress Report - Materials and Structures, November 1982, Westinghouse Task DE-AT02-80CH94049

8. Cloud, R. L., Seismic Capability of Nuclear Piping, August 1979. Review Performed for Stone & Webster Engineering Corporation, Boston, MA

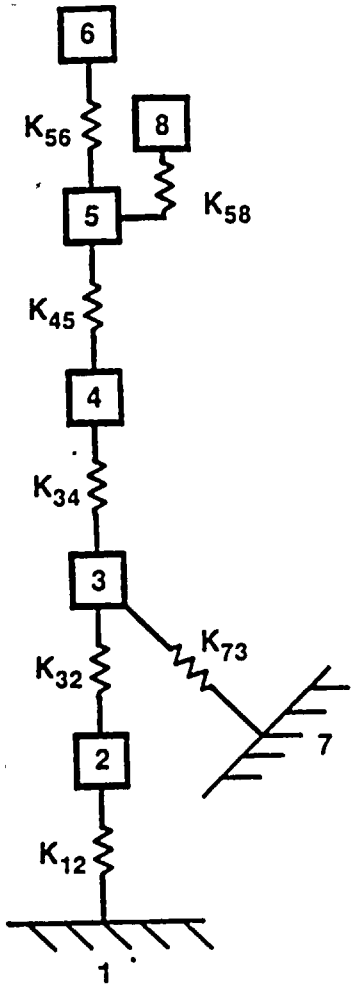
9. PB-241 314, A. J. Schiff, et al., Response of Power Systems to the San Fernando Valley Earthquake of February 9, 1971, Prepared for the National Science Foundation, January 1972

10. US NRC NUREG/CR-1161, Recommended Revisions to Nuclear Regulatory Commission - Seismic Design Criteria, Lawrence Livermore Laboratory, May 1980



PRESENT MODEL

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



MODIFIED MODEL

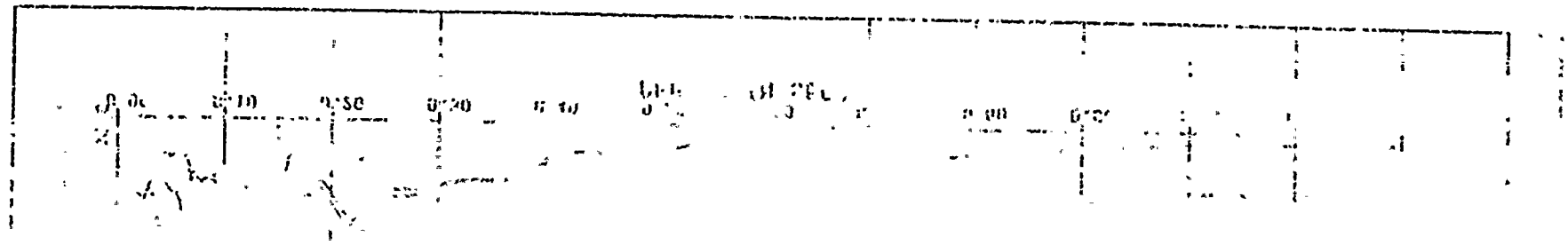
USED IN VERTICAL FLOOR
FLEXIBILITY STUDY

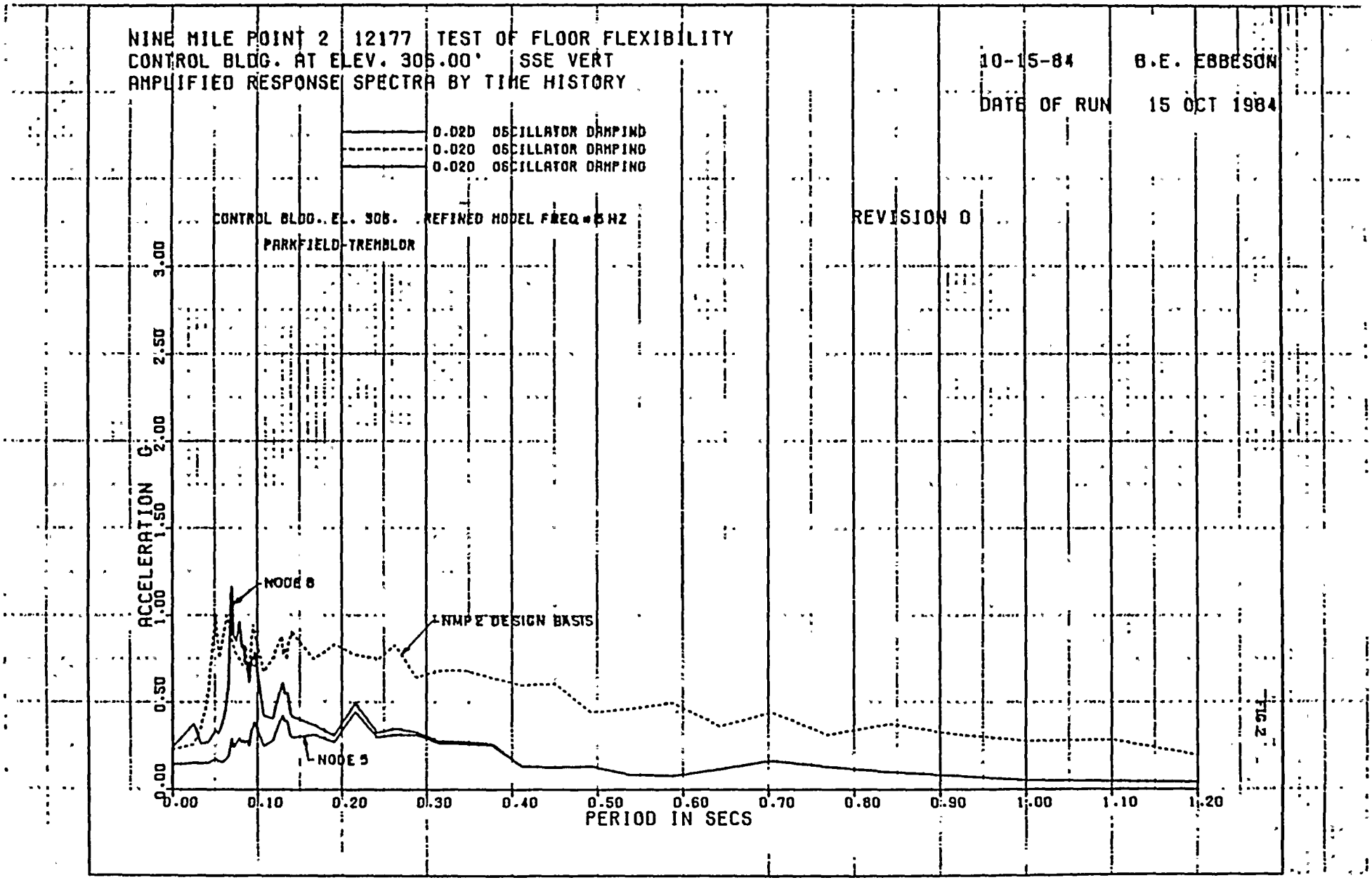
FIG. 1

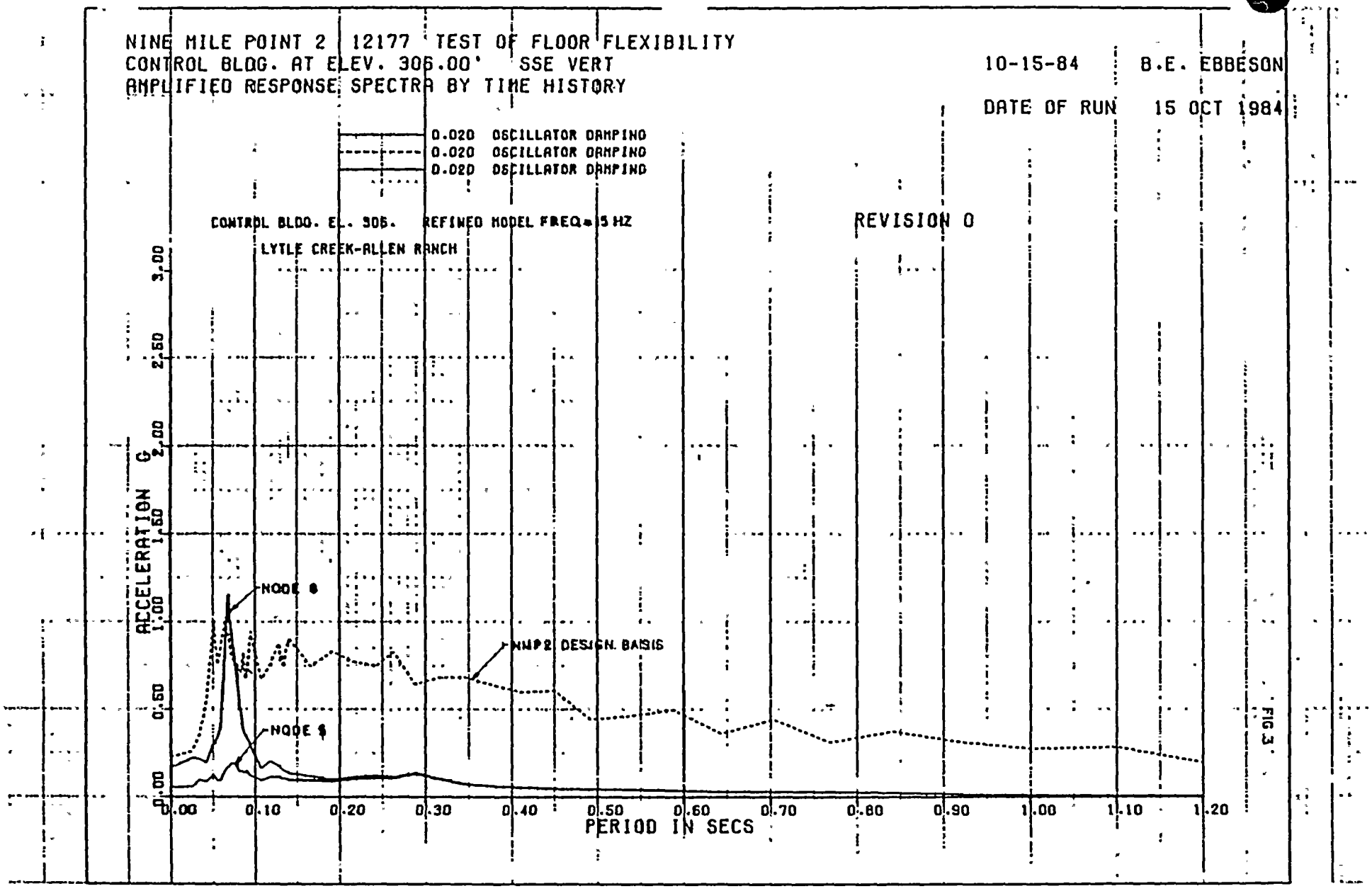
SEISMIC MODELS

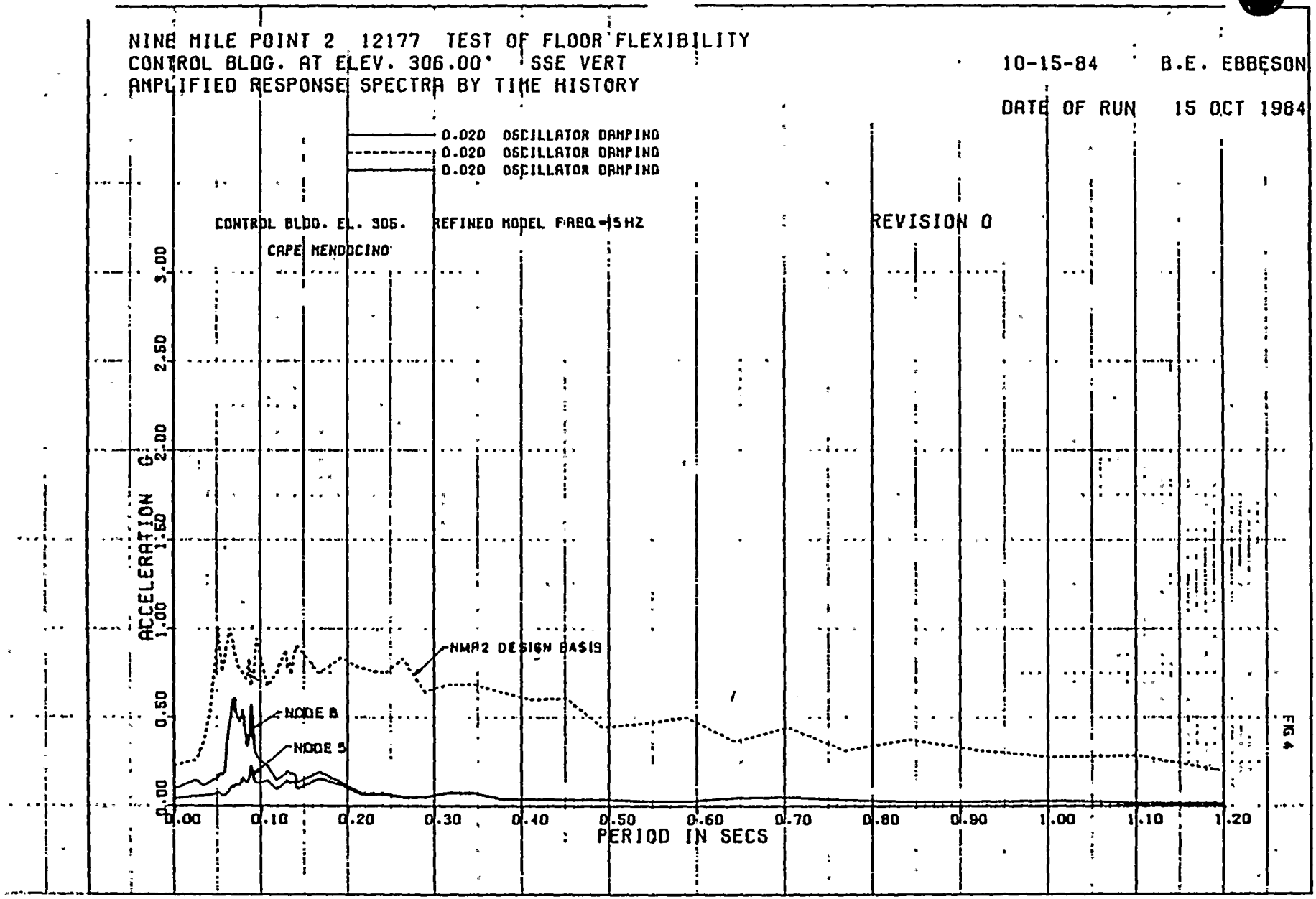
CONTROL BLDG EL 306

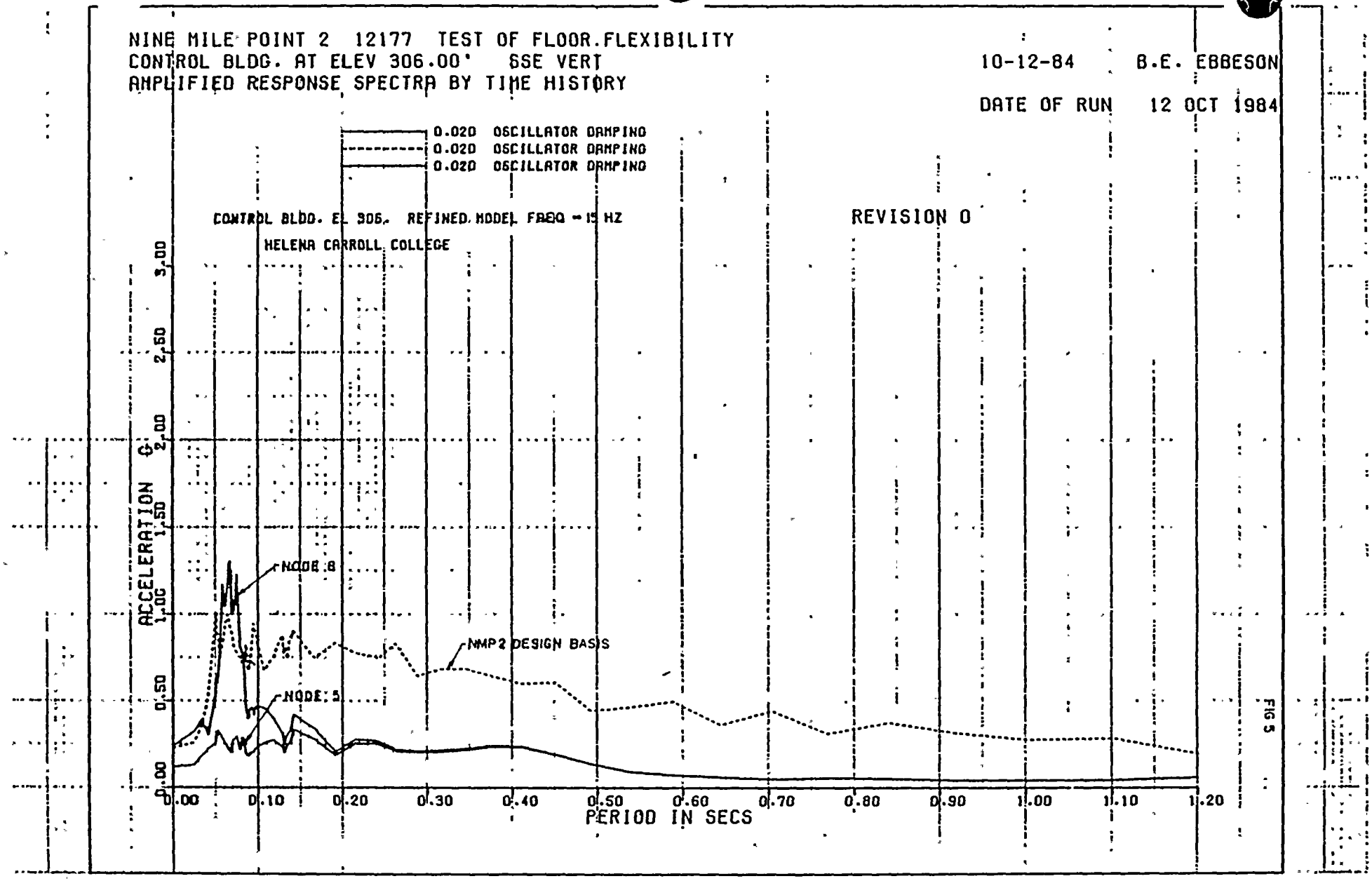
NMPC NMP2
J.O. NO. 12177 CH84-1658

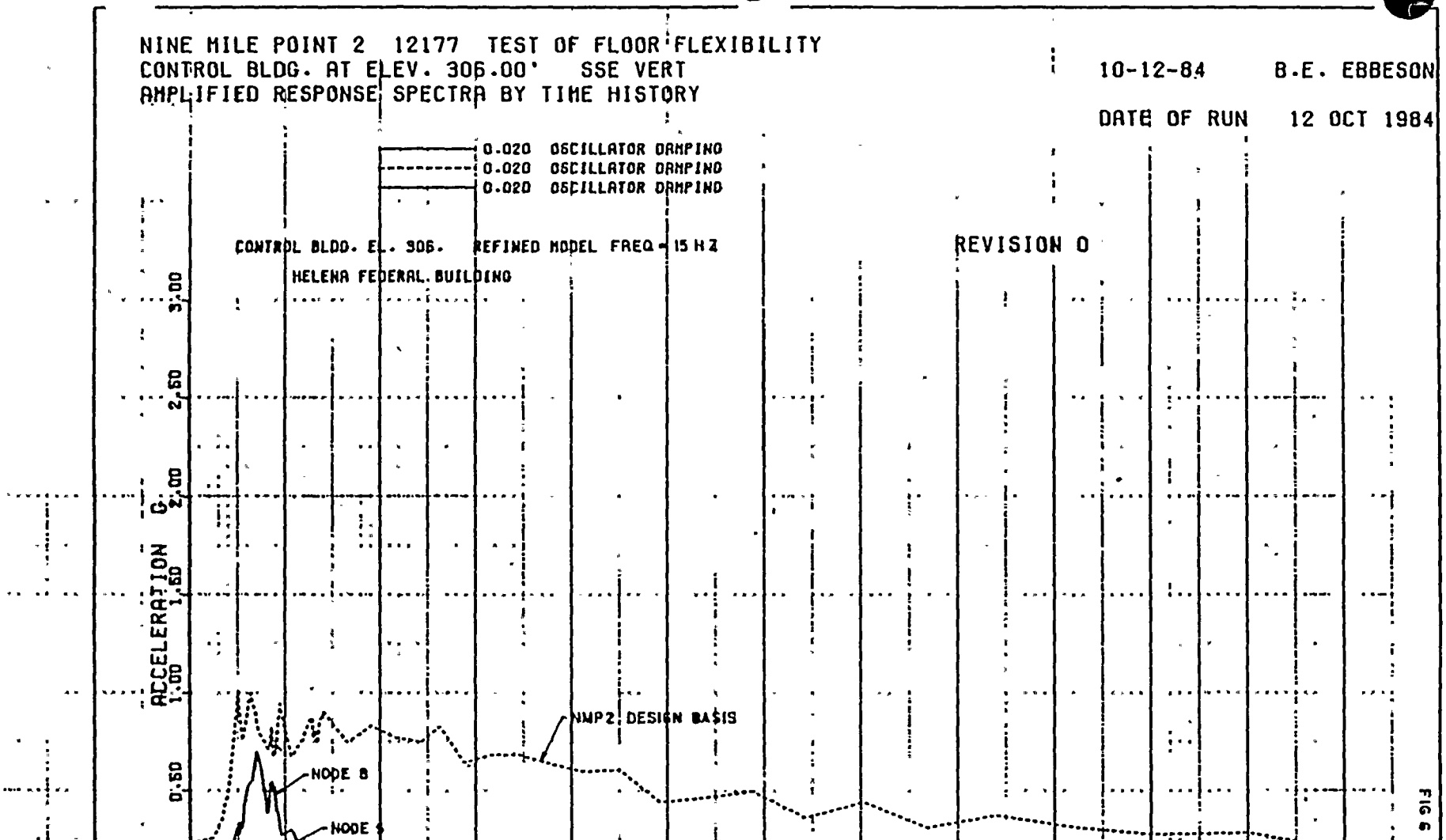


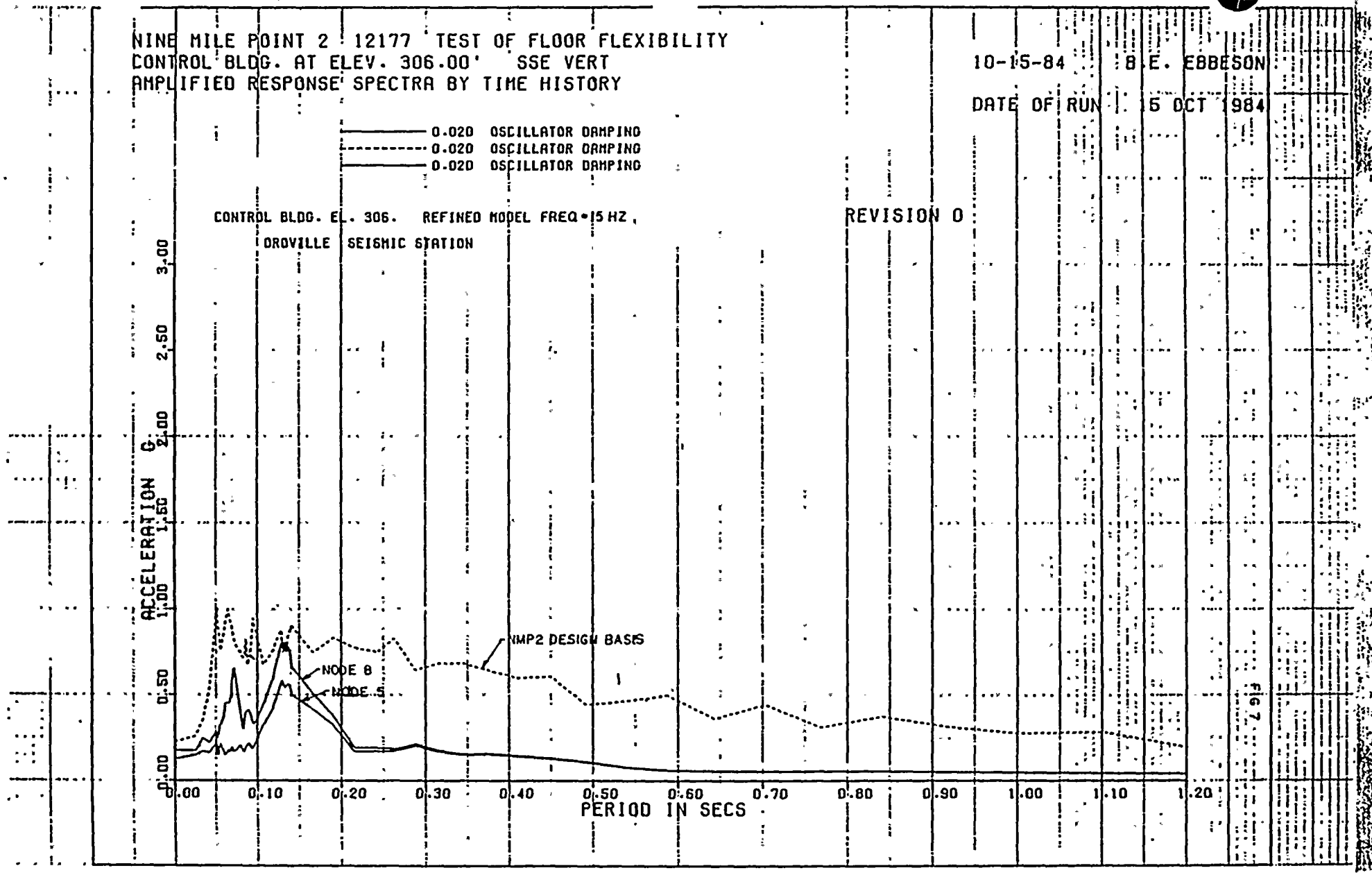

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.02D OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ = 5 HZ
REVISION 0
PARKFIELD-TREMBLOR
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
NODE 8
NMP2 DESIGN BASIS
NODE 5
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
PERIOD IN SECS
FIG 2

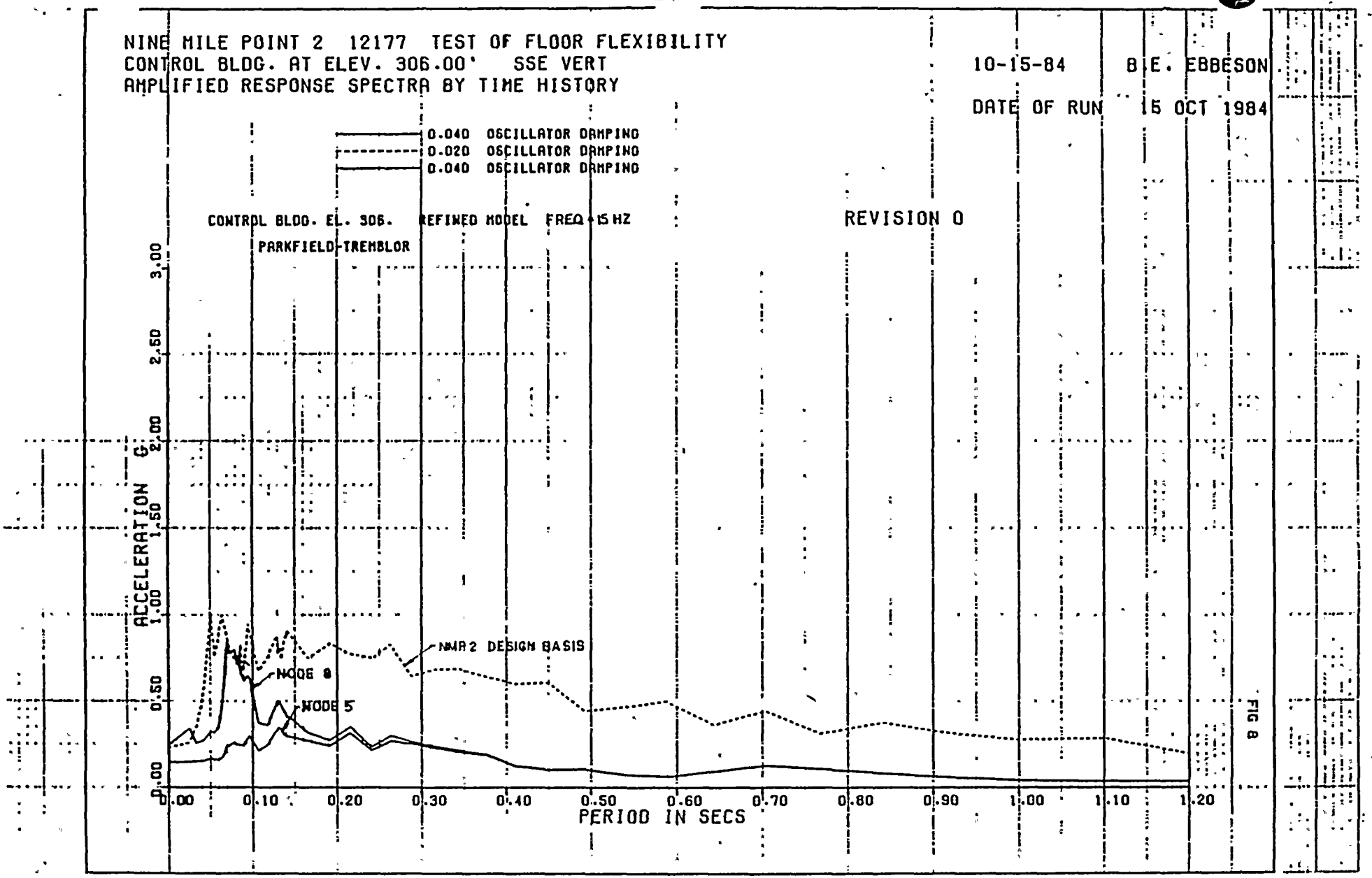

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ.= 5 HZ
REVISION 0
LYTLE CREEK-ALLEN RANCH
ACCELERATION G
3.00
2.50
2.00
1.60
1.00
0.50
0.00
NODE 8
NMP2 DESIGN BASIS
NODE 9
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
PERIOD IN SECS
FIG 3

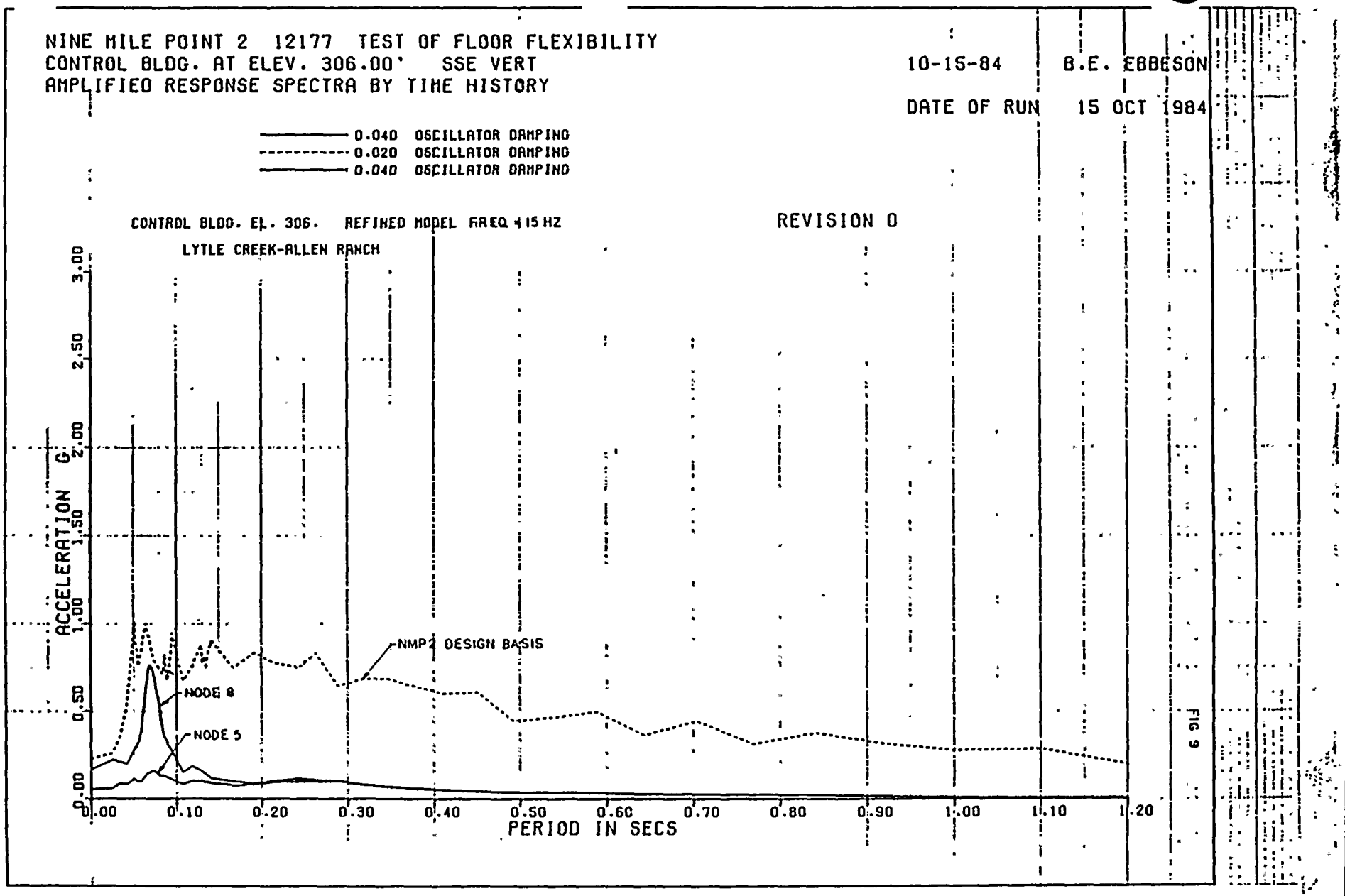

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ-15HZ
CAPE MENDOCINO
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 4

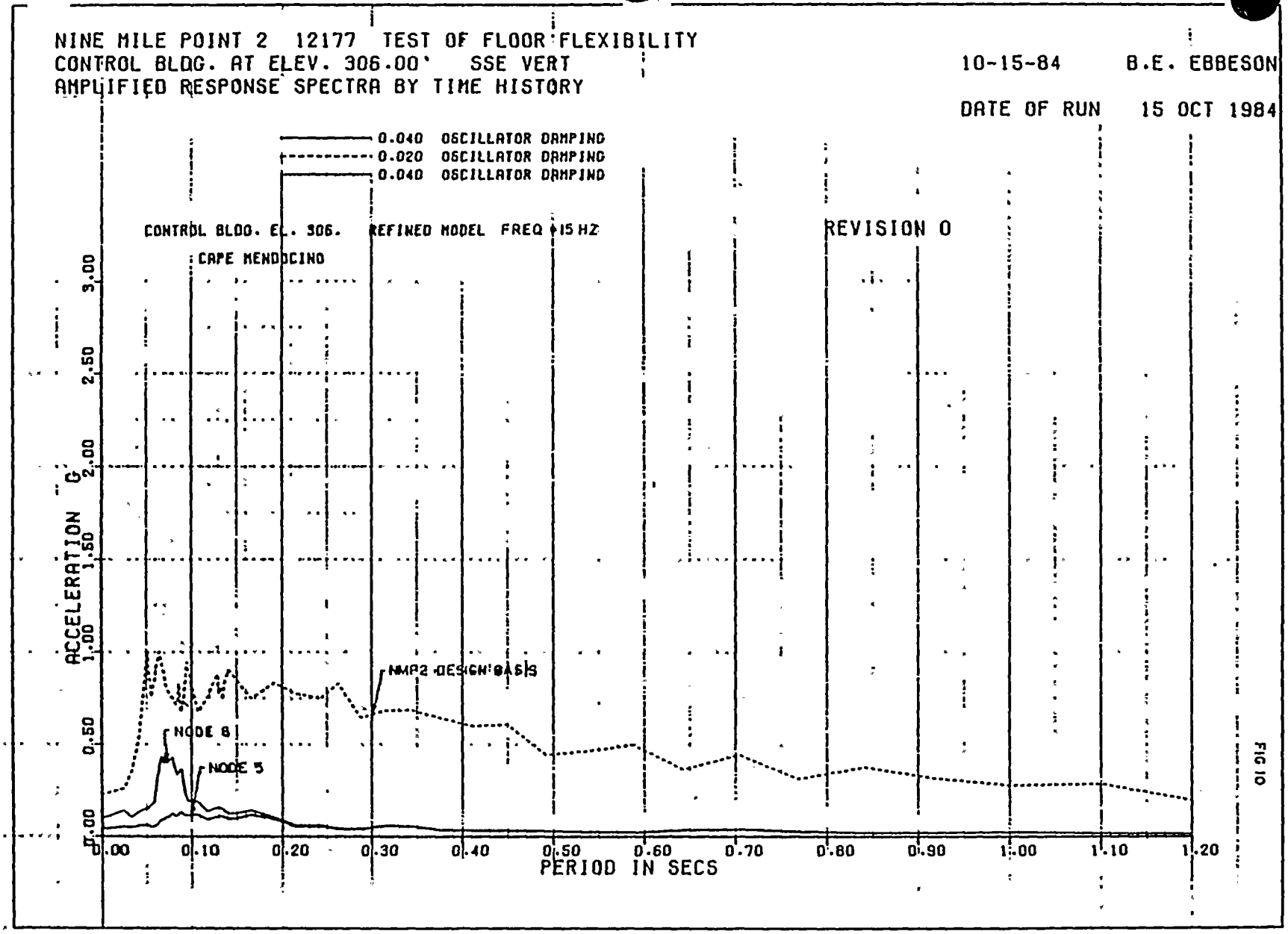

NINE MILE POINT 2 12177 TEST OF FLOOR.FLEXIBILITY
CONTROL BLDG. AT ELEV 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-12-84 B.E. EBBESON
DATE OF RUN 12 OCT 1984
0.02D OSCILLATOR DAMPING
0.02D OSCILLATOR DAMPING
0.02D OSCILLATOR DAMPING
CONTROL BLDG. EL 306. REFINED MODEL FREQ = 15 HZ
HELENA CARROLL COLLEGE
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NODE 8
NMP2 DESIGN BASIS
NODE 5
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
PERIOD IN SECS
FIG 5

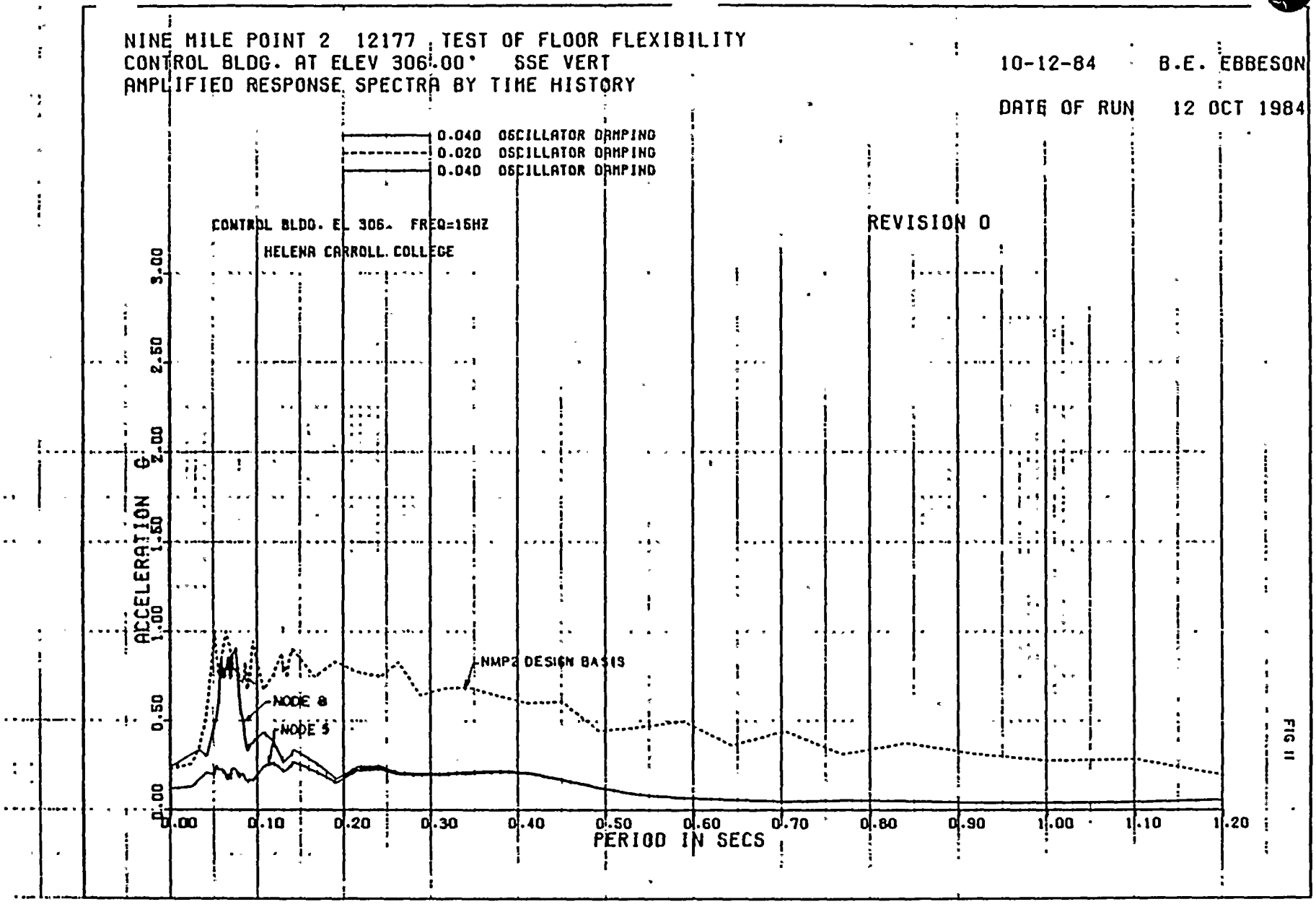

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-12-84 B.E. EBBESON
DATE OF RUN 12 OCT 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ = 15 HZ
HELENA FEDERAL BUILDING
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 5

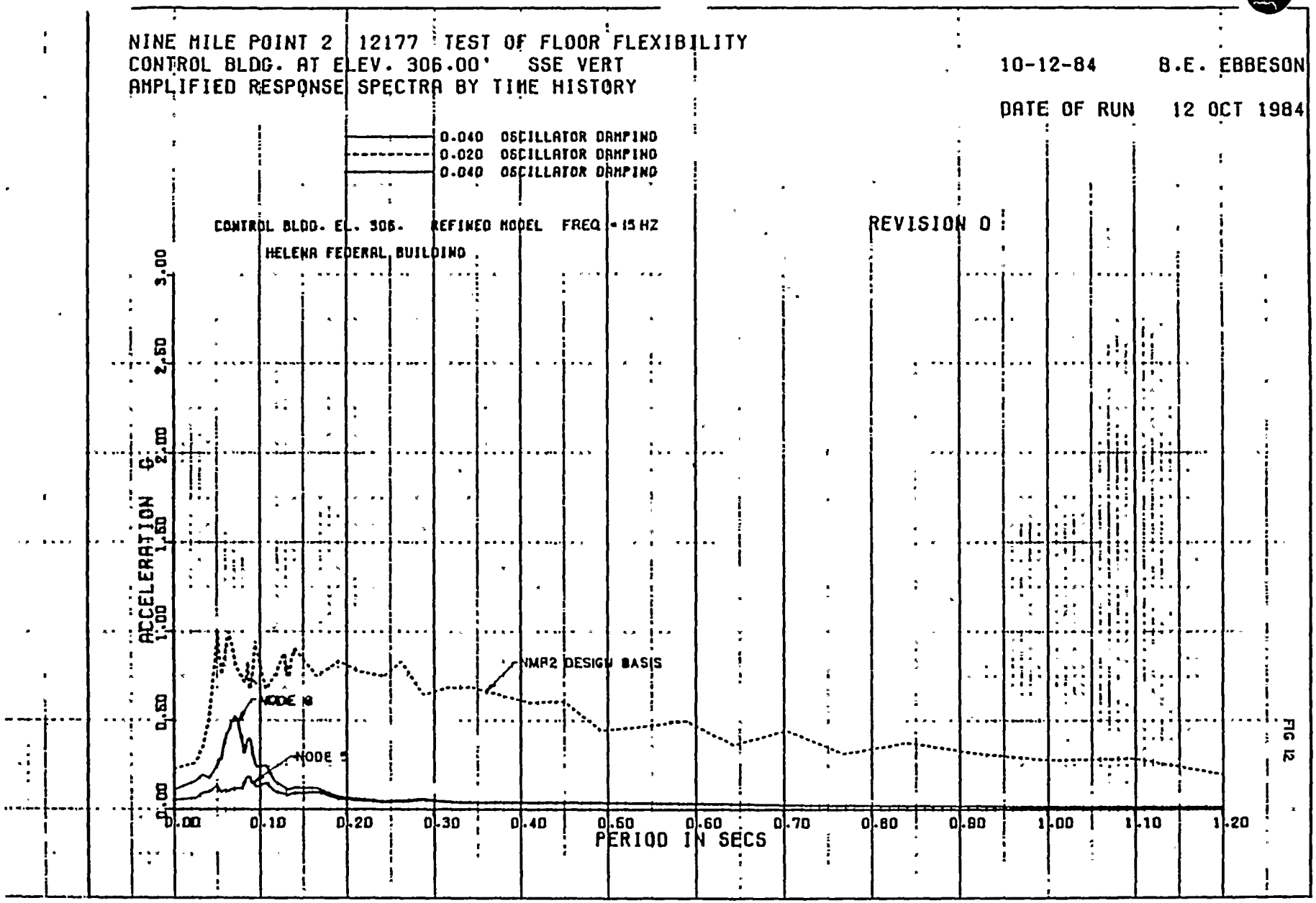

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ=15 HZ.
OROVILLE SEISMIC STATION
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS

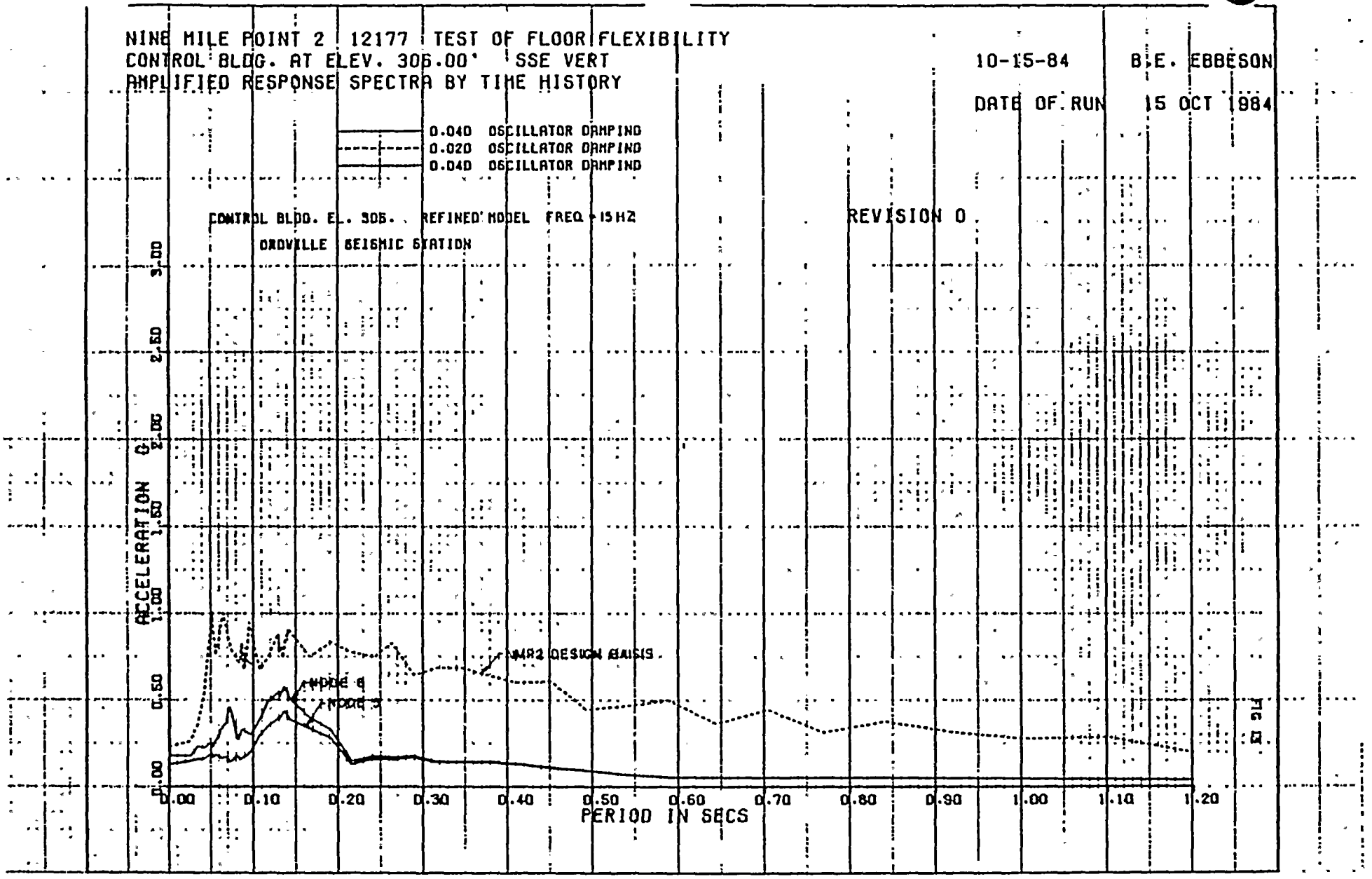

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.040 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.040 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ=15 HZ
PARKFIELD-TREMBLOR
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 8

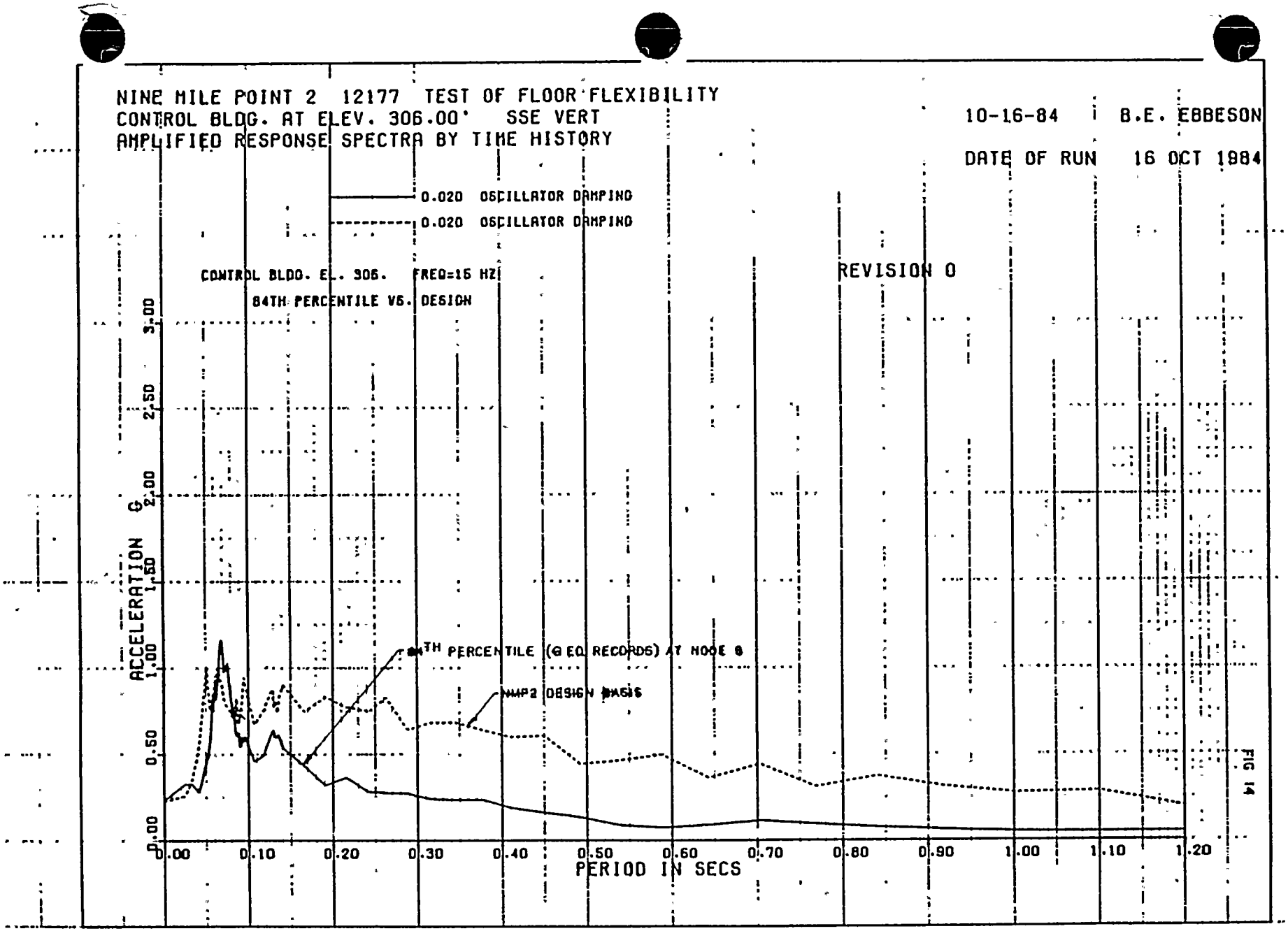

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.040 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.040 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ 4.15 HZ
LYTLE CREEK-ALLEN RANCH
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 9

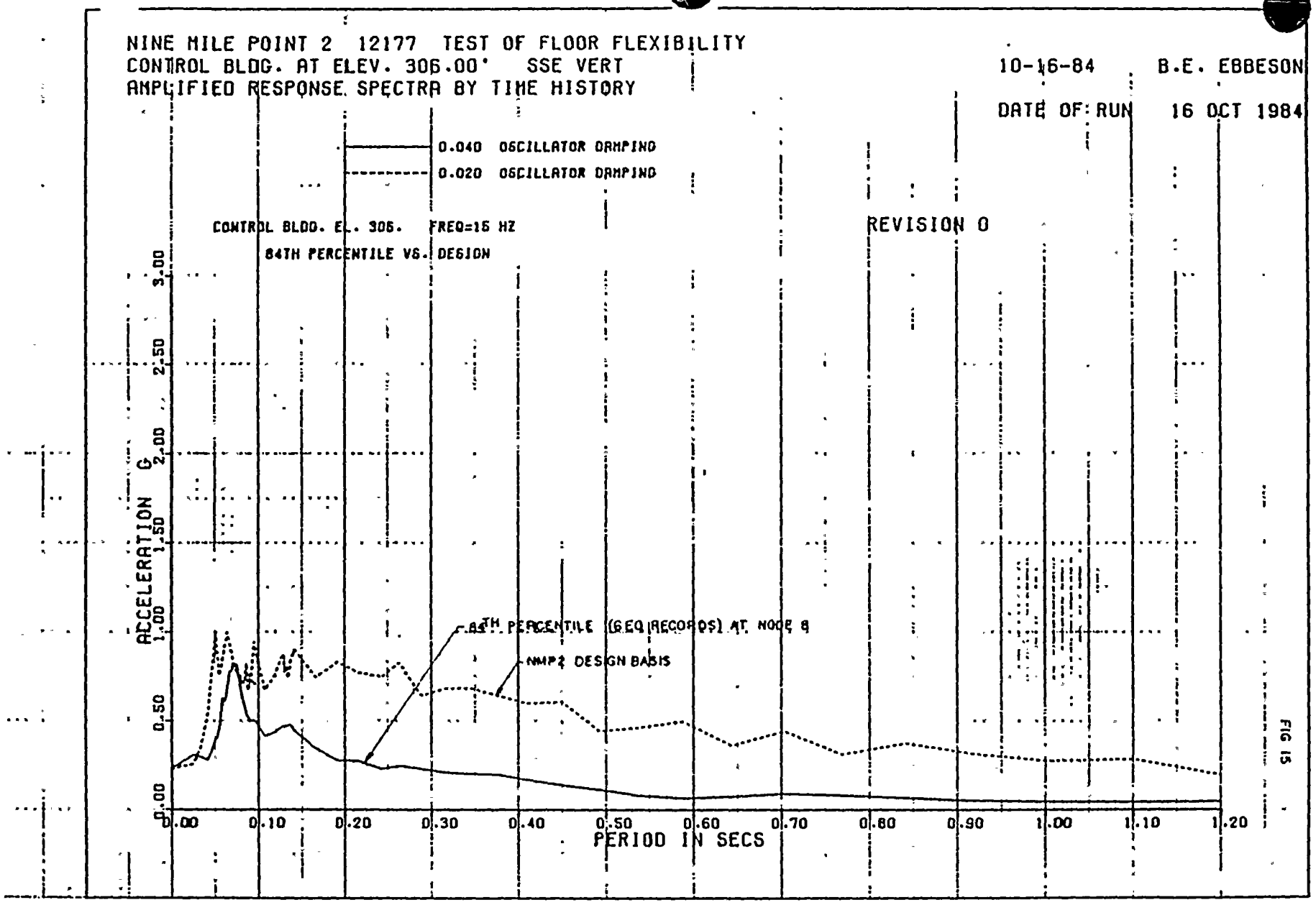

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-15-84 B.E. EBBESON
DATE OF RUN 15 OCT 1984
0.040 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
0.040 OSCILLATOR DAMPIND
CONTROL BLDG. EL. 306. REFINED MODEL FREQ 15 HZ
REVISION 0
CAPE MENDOCINO
ACCELERATION "G"
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 10

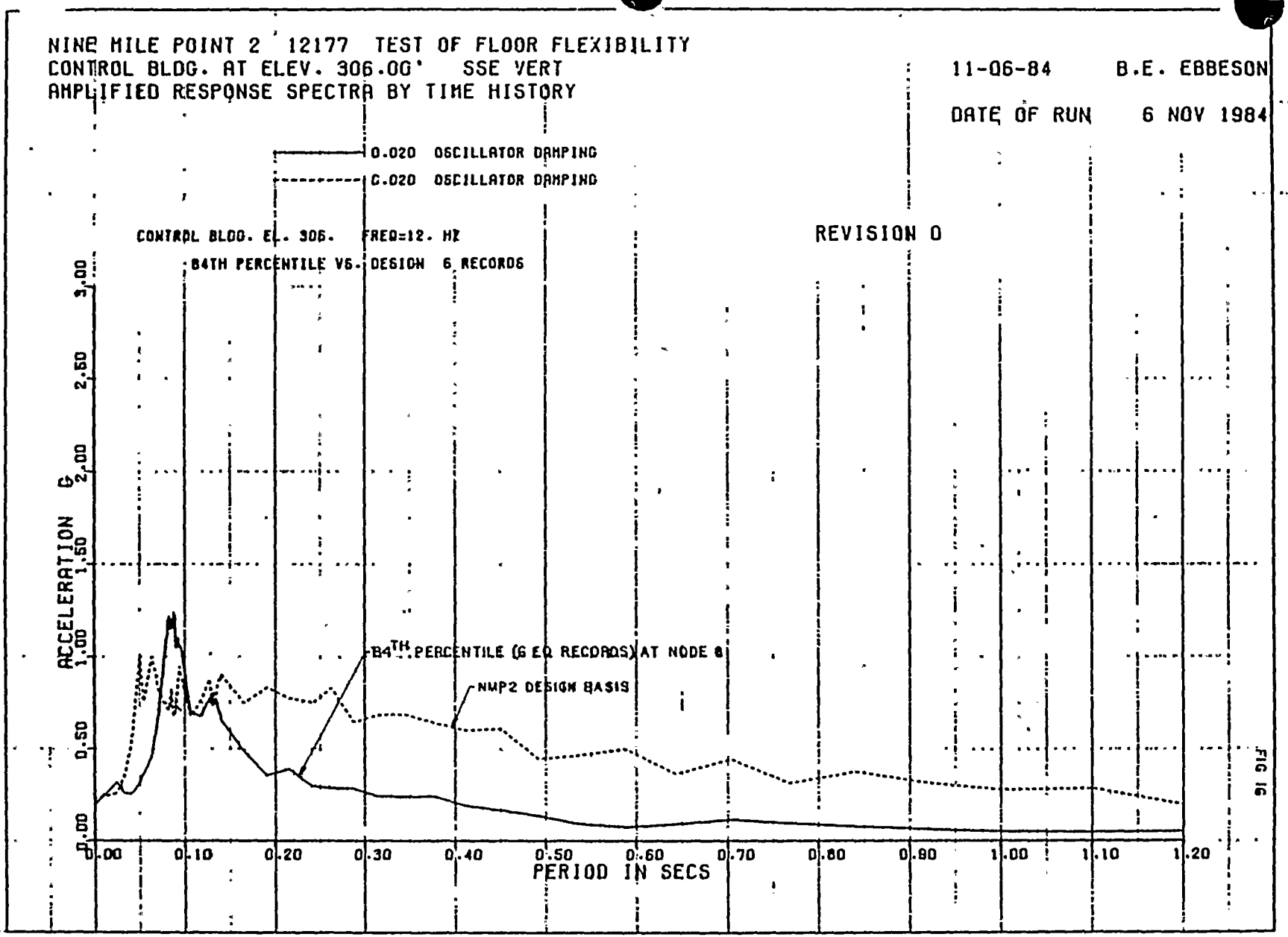

NINE MILE POINT 2 12177 , TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-12-84 B.E. EBBESON
DATE OF RUN 12 OCT 1984
0.04D OSCILLATOR DAMPING
0.02D OSCILLATOR DAMPING
0.04D OSCILLATOR DAMPIND
CONTROL BLDG. EL 306. FREQ=16HZ
HELENA CARROLL COLLEGE
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 8
NODE 5
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
PERIOD IN SECS
FIG 11


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
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
NMP2 DESIGN BASIS
NODE 18
NODE 5
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
PERIOD IN SECS
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
0.04D OSCILLATOR DAMPING
0.02D OSCILLATOR DAMPING
0.04D OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. REFINED MODEL FREQ 15HZ
REVISION 0
ORDVILLE SEISMIC STATION
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
MODE 6
MODE 3
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 13


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
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
84TH PERCENTILE (6 EQ RECORDS) AT NODE 6
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 14

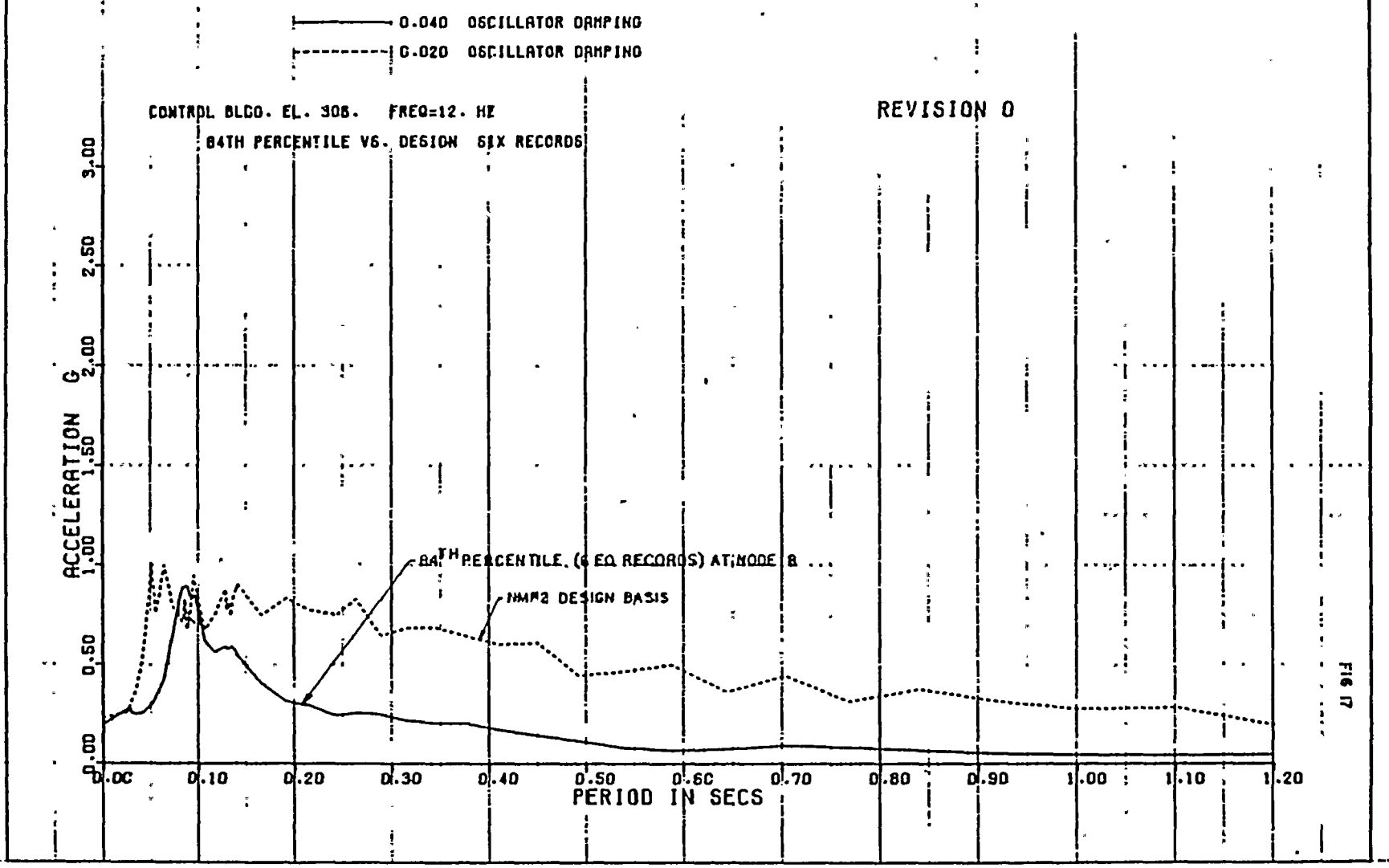

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
10-16-84 B.E. EBBESON
DATE OF RUN 16 OCT 1984
0.040 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. FREQ=15 HZ
84TH PERCENTILE VS. DESIGN
REVISION 0
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
84TH PERCENTILE (6 EQ RECORDS) AT NODE 8
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 15

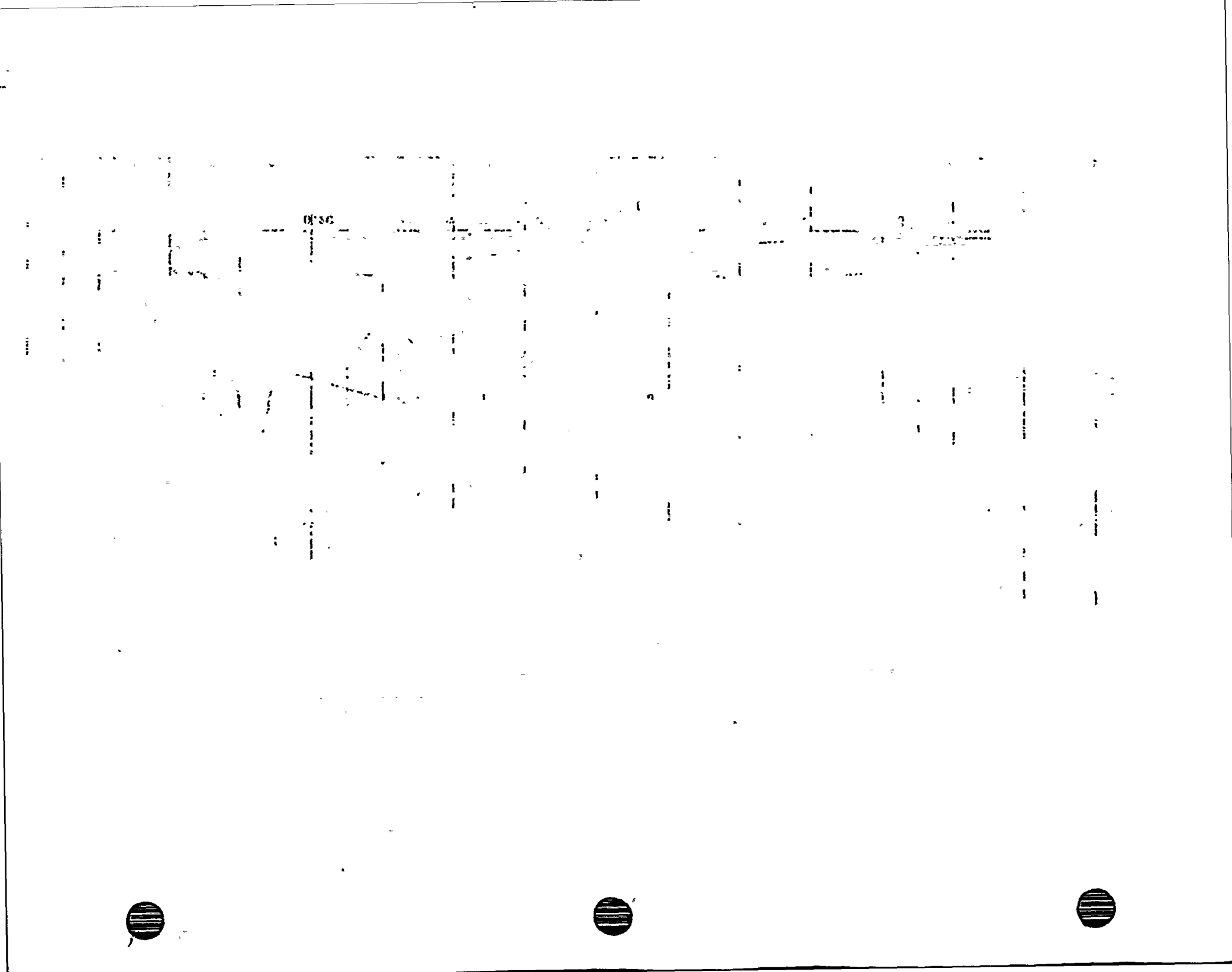

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
11-06-84 B.E. EBBESON
DATE OF RUN 6 NOV 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. FREQ=12. HZ
84TH PERCENTILE VS. DESIGN 6 RECORDS
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
84TH PERCENTILE (6 EQ RECORDS) AT NODE 6
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 16

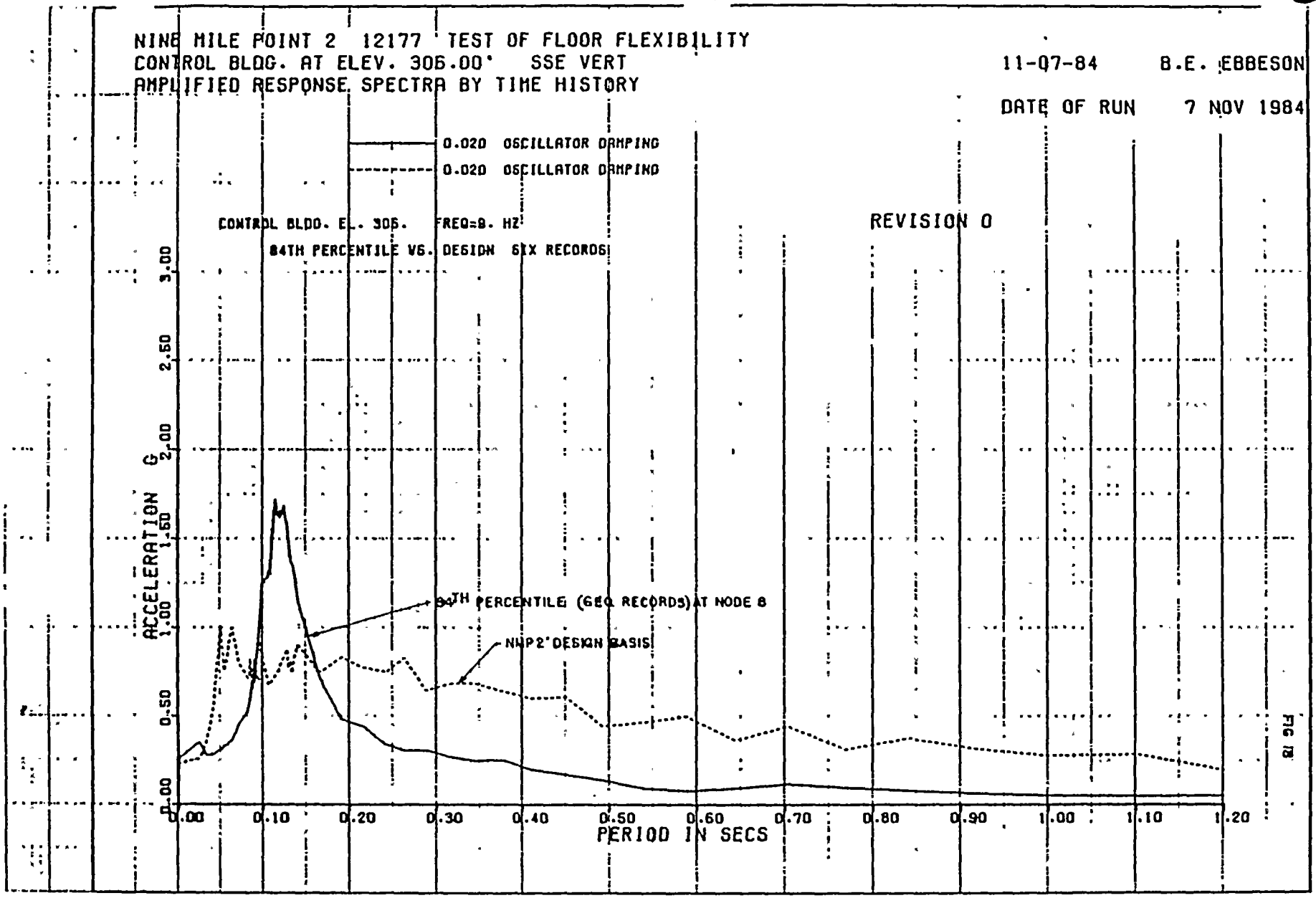
NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY

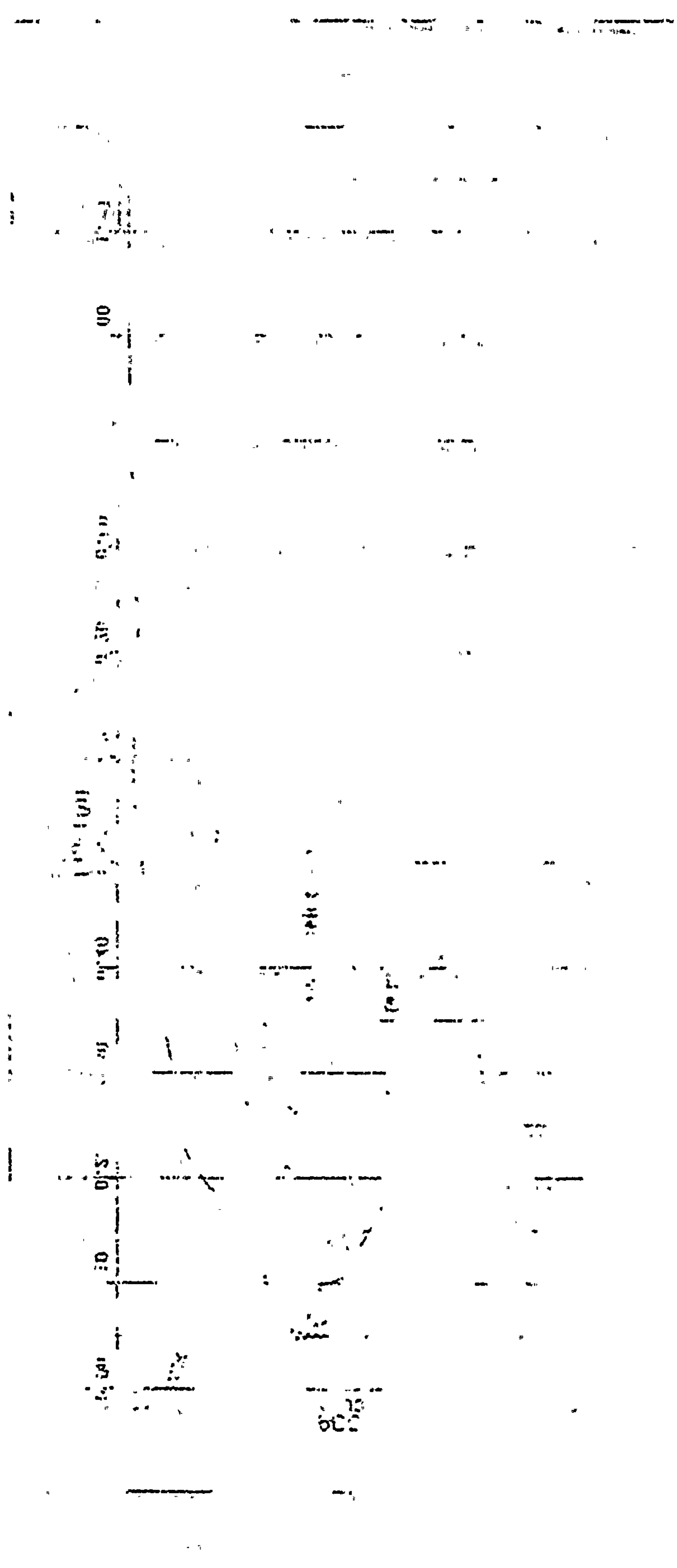
11-06-84 B.E. EBBESON

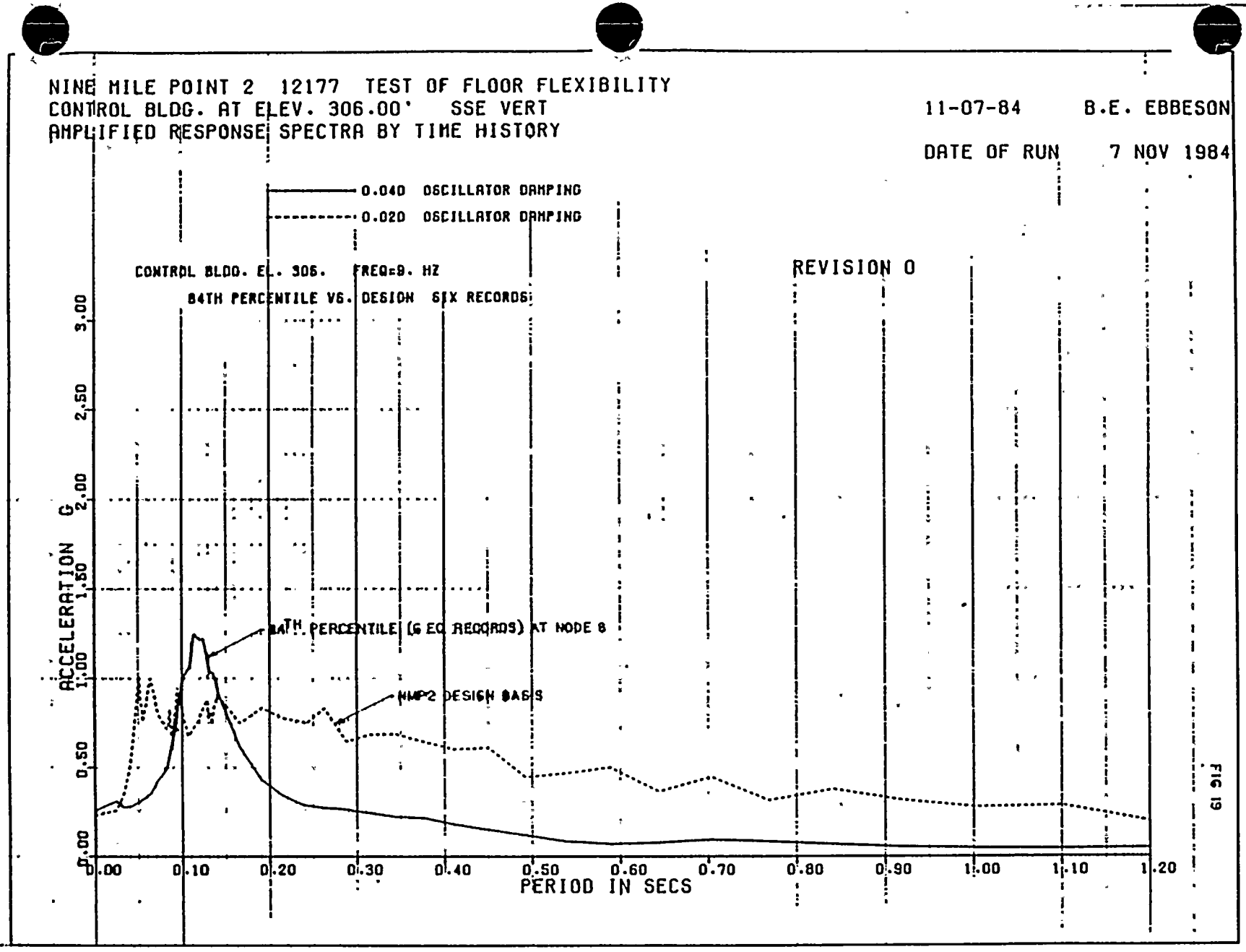
DATE OF RUN 6 NOV 1984

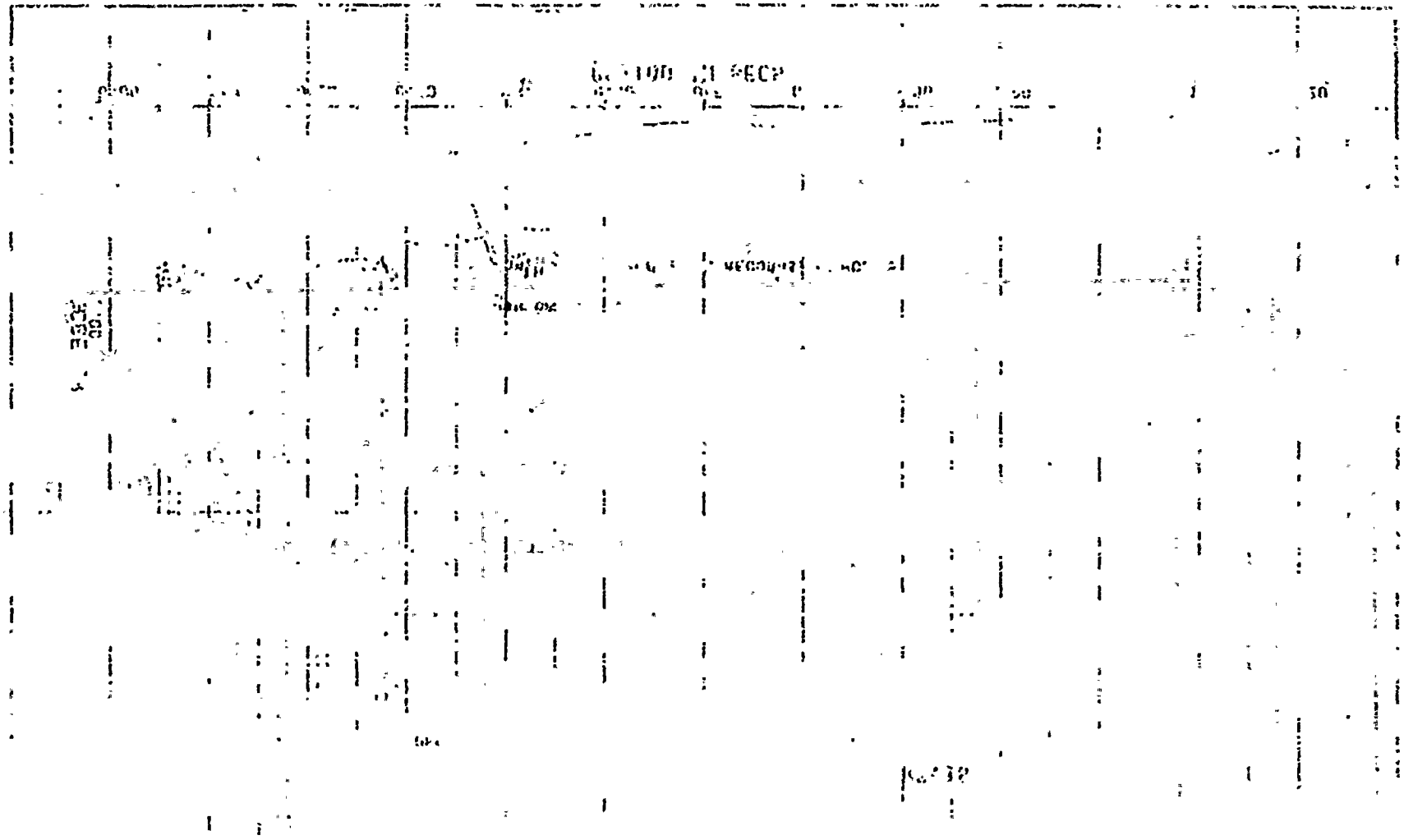


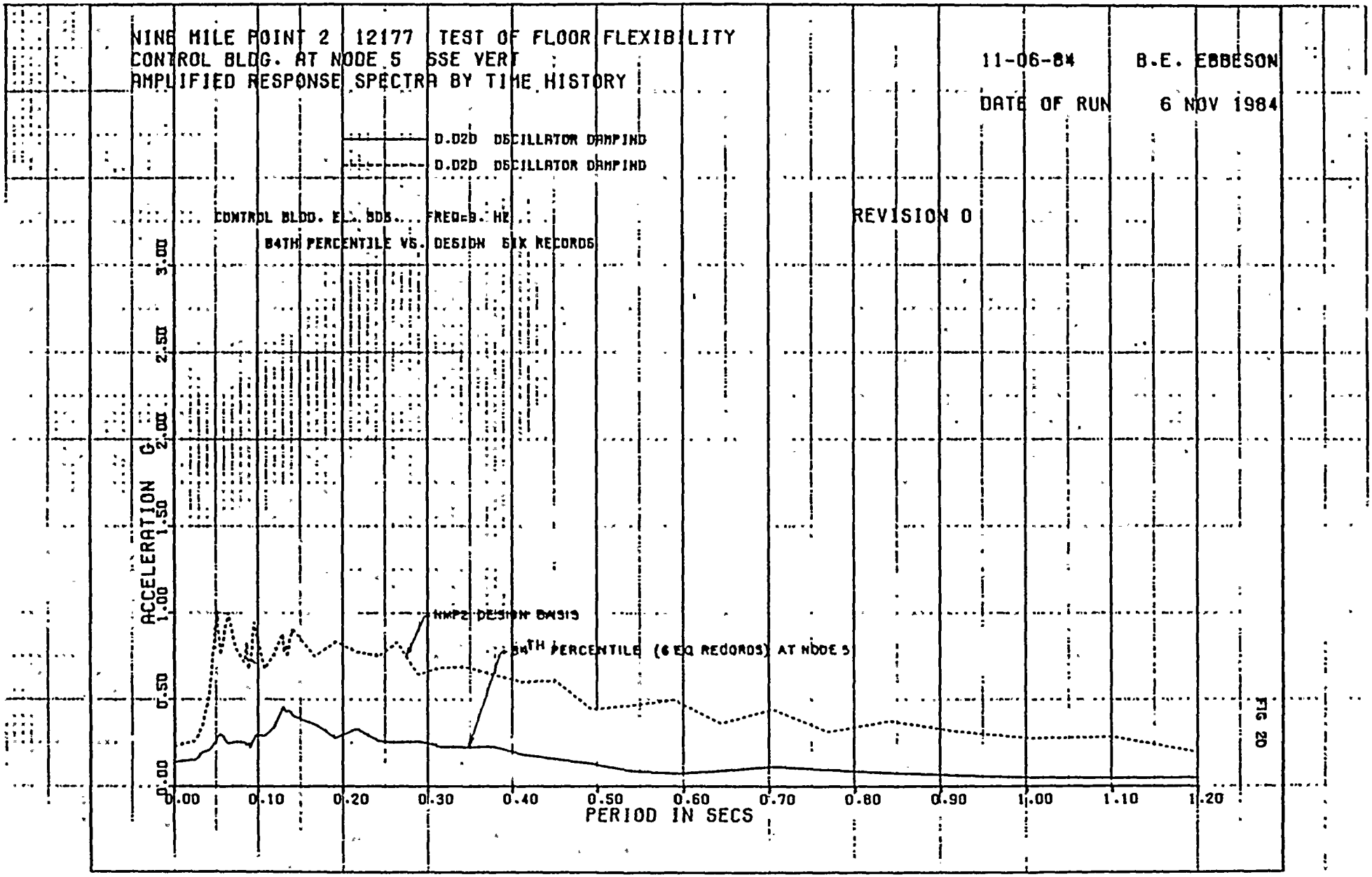


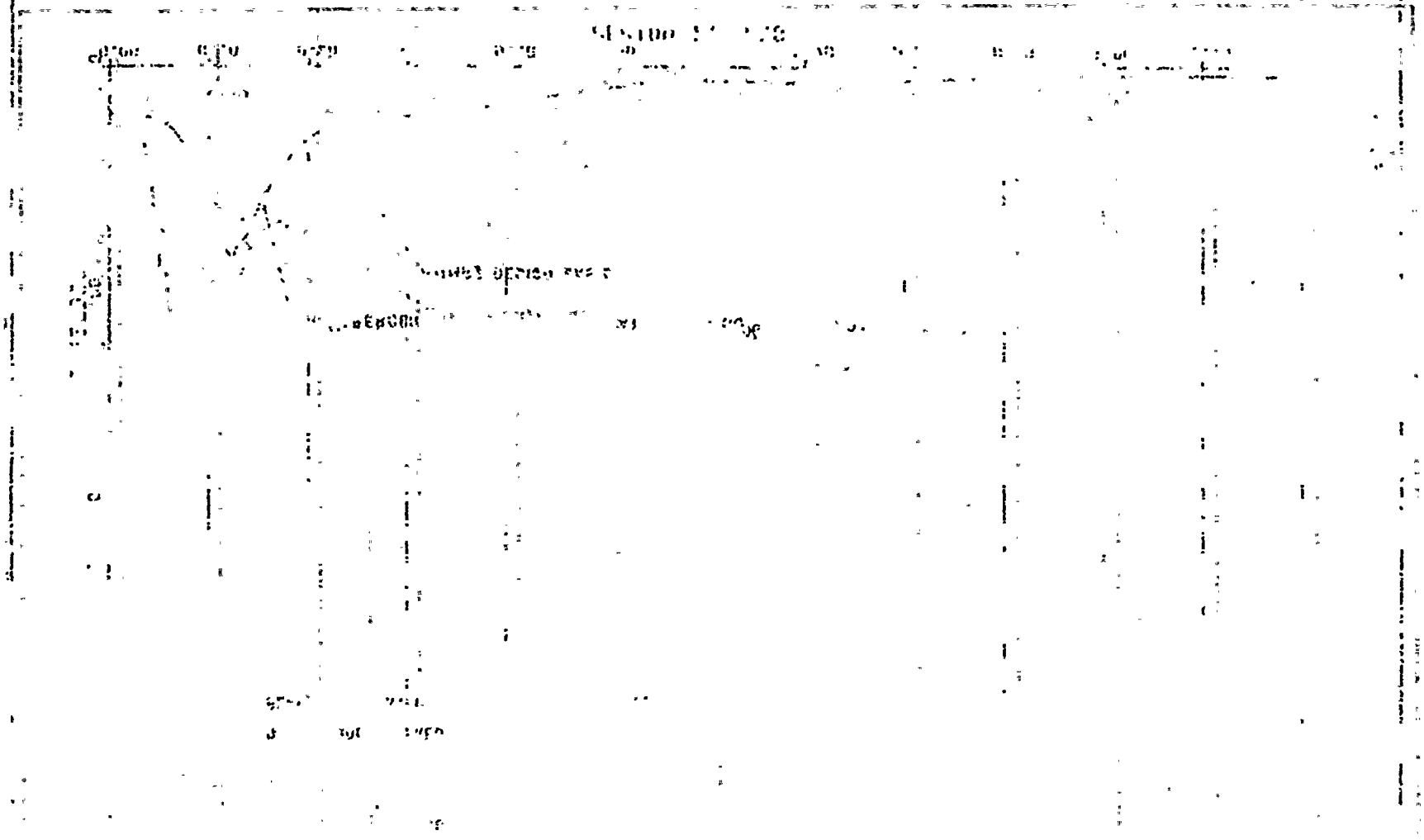

NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
11-07-84 B.E. EBBESON
DATE OF RUN 7 NOV 1984
0.020 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. FREQ=8. HZ
84TH PERCENTILE VS. DESIGN SIX RECORDS
REVISION 0
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
84TH PERCENTILE (GEQ RECORDS) AT NODE 8
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 18

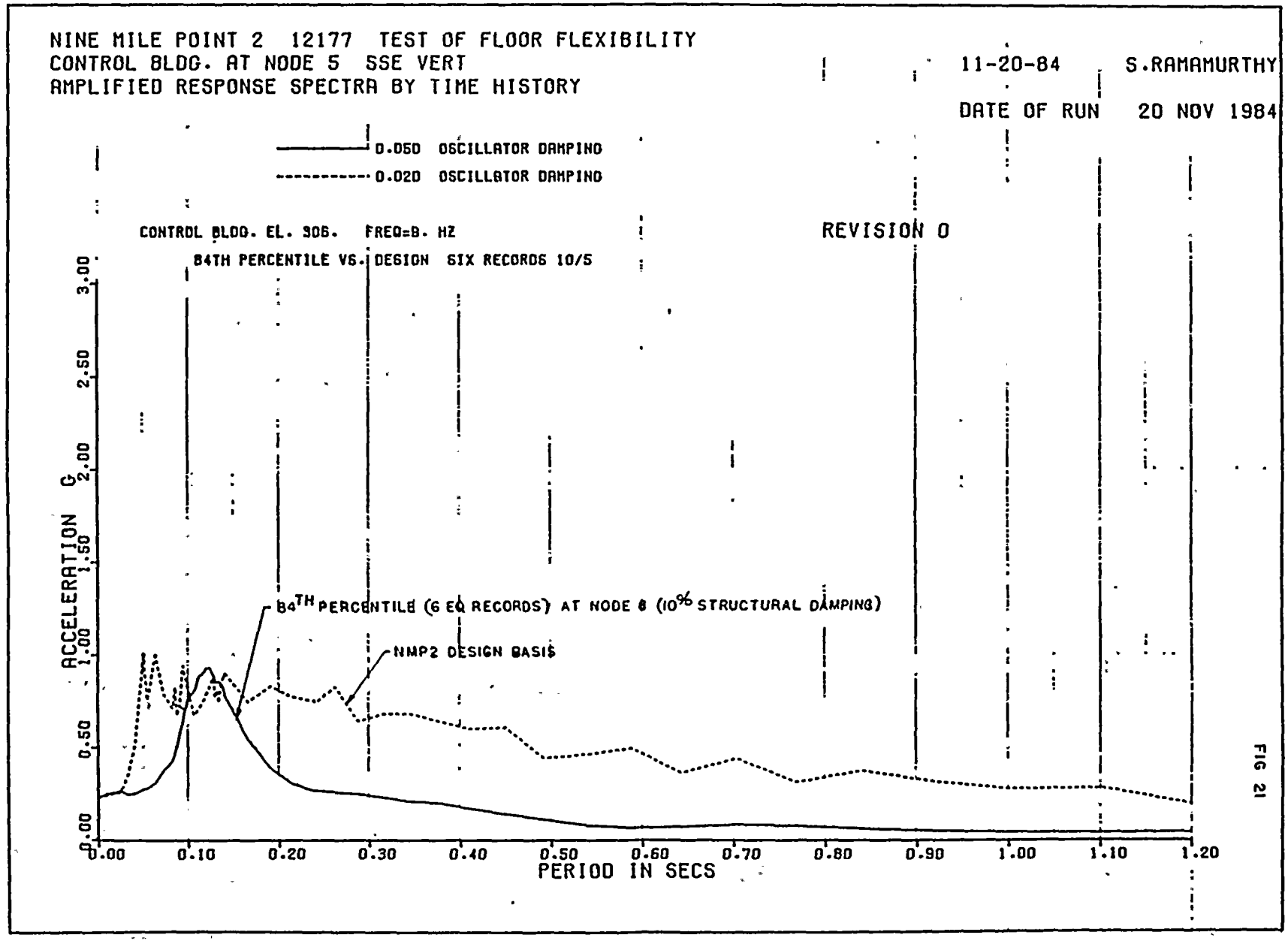



NINE MILE POINT 2 12177 TEST OF FLOOR FLEXIBILITY
CONTROL BLDG. AT ELEV. 306.00' SSE VERT
AMPLIFIED RESPONSE SPECTRA BY TIME HISTORY
11-07-84 B.E. EBBESON
DATE OF RUN 7 NOV 1984
0.040 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. FREQ=9. HZ
84TH PERCENTILE VS. DESIGN SIX RECORDS
REVISION 0
84TH PERCENTILE (6 EQ RECORDS) AT NODE 8
NMP2 DESIGN BASIS
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
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
PERIOD IN SECS
FIG 19




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. 885... FREQ=8. HZ
84TH PERCENTILE VS. DESIGN SIX RECORDS
REVISION 0
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
NMP2 DESIGN BASIS
84TH PERCENTILE (6 EQ RECORDS) AT NODE 5
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
PERIOD IN SECS
FIG 20




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
0.050 OSCILLATOR DAMPING
0.020 OSCILLATOR DAMPING
CONTROL BLDG. EL. 306. FREQ=8. HZ
84TH PERCENTILE VS. DESIGN SIX RECORDS 10/5
REVISION 0
ACCELERATION G
3.00
2.50
2.00
1.50
1.00
0.50
0.00
84TH PERCENTILE (6 EQ RECORDS) AT NODE 8 (10% STRUCTURAL DAMPING)
NMP2 DESIGN BASIS
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
PERIOD IN SECS
FIG 21