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March 3, 1986
PY-CEI/NRR-0440L

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Seismic Event Evaluation Report
Supplemental Information

Dear Mr. Denton:

This letter and its attachments further supplements the information provided in letters dated February 12 and 28, 1986 (PY-CEI/NRR-0437L and PY-CEI/NRR-0438L) related to our Seismic Event Evaluation. The proposed relocation of the reactor building platform seismic instrument, previously discussed in Attachment 4 to our February 28, 1986 letter, will be completely installed and recalibrated prior to exceeding 5% rated thermal power. Attachment A includes a discussion of the results of an in-situ test to estimate the natural frequency of the mounting arrangement for the seismic monitoring instrumentation D51-N101.

Attachment B to this letter documents the completed stress comparisons for structures and provides a further discussion of our commitments related to equipment seismic qualification evaluations, and future generic evaluations to demonstrate the plant's capability to accommodate the low energy content, short duration, high frequency earthquake.

Attachments C and D provide a report on the strong motion data from the earthquake aftershocks and information related to local injection well activity. These are information submittals consistent with our commitment to keep the staff informed on an ongoing basis as to the results of our program of seismological and geological studies. Finally, Attachment E provides a discussion of the enhancement of our procedures related to earthquakes based on the experience gained during the January 31, 1986 event.

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This information is being provided to resolve staff concerns and document our commitments for future confirmatory activities to support issuance of a supplemental safety evaluation report. Should you have any questions related to this information, please let me know.

Very truly yours,

Murray R. Edelman
Vice President
Nuclear Group

MRE:njc

cc: Jay Silberg, Esq.
John Stefano (2)
J. Grobe

ATTACHMENT A

NATURAL FREQUENCY OF SEISMIC INSTRUMENTATION MOUNTING ARRANGEMENT

Purpose:

A test was conducted to estimate the natural frequency of the support plate assembly for D51-N101 accelerometer system and further determine if it could have been a contribution to the resultant spectra obtained during the seismic event. This would include any frequencies associated with the bolting arrangement attaching the plate to reactor building.

Test Method/Results

In a simple test by utilizing existing test/calibration equipment, it is possible to approximate the natural frequency of the support plate for D51-N101. This would be done by inducing a known test signal/frequency with a standard calibration "test box" and compare those results to recordings created by physically striking the support plate and causing it to attenuate its natural frequency.

A test box and strip chart recorder were connected to installed accelerometer D51-N101 to simulate a known frequency and obtain a response spectra "baseline" test pattern. A 50 hz signal was simulated (approximate upper limit of response spectra system) and a trace from the recorder was obtained for comparison purposes.

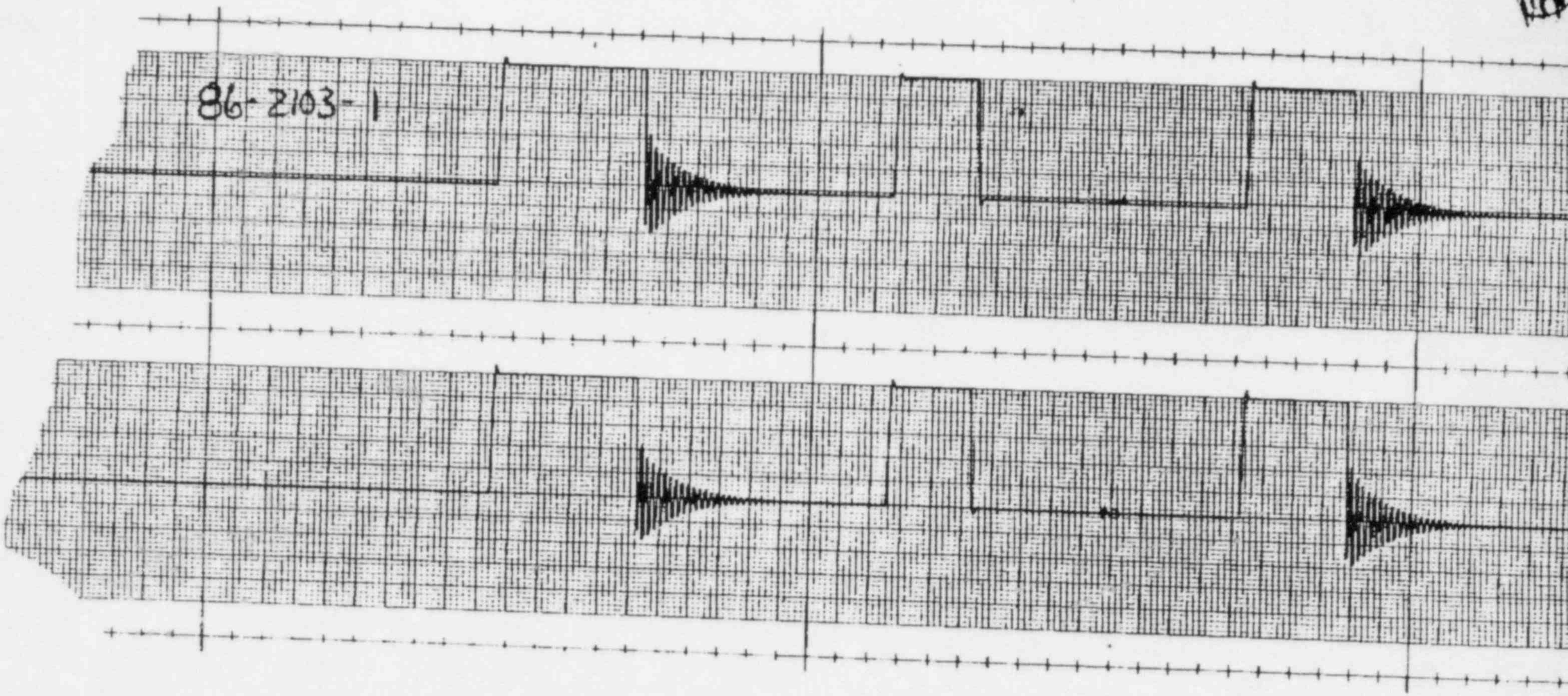
Next, the foundation plate was rapped (with NRC Region III observing) to artifically excite the support arrangement for D51-N101. A strip chart recording was again obtained for comparison with the known 50 hz trace. As can be seen from the strip chart, (Fig. 86-2103-1) the 50 Hz pulse leaves a defined pattern with measurable/visible decay strength. The rap test (Fig. 86-2103-2) shows the initial strikes and resultant impulses which represent the natural frequency of the platform. It's clearly visible that the frequency is at a minimum 100 Hz and probably on the order of 150 Hz. There are no visible separations between pen sweeps as seen on the 50 Hz recording. This test indicated that the resultant spectra frequency of the support system was considerably higher than the spectra produced by an earthquake and measured by our seismic instrumentation. This also shows that the support system which is mounted with four bolts does not amplify our seismic instrumentation which has an upper limit of approximately 50 Hz.

Attachments

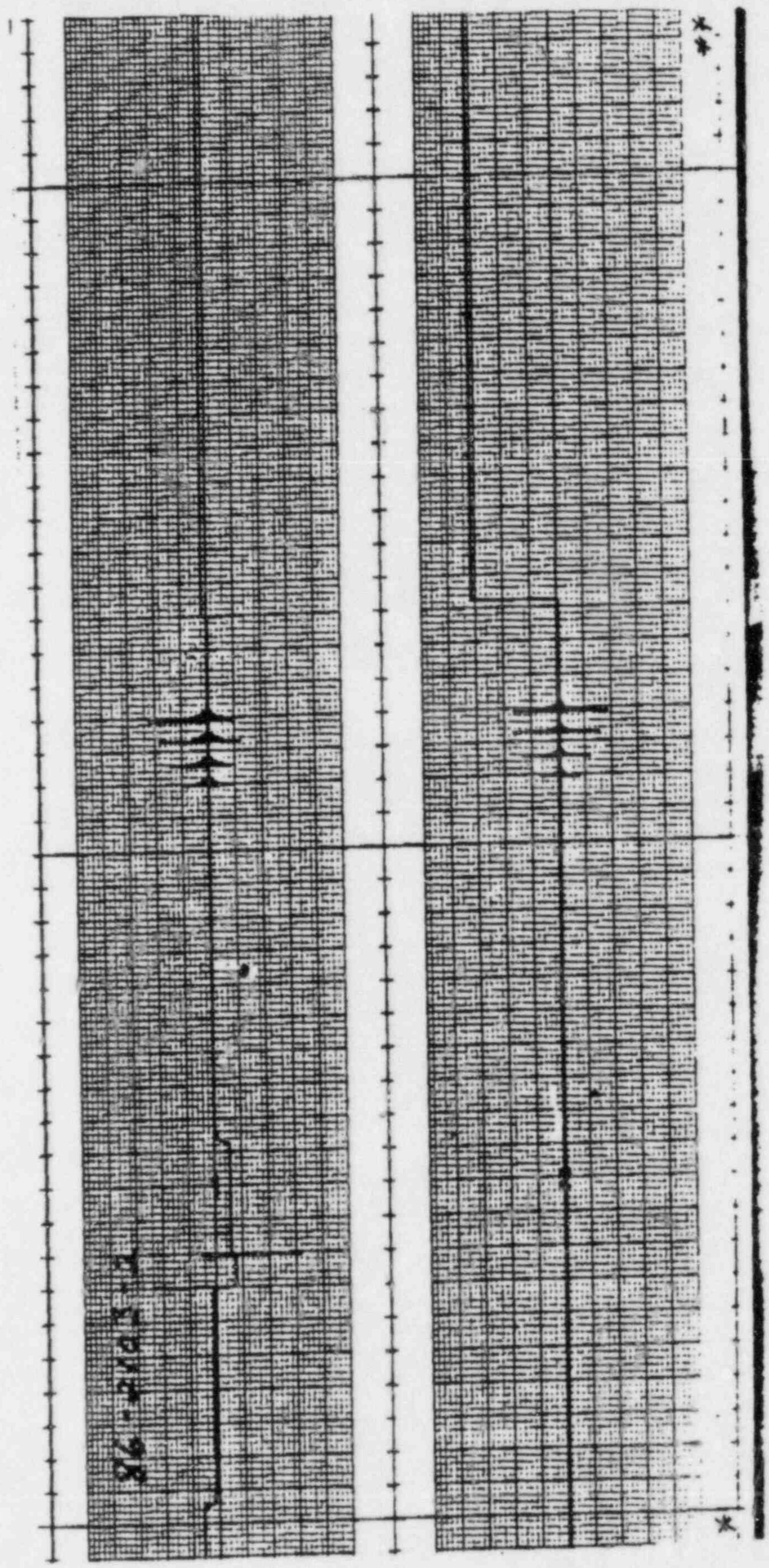
Trace #86-2103-1 - simulated 50 hz signal

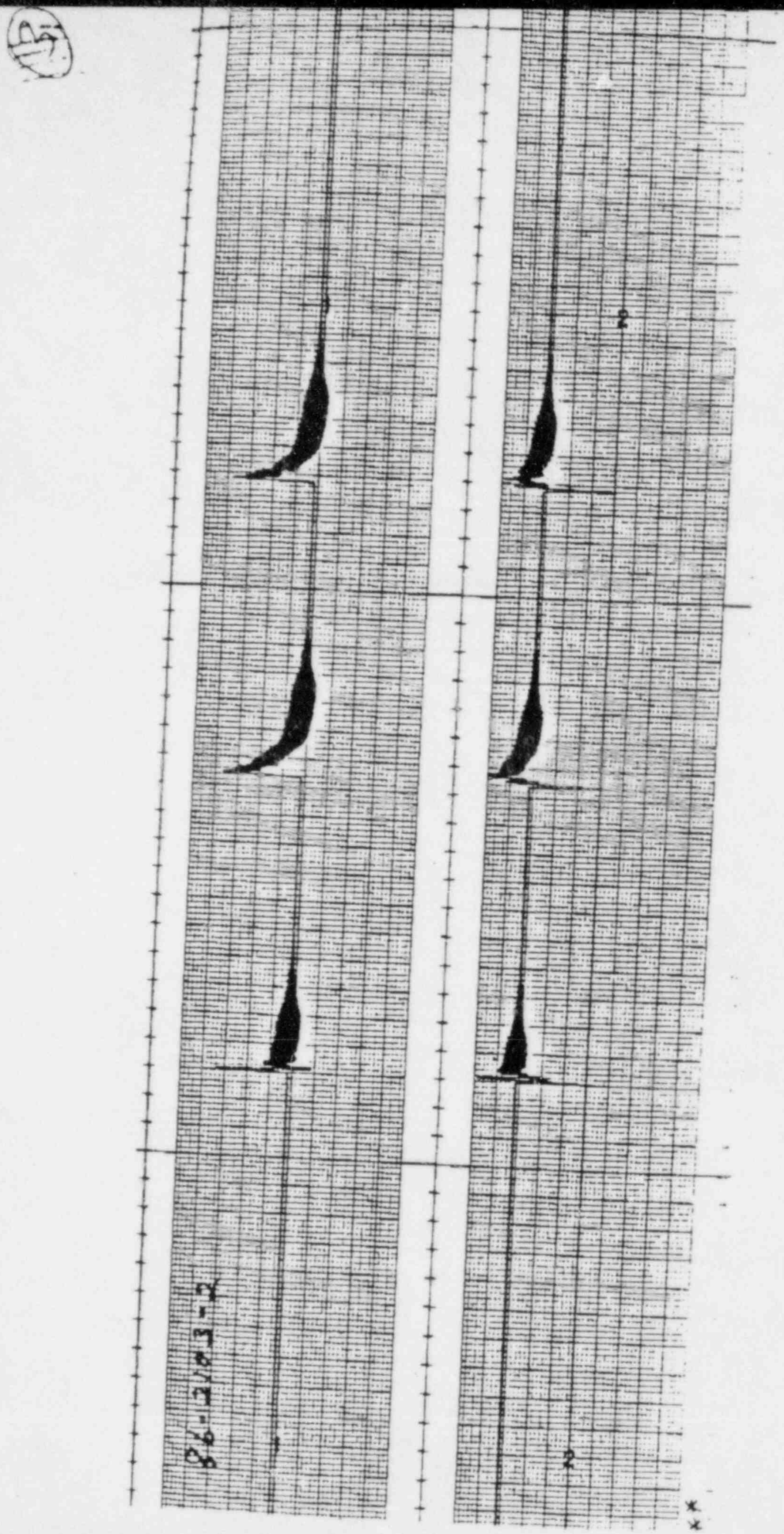
Trace #86-2103-2 - resultant spectra of foundation plate following rap test of foundation (signal depicting response frequency of foundation higher than 100 hz).

This test was performed by a CEI technician under the direction of a representative of Kinemetrics. Also G/C structural engineers assisted in interpretation of the data.



50 Hz. Reference





ATTACHMENT B

<u>SEISMIC CAPABILITY EVALUATIONS</u>

Attachment B

Seismic Capability Evaluations

In Attachment 3 of our letter dated February 28, 1986 (PY-CEI/NRR-0438 L) we provided the results of our seismic qualification evaluation of a representative sample of active equipment. Additionally in Attachment 3, we documented our commitment to perform additional evaluations whose scope and schedule would be provided by March 10, 1986. This discussion provides further clarification of the criteria that is being used to select the active components for the expanded sample of equipment to be evaluated.

The previous seismic qualification evaluations of equipment provided a representative sample of active equipment types: (a) pressure transmitters and instruments racks, (b) ECCS pumps and motors, (c) valves and motor operators and (d) electrical switchgear and fans; at various locations: (a) & (b) at Auxiliary Building Foundation 568' (c) at Reactor Building 686', (d) Control Complex, Auxiliary Building and Intermediate Building, 620' which were qualified by analysis for (b) items, and by testing for (a), (c) and (d) items. All items showed ample margins to accomodate the recorded earthquake.

To provide a broader sample, additional comparisons will be made of balance of plant equipment that is qualified by analysis. Other components will be selected for evaluation based on specific application such as eccentric loading configurations and potential sensitivity to high frequency seismic response. Among the additional items will be the battery and battery rack and an active valve and motor operator supported by the piping system. The list of equipment for the further evaluations will be provided to the staff by March 10, 1986 and the results submitted by June 1986.

To assess the overall plant capability to accomodate low energy, high frequency, short duration earthquakes, an evaluation will be provided to demonstrate the low energy content associated with such earthquakes can be readily accomodated by the existing design. Artificial time histories with slightly longer duration of strong motion or the peak amplitude increased over the 1986 recorded data will be utilized to calculate response spectra for this evaluation. A comparison of these artifically generated response spectra with the actual recorded spectra will be made to show that such increases result in insignificant changes, which do not affect the seismic capability of the plant structures and equipment. The results of this evaluation will be submitted to the NRC staff by June 1986.

Finally, attached is the stress comparison which was made to assess the effects of high frequency earthquakes on structural design. This evaluation showed the design stress is significanlty higher than the dynamic stresses due to the recorded earthquake, at various containment locations. The attached report is provided to document our conclusions.

EFFECTS OF HIGH FREQUENCY EARTHQUAKES ON STRUCTURAL DESIGN

I. INTRODUCTION

The 1986 Ohio earthquake has short duration, high frequency, low velocity, small displacement, and no engineering significance on structures. It is the objective of this report to quantify the insignificance of high frequency acceleration on structural design.

II. THE METHOD OF COMPARISON

The conventional seismic stress analysis applies the inertial load as equivalent static load which ignores the effects of small relative displacement. In this comparison, the dynamic forces and moments were calculated using the fixed base containment seismic model and the time histories recorded at the top of Reactor Building mat as input. As shown in the attached Table, the design is controlled by the maximum stress at elevation 592'-3". At this elevation, the design stress of 1.320 ksi is 2.6 times higher than the dynamic stress of .51 ksi.

It should be pointed out that the containment material, ASME SA516 Grade 70, has a yield stress of 38 ksi which is more than 74 times higher than the dynamic stresses of 0.51 ksi. It reemphasizes the insignificance of this high frequency earthquake.

III. CONCLUSION

Based on the comparison in the Table at elevation 592'-3", the design stress is 2.6 times higher than the dynamic stress due to recorded earthquake. Furthermore, the yield stress of the containment material is 74 times higher than the dynamic stress. The above comparison proved the insignificance of this 1986 Ohio earthquake.

CONTAINMENT STRESSES COMPARISON

ELEVATION	DYNAMIC FORCES			DYNAMIC STRESSES	DESIGN STRESSES
	P (K)	M_x (Ft-K)	M_z (Ft-K)	$P/A + M_x/S$ or $P/A + M_z/S$ (K/In²)	(K/In²)
688'-6"	1,339	44,220	31,820	0.414	.398
644'-6"	1,589	46,970	44,820	0.464	.802
592'-3"	1,674	38,000	53,670	0.510	1.320

ATTACHMENT C

STRONG MOTION DATA FROM AFTERSHOCK OF THE 1986 EARTHQUAKE

Woodward-Clyde
Consultants for
EPRI

STRONG MOTION DATA FROM AFTERSHOCKS OF THE 1986 CLEVELAND EARTHQUAKE

WOODWARD-CLYDE CONSULTANTS, PASADENA 22 FEBRUARY 1986

INTRODUCTION

This report presents strong motion data from two aftershocks of the 31 January, 1986 Cleveland earthquake recorded at the temporary Barge Site station by Woodward-Clyde Consultants on behalf of EPRI. Origin time parameters of the two aftershocks are given in Table 1.

DESCRIPTION OF THE SEISMOGRAMS

The seismograms of the Feb 3 and Feb 6 events are shown in Figures 1 and 2 respectively. On the vertical component of the Feb 3 event, one peak of the P wave is clipped, and the S wave is clipped. The horizontal components are unclipped. The north component has anomalous high frequency energy, which the Fourier spectrum shows to be centered at 30 Hz All three components of the Feb 6 event are clipped. Again, the north component has anomalous energy centered at 30 Hz.

DATA CORRECTION

Data correction consists of the following four steps.

1. Reduce tape output to amplifier output (in volts) by dividing by 10,000.

2. Reduce amplifier output to transducer output (in volts) by dividing by the gain. The gain settings are given in Table 2.

3. Correct for seismograph response (normalized to unit magnification at the seismometer's natural period). The seismograph response consists of the seismometer response (natural period = 1 sec., damping constant = 0.64 critical), and an anti-aliasing filter that rolls off rapidly to the Nyquist frequency of 50 Hz. Correction was made for the seismometer response, giving true ground velocity in transducer output volts. This correction entailed the use of a lowcut cosine filter between 0.5 and 0.2 Hz.

4. Correct for transducer velocity sensitivity at 1 Hz. The velocity sensitivity is on the order of 1 volt per cm/sec. Calibration of the instruments is now in progress.

ALL OF THE FOLLOWING RESULTS ARE BASED ON THE PRELIMINARY ASSUMPTION THAT 1 VOLT EQUALS 1 CM/SEC FOR ALL THREE CHANNELS. FINAL RESULTS WILL BE OBTAINED FROM THE RESULTS OF INSTRUMENT CALIBRATIONS THAT ARE NOW IN PROGRESS.

DATA ANALYSIS

The following data analyses have been performed.

1. Differentiation of velocity to obtain acceleration. Note that the truncation of peaks due to clipping will give rise to spurious acceleration values.

2. Calculation of Fourier spectra of velocity and acceleration. This has been done for the whole record of each component. The time series and its spectrum are shown together in each Figure. The spectra are subject to errors due to clipping.

3. Calculation of pseudo relative velocity response spectra. This has been done for individual P and S phases and for the whole record of each component. The spectra are subject to errors due to clipping.

PEAK GROUND MOTION VALUES

Provisional peak ground motion values are listed in Tables 3 and 4. These values are given for the whole record and for the P and S phases. Final values await the calibration of the seismometers. The peak values are subject to errors due to clipping where noted. The time-domain peak values are given for velocity and acceleration in Table 3. The spectral peak values of pseudo relative velocity and pseudo absolute acceleration are given with their periods in Table 4. For the vertical and east components, all of the spectral peaks occur in the period range of 0.05 to 0.065 seconds (20 to 15 Hz). For the north component, the spectral peaks occur at periods of about 0.032 seconds (30 Hz), representing the peak of the anomalous energy on this component.

TABLE 1

CLEVELAND EARTHQUAKE - AFTERSHOCKS

ORIGIN TIME DATA

WCC EVENT NO.	DATE	ORIGIN TIME
20	Feb 3	19:47:16
4	Feb 6	18:36:19

TABLE 4

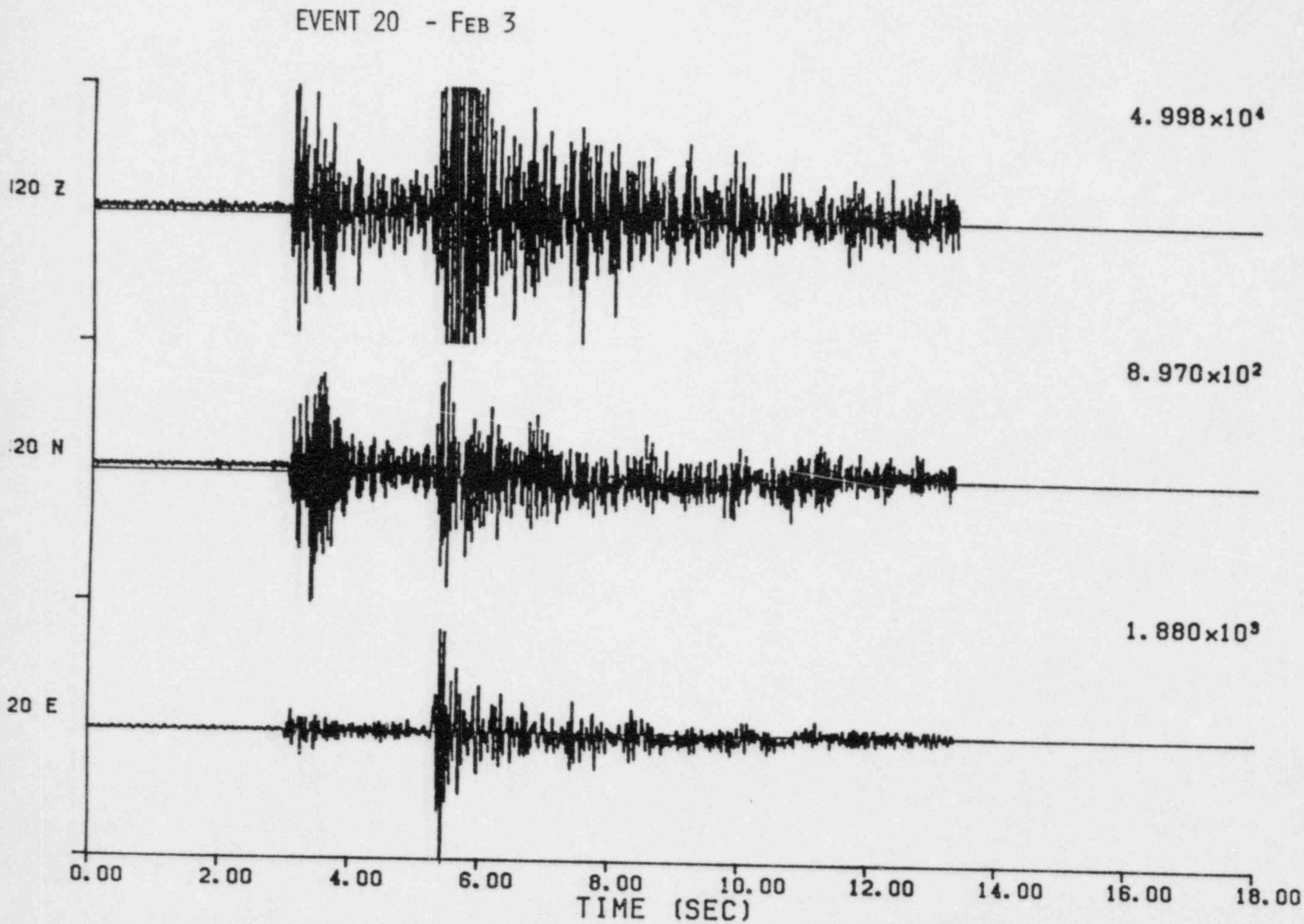
PROVISIONAL FREQUENCY-DOMAIN PEAK GROUND MOTION VALUES

EVENT	CPT	PHASE	VELOCITY (CM/SEC)	PERIOD SEC	ACCELER (CM/SEC^2)	PERIOD SEC	COMMENT
20	Z	ALL	.33	0.062	33.9	0.060	CLIPPED
		P	0.17	0.053	21.5	0.050	"
		S	0.33	0.062	33.9	0.060	"
	N	ALL	0.033	0.032	6.68	0.030	NOISY
		P	0.033	0.032	6.68	0.030	"
		S	0.020	0.032	3.94	0.032	"
	E	ALL	0.064	0.062	6.45	0.060	CLIPPED

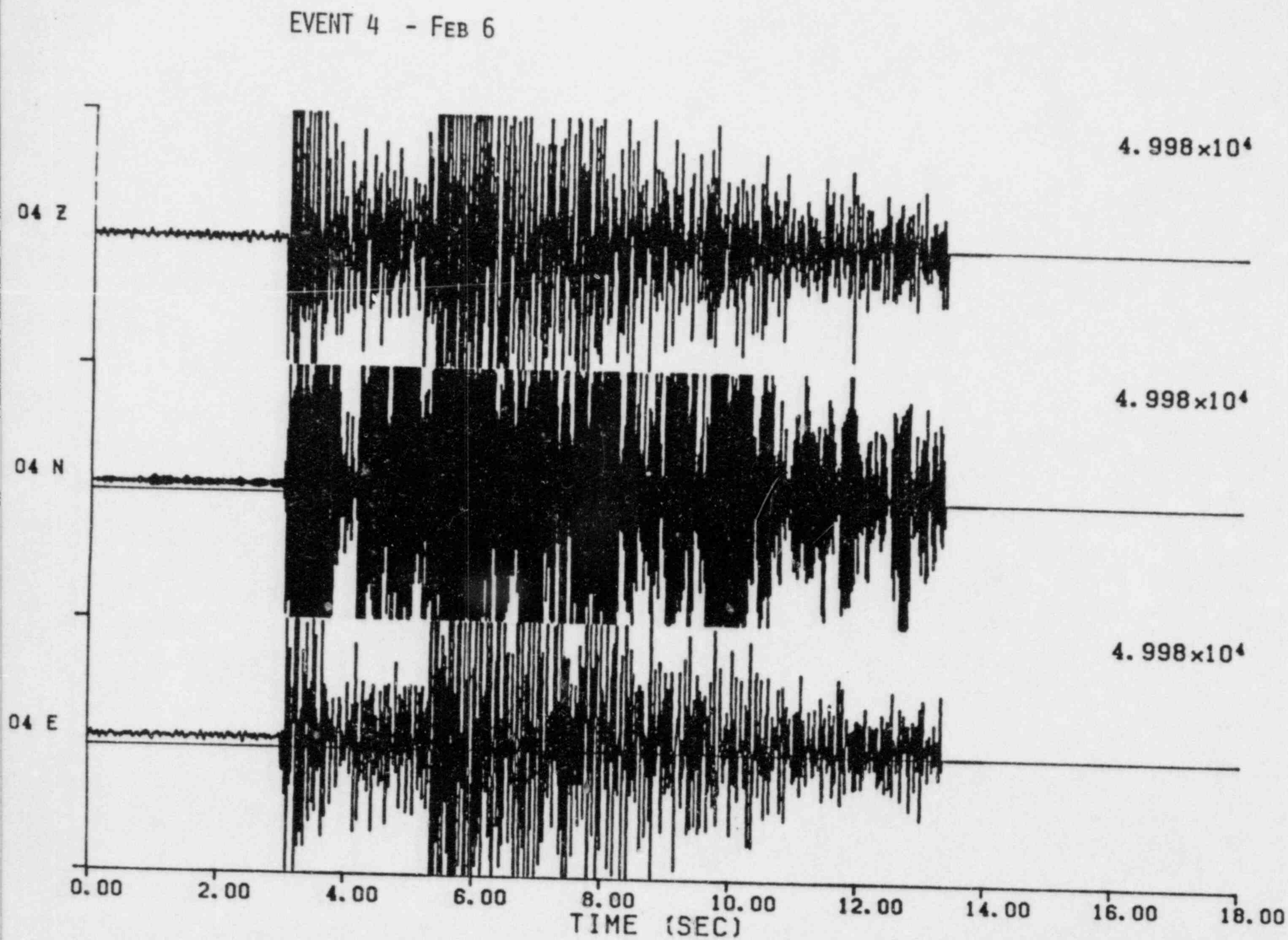
RAW SEISMOGRAMS AS PLOTTED BY WCC - WAYNE

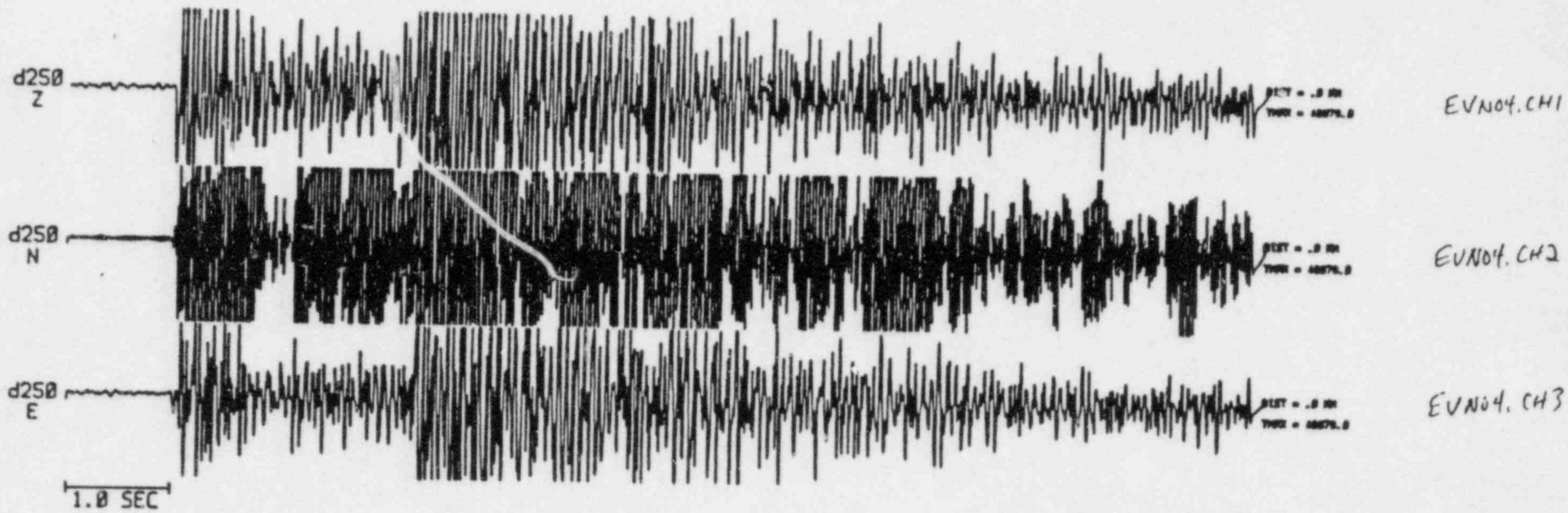
TABLE 4

EVENT	CPT	PHASE	peak PSRV SPECTRAL	peak PSRV PERIOD	peak PAA SPECTRAL	peak PAA PERIOD	COMMENT
20	Z	ALL	3.27×10^{-1}	0.062	33.9	0.060	
		P	1.71×10^{-1}	0.053	21.5	0.050	
		S	3.29×10^{-1}	0.062	33.9	0.060	
	N	ALL	3.29×10^{-2}	0.032	6.68	0.030	
		P	3.29×10^{-2}	0.032	6.68	0.030	
		S	2.00×10^{-2}	0.032	3.94	0.032	
	E	ALL	6.41×10^{-2}	0.062	6.45	0.060	
		P	1.12×10^{-2}	0.059	1.20	0.059	
		S	6.43×10^{-2}	0.062	6.46	0.062	
4	Z	ALL	~~[illegible]~~ 3.26×10^{-2}	0.069	3.40	0.034	
		P	2.80×10^{-2}	0.056	3.32	0.030	
		S	3.27×10^{-2}	0.069	3.40	0.034	
	N	ALL	3.12×10^{-2}	0.030	6.54	0.030	
		P	3.12×10^{-2}	0.030	6.54	0.030	
		S	2.98×10^{-2}	0.032	6.17	0.030	
	E	ALL	2.79×10^{-2}	0.059	3.57	0.030	
		P	1.67×10^{-2}	0.060	3.09	0.029	
		S	2.79×10^{-2}	0.059	3.57	0.030	



EVENT 20 - FEB 3
4.998×10⁴
8.970×10²
1.880×10³
120 Z
20 N
20 E
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
TIME (SEC)


EVENT 4 - FEB 6
04 Z
04 N
04 E
4.998×10⁴
4.998×10⁴
4.998×10⁴
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
TIME (SEC)

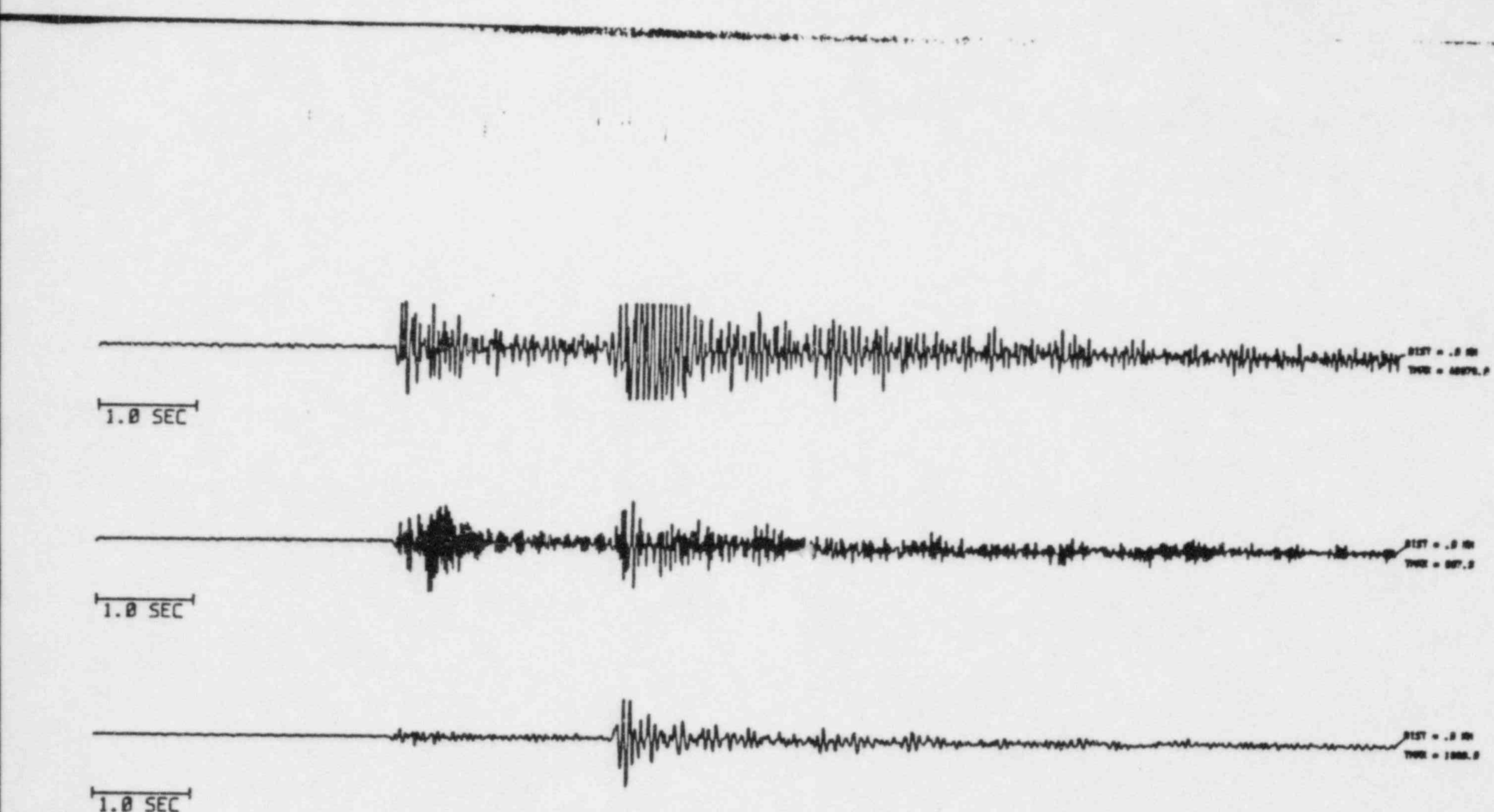


EVN04.

037:18.36

$M_c = 2.4$

BARGE SITE



EVN02Ø

034 17 47

BARGE SITE

RAW SEISMOGRAMS AS PLOTTED BY WCC - PASADENA

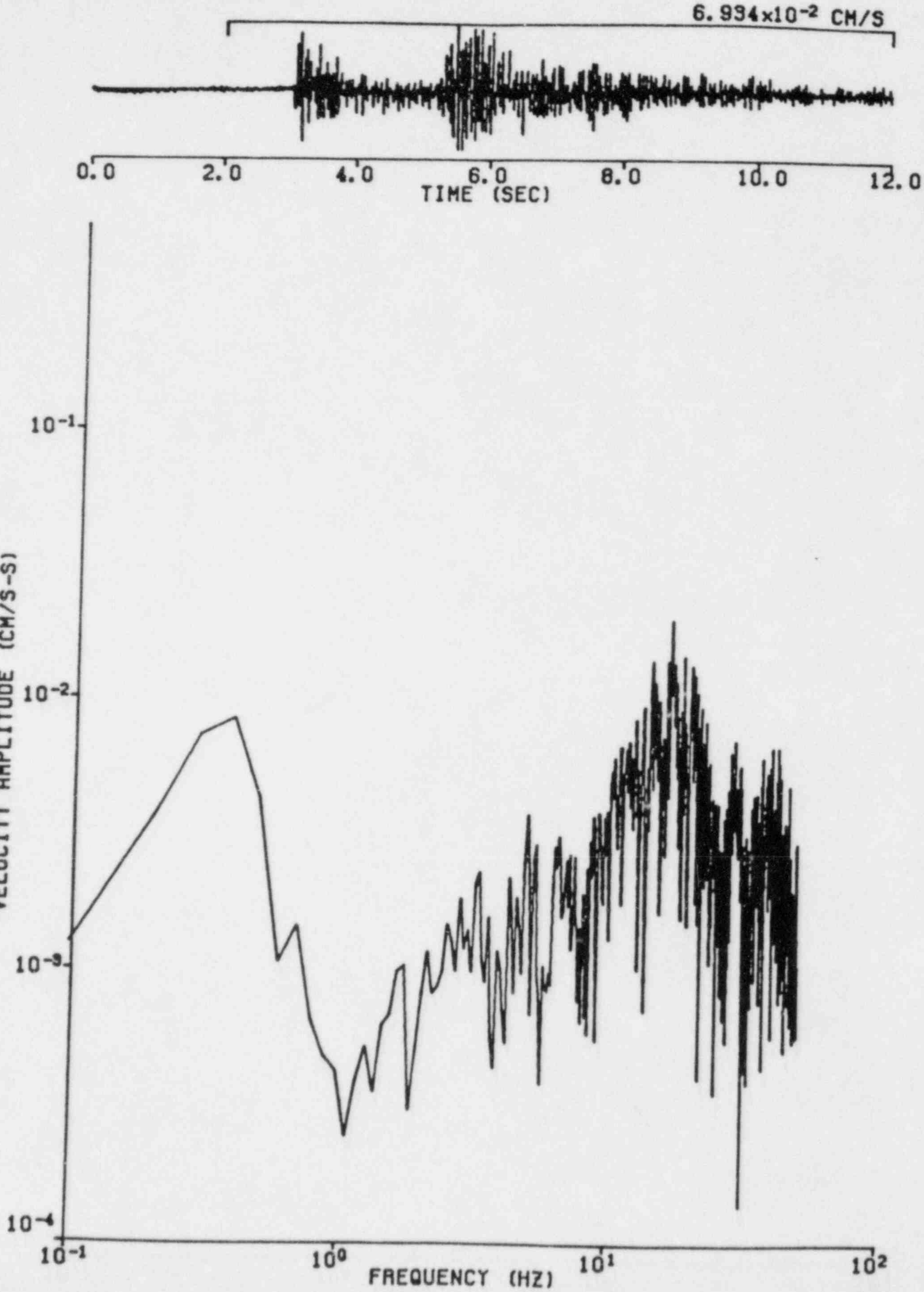
FOURIER AMPLITUDE SPECTRA - WHOLE RECORD

CORRECTED VELOCITY

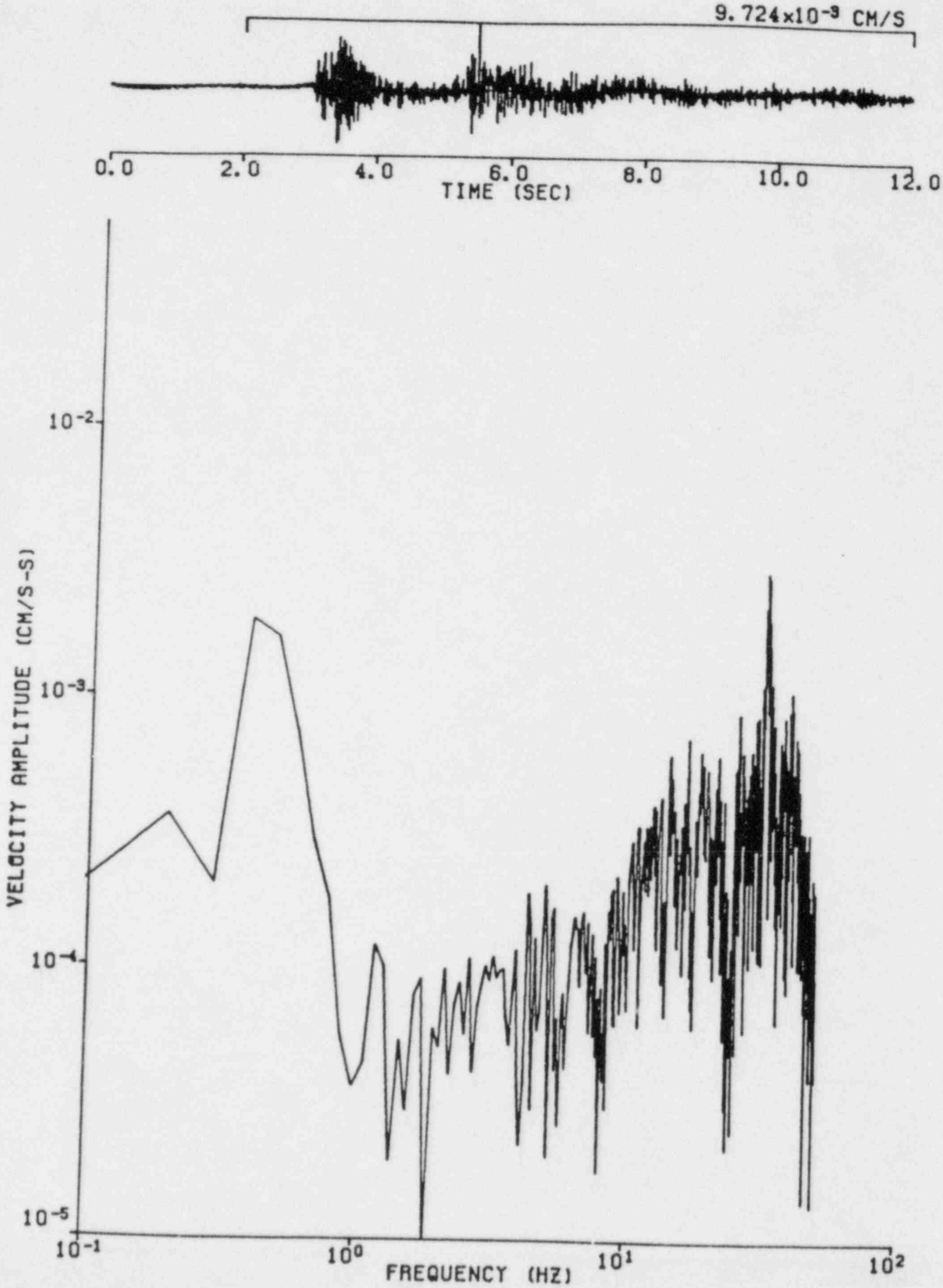
CORRECTED ACCELERATION

PEAK AMPLITUDES ARE SHOWN TO RIGHT OF TIME HISTORIES

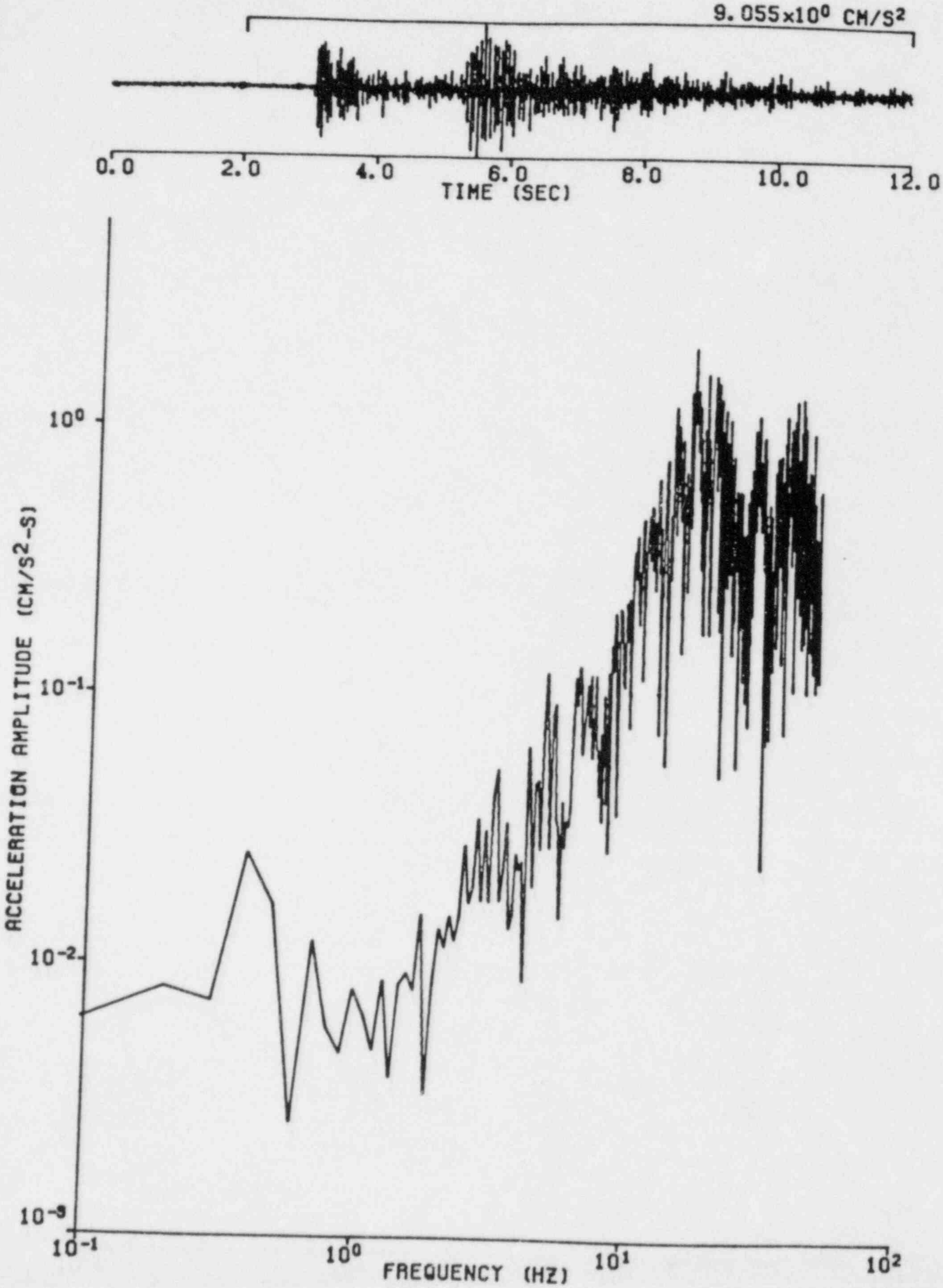
EVENT 20 Z CORRECTED VELOCITY
SIGNAL WINDOW 2.00 TO 12.00 SEC



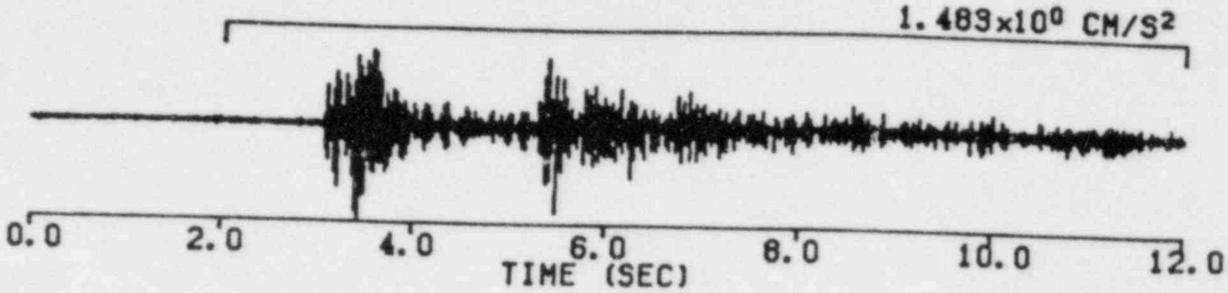
EVENT 20 N CORRECTED VELOCITY
SIGNAL WINDOW 2.00 TO 12.00 SEC

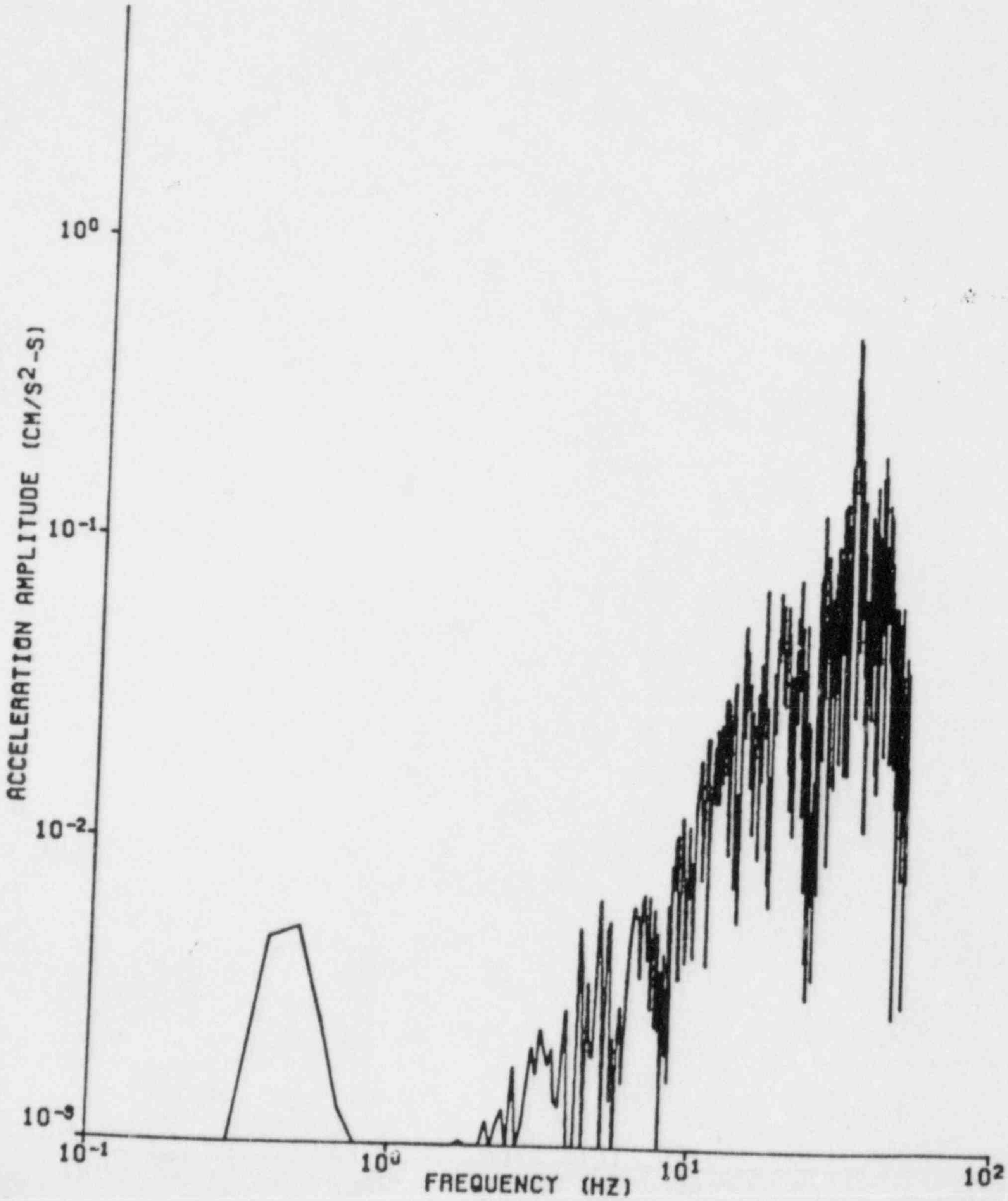


EVENT 20 Z CORRECTED ACCELERATION
SIGNAL WINDOW 2.00 TO 12.00 SEC

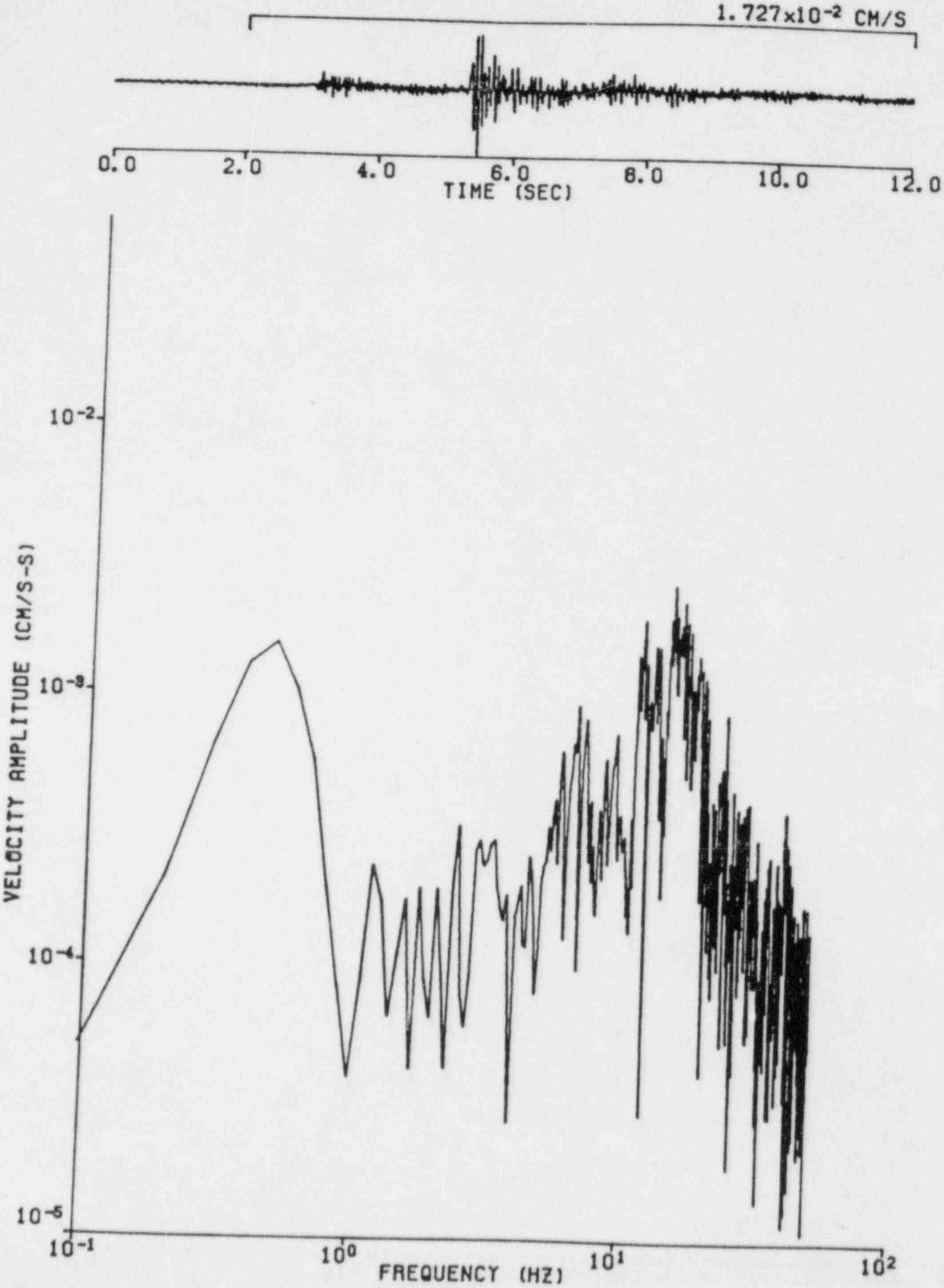


EVENT 20 N CORRECTED ACCELERATION
SIGNAL WINDOW 2.00 TO 12.00 SEC





EVENT 20 E RRECTED VELOCITY
SIGNAL WINDOW 00 TO 12.00 SEC



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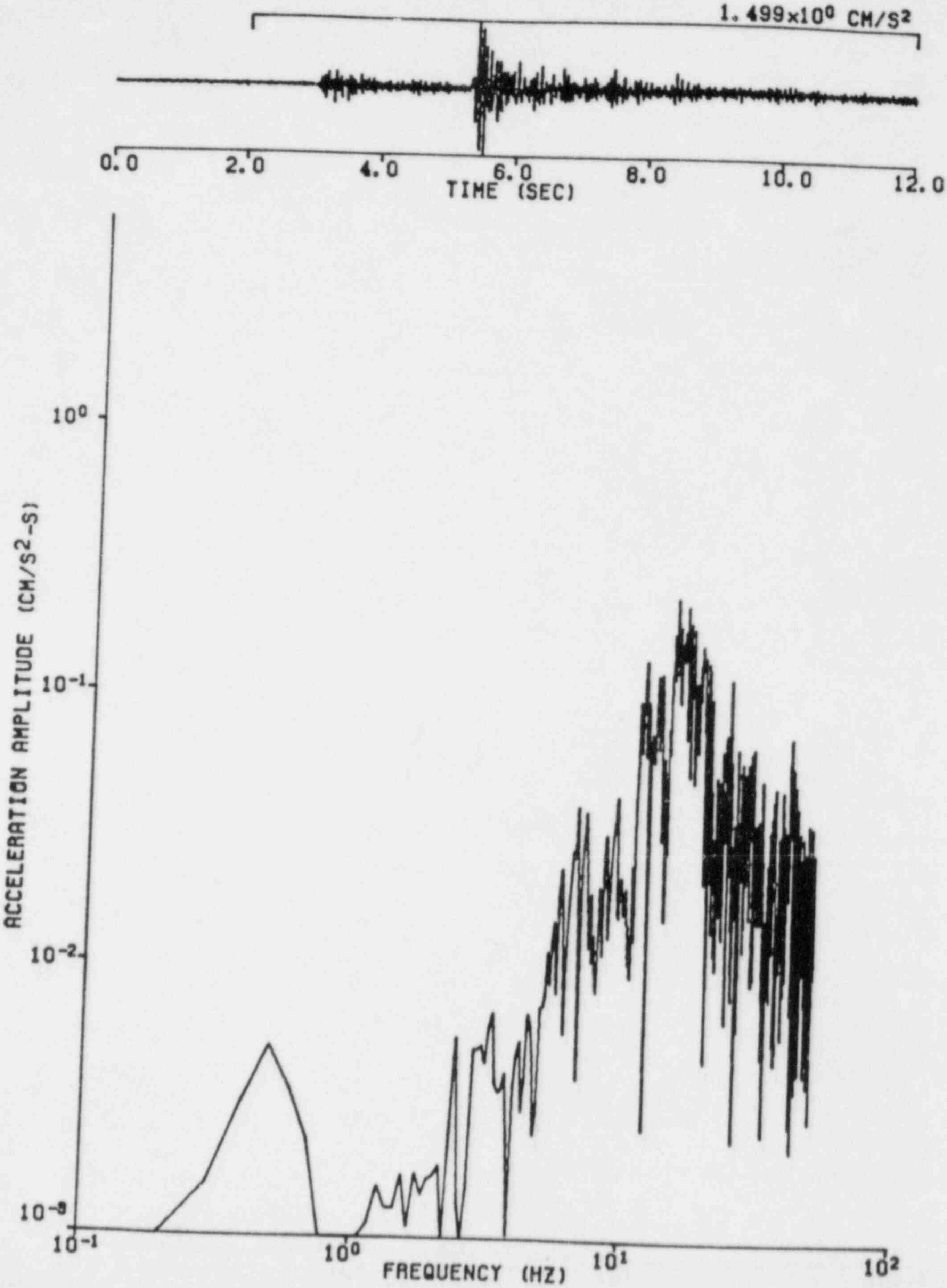
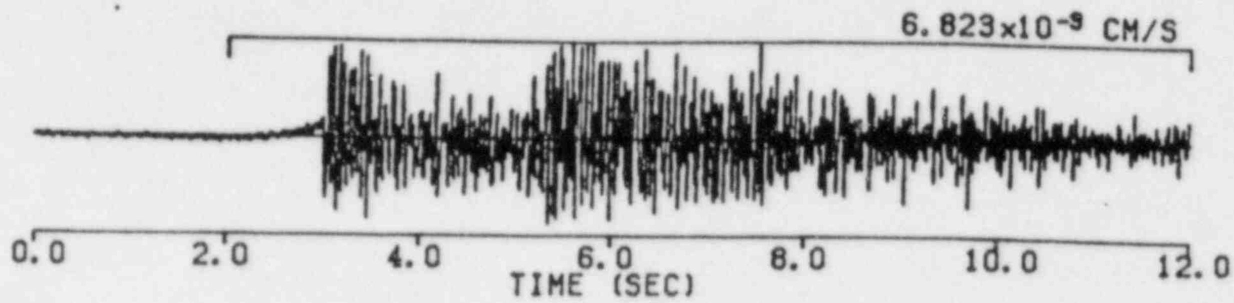
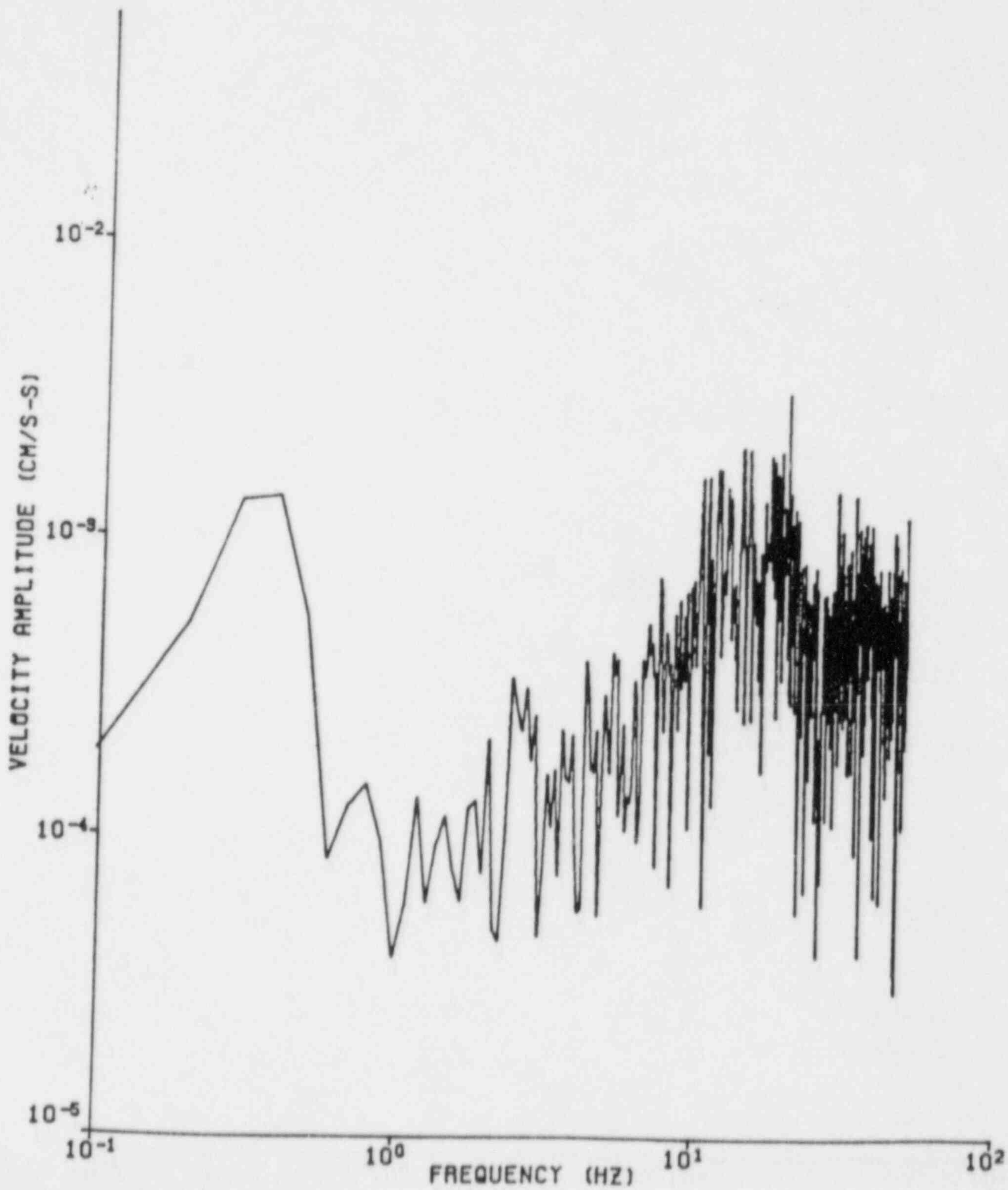
SIGNAL WINDOW 2.00 TO 12.00 SEC



EVENT 4 Z CORRECTED VELOCITY
SIGNAL WINDOW 2.00 TO 12.00 SEC





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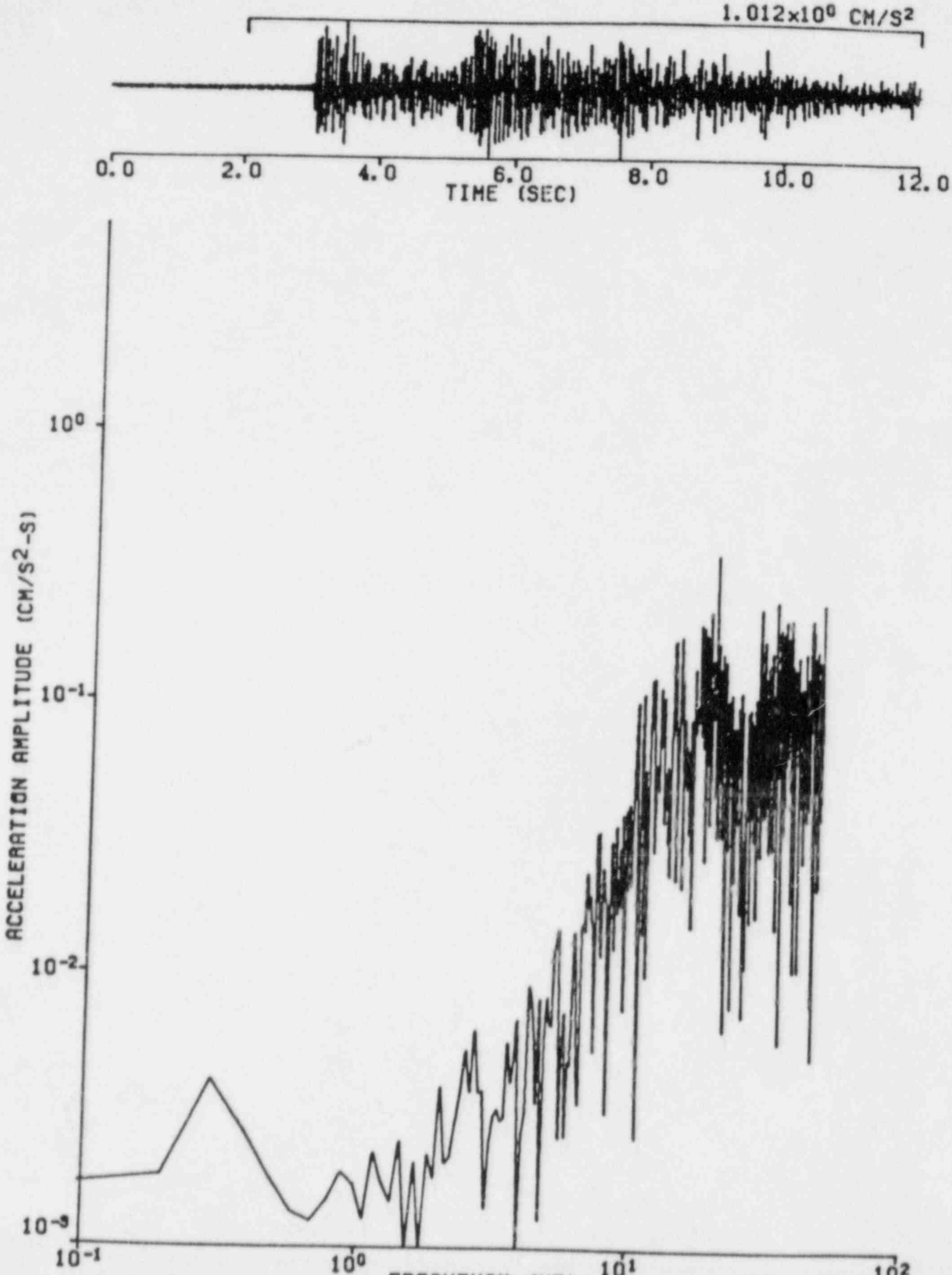
SIGNAL WINDOW 2.00 TO 12.00 SEC



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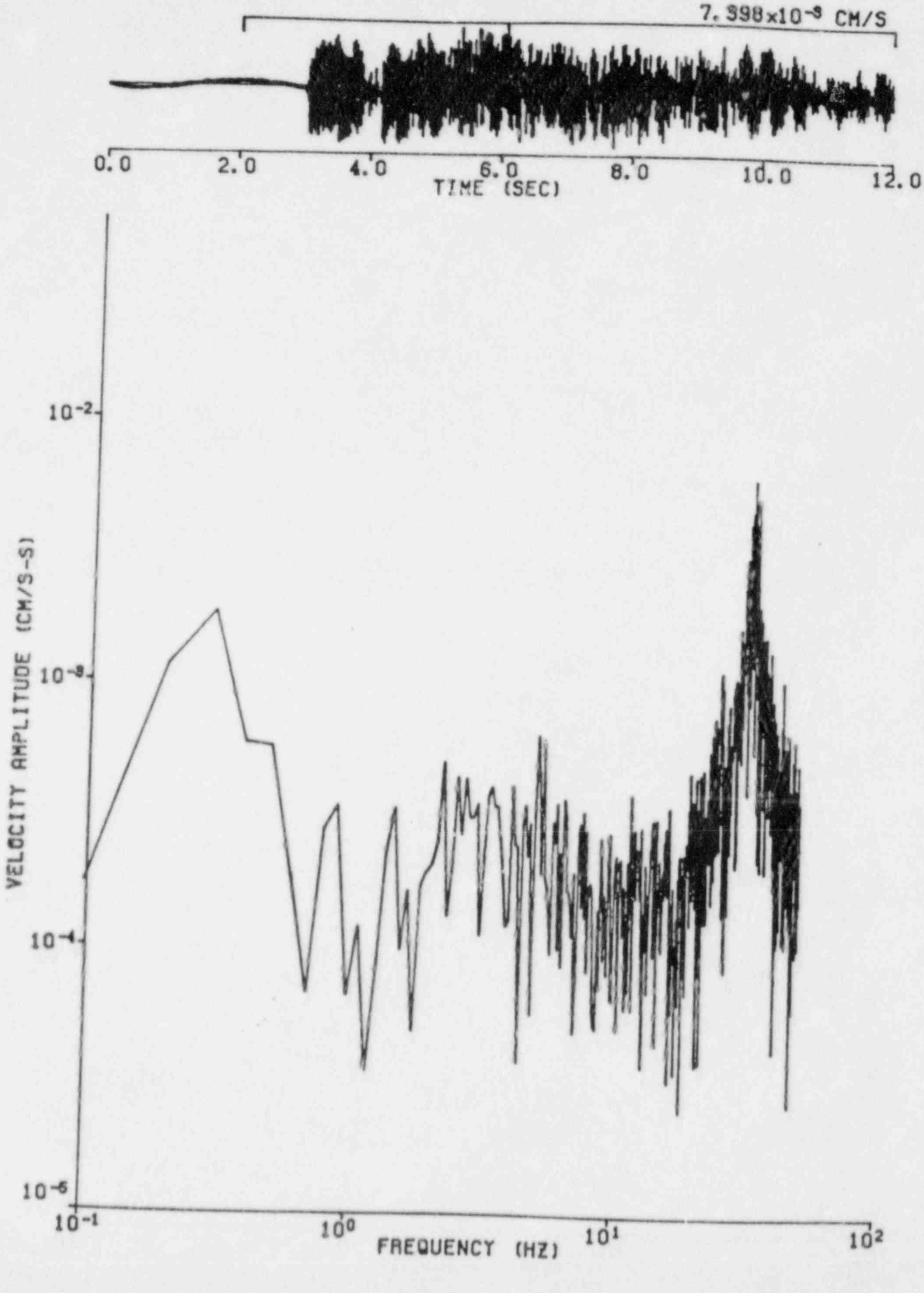
SIGNAL WINDOW 2.00 TO 12.00 SEC



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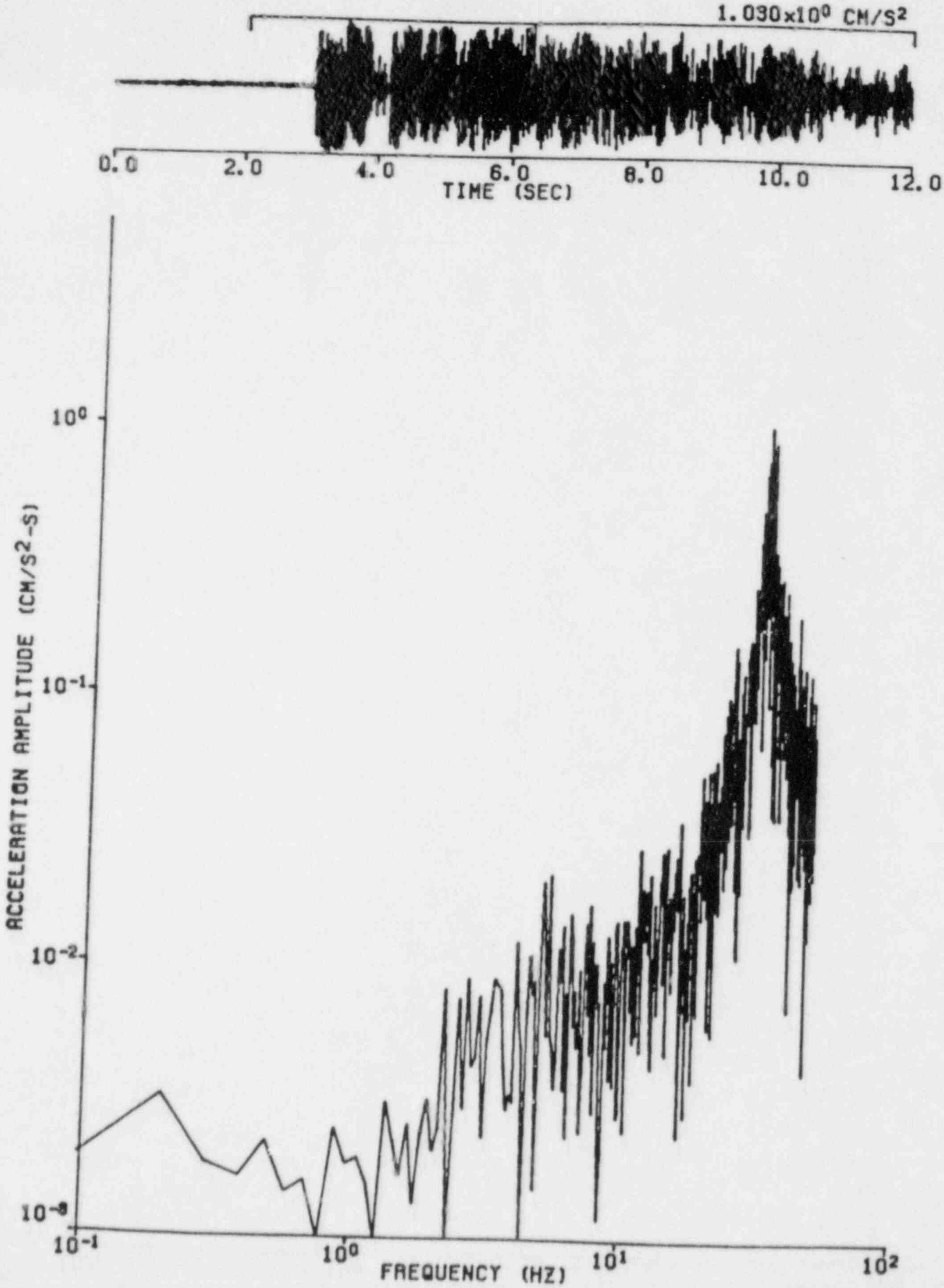
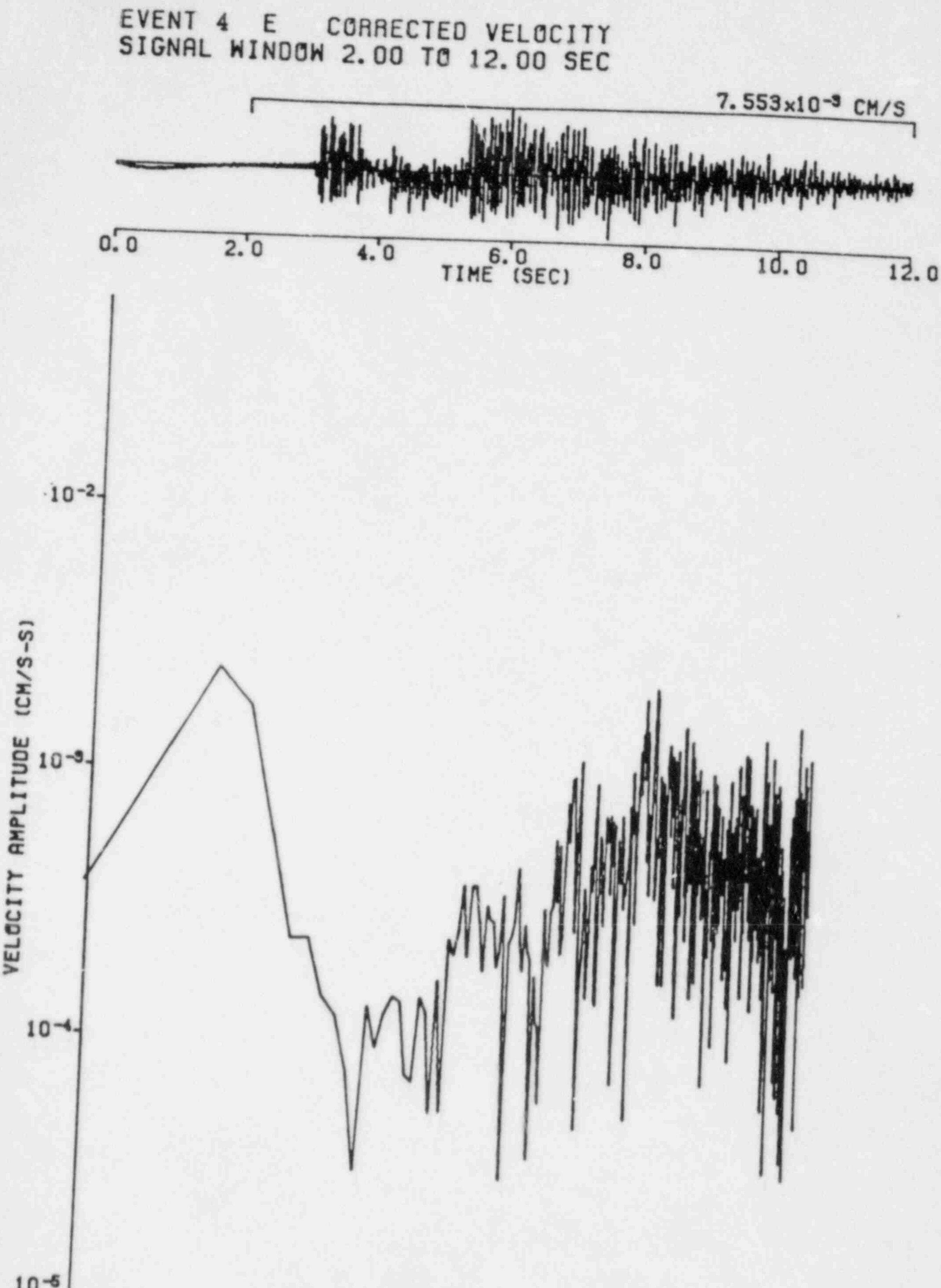
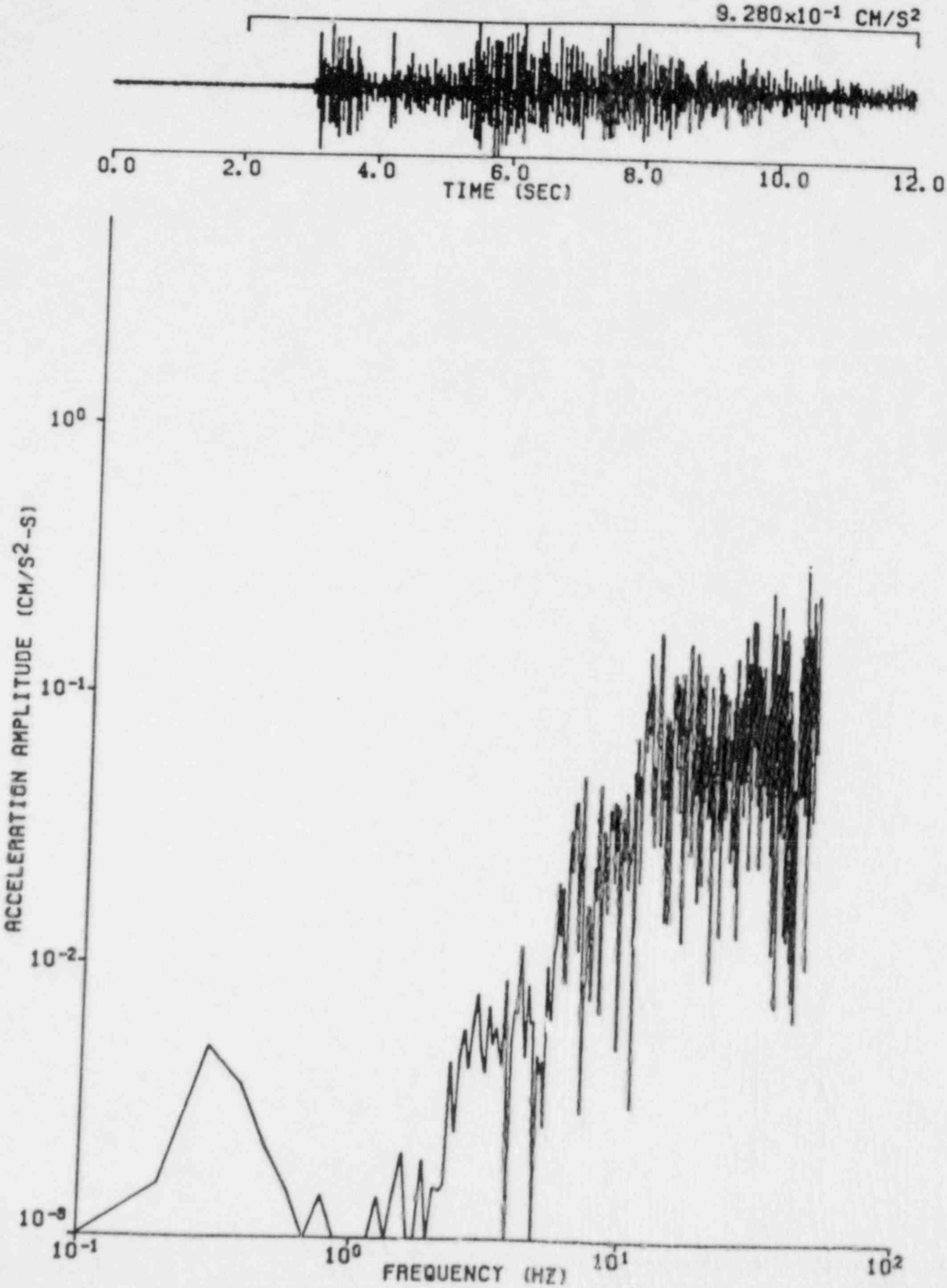
SIGNAL WINDOW 2.00 TO 12.00 SEC




EVENT 4 E CORRECTED VELOCITY
SIGNAL WINDOW 2.00 TO 12.00 SEC
7.553x10⁻³ CM/S
0.0
2.0
4.0
6.0
8.0
10.0
12.0
TIME (SEC)
VELOCITY AMPLITUDE (CM/S-S)
10⁻²
10⁻³
10⁻⁴
10⁻⁵
10⁻¹
10⁰
10¹
10²
FREQUENCY (HZ)

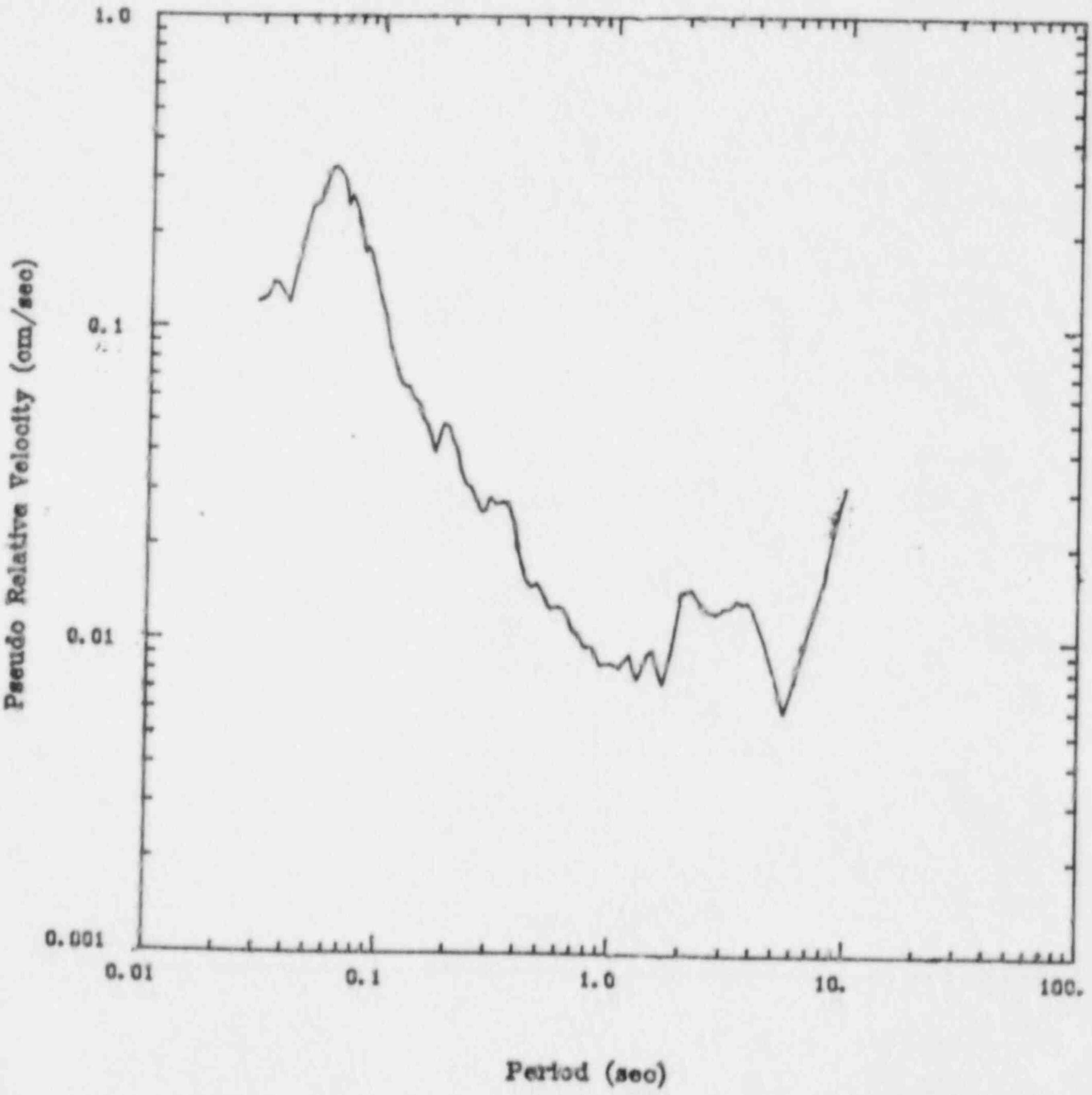
EVENT 4 E CORRECTED ACCELERATION
SIGNAL WINDOW 2.00 TO 12.00 SEC



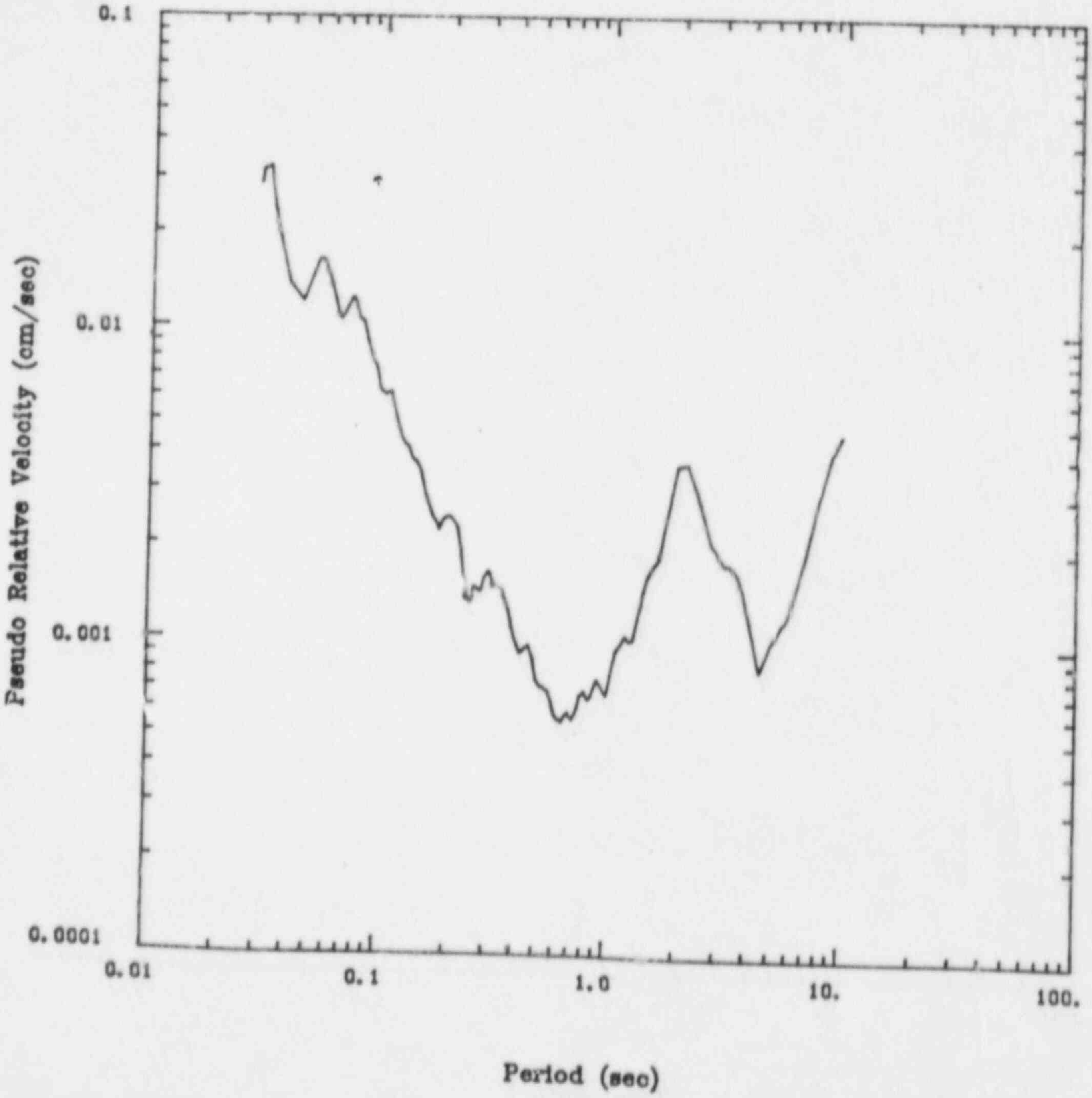
PSEUDO RELATIVE VELOCITY RESPONSE SPECTRA - WHOLE RECORD

- P AND S PHASES

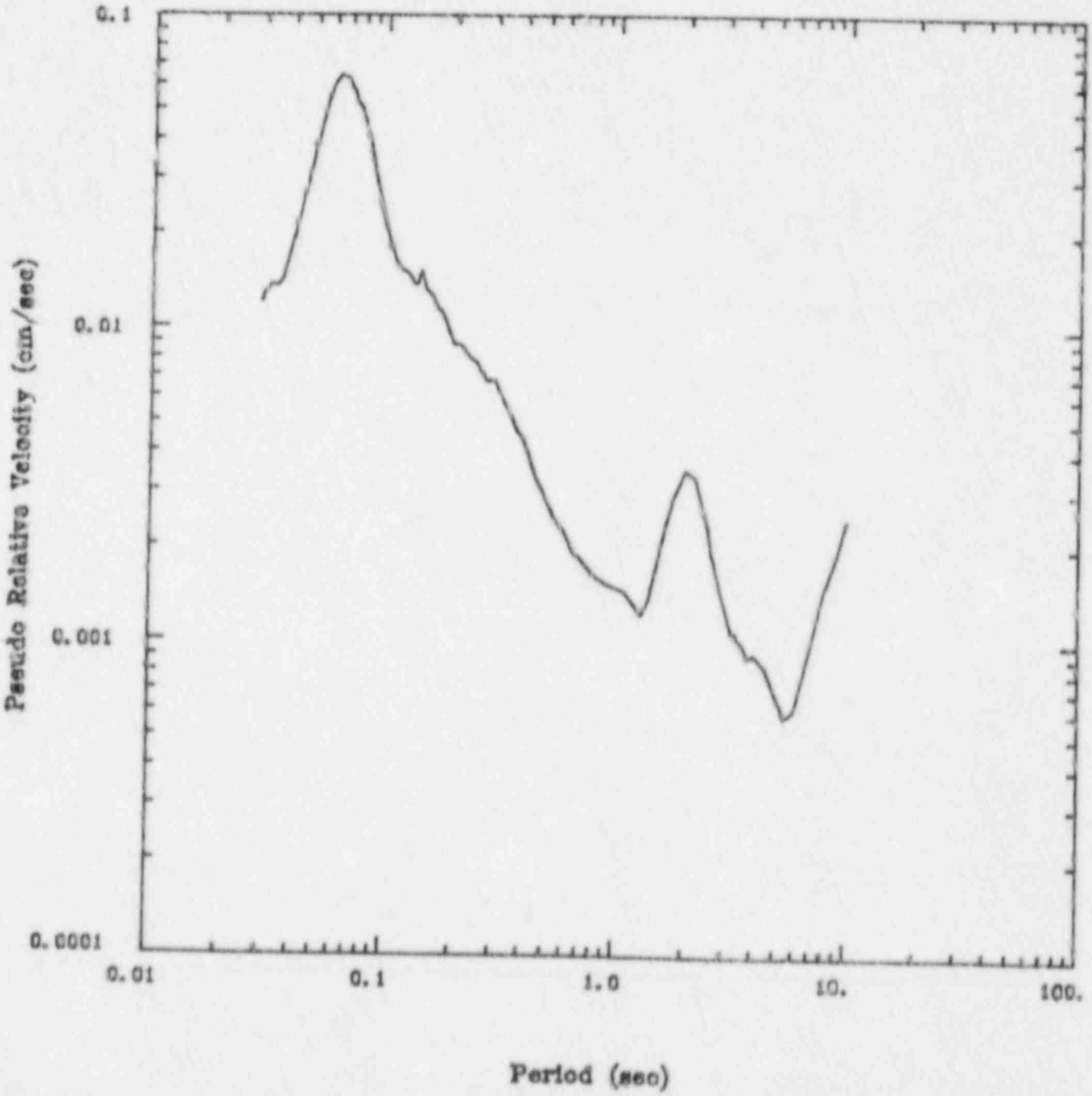
EVN20 WHOLE SIGNAL (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



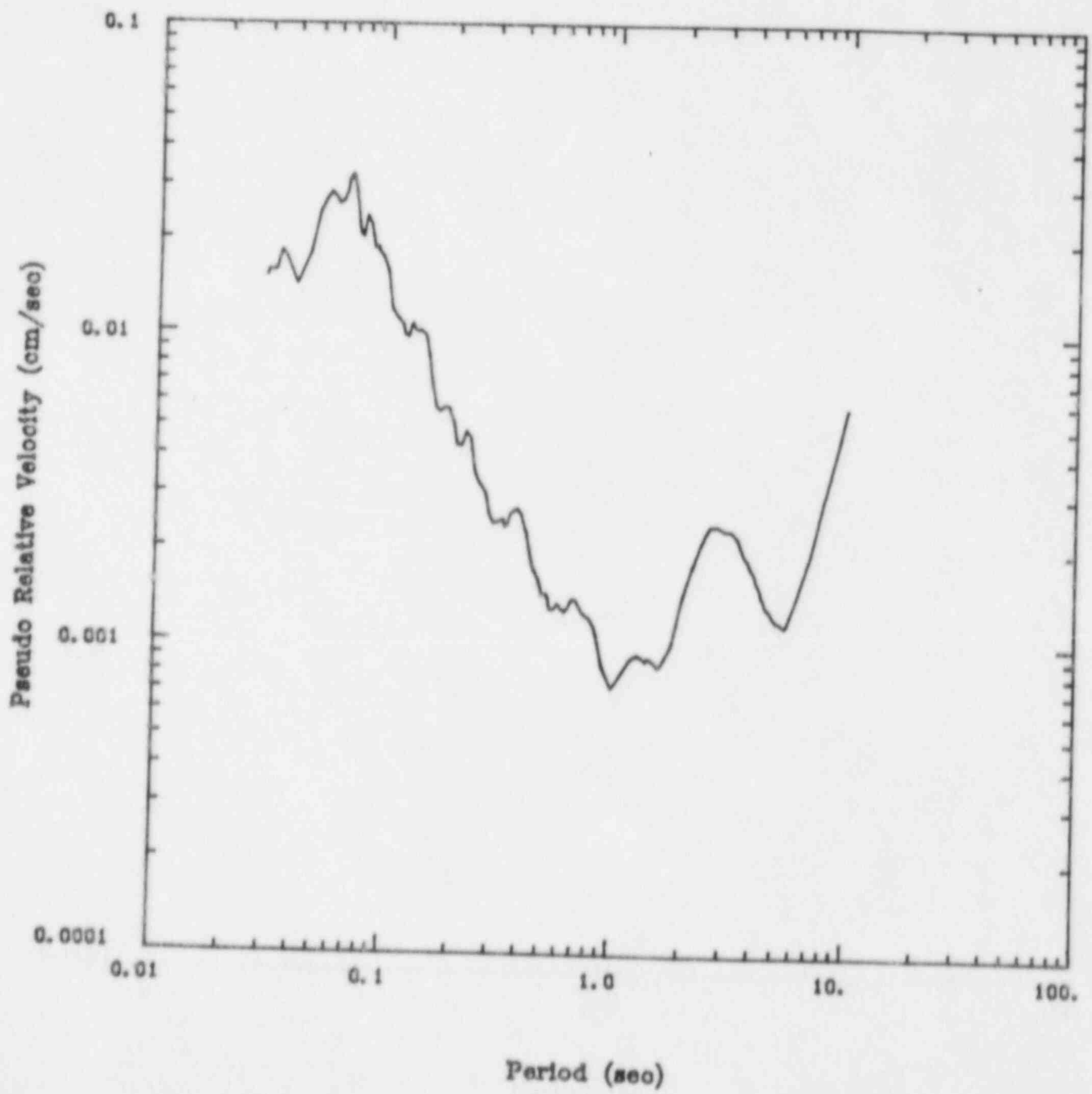
EVN20 WHOLE SIGNAL
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: NORTH INSTRUMENT CORRECTED



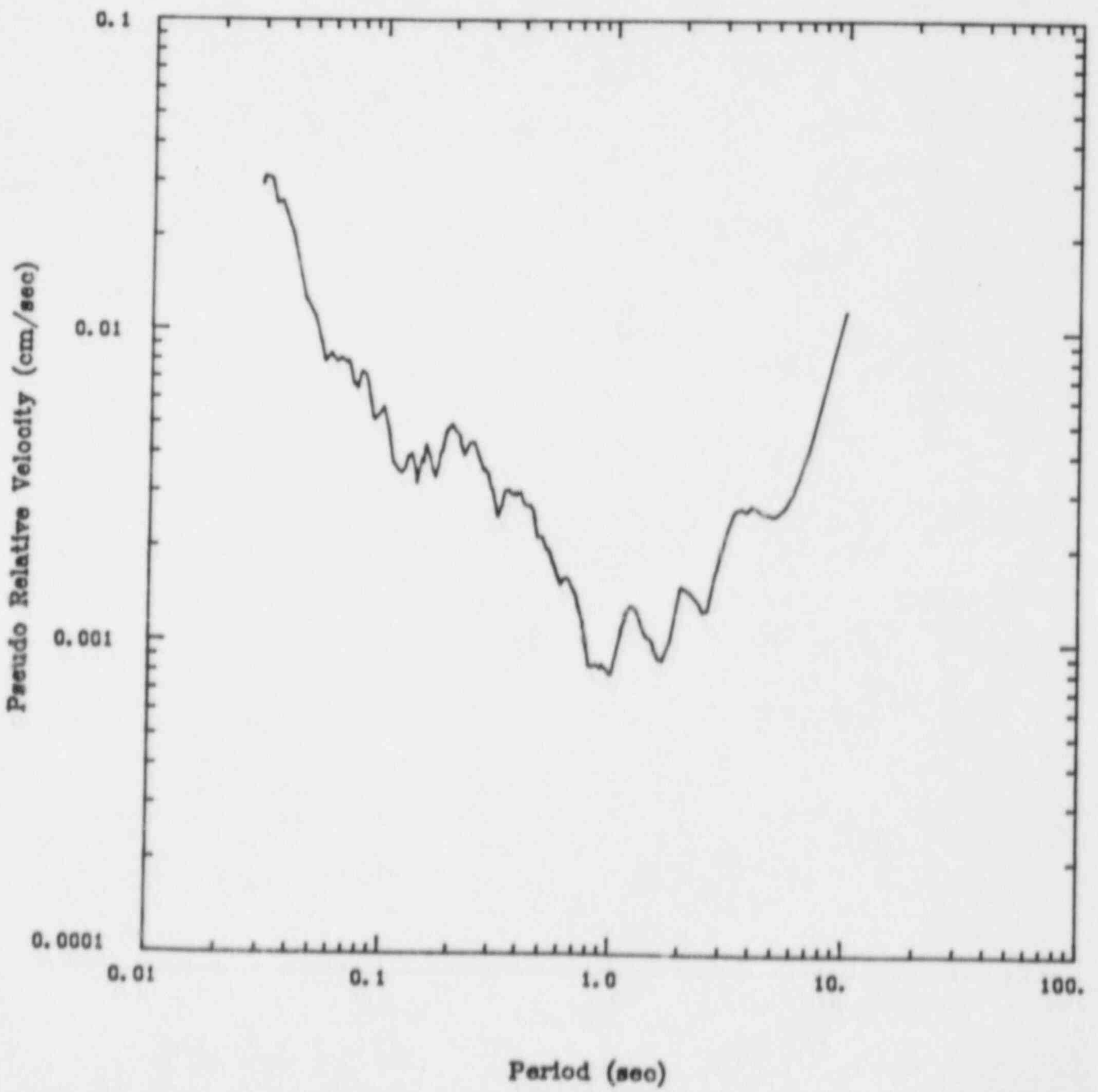
EVN20 WHOLE SIGNAL
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: EAST INSTRUMENT CORRECTED



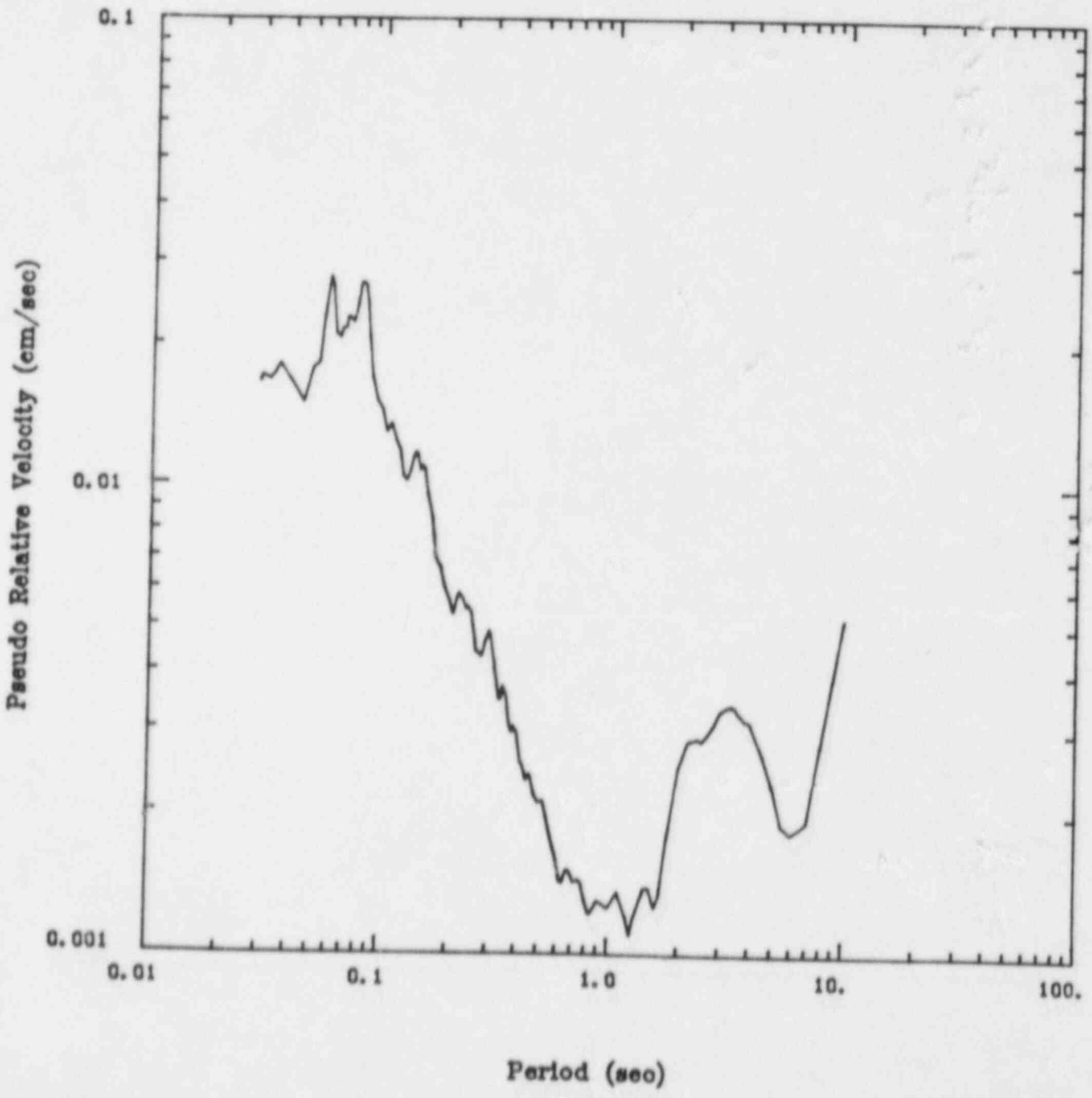
EVN04 WHOLE SIGNAL (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



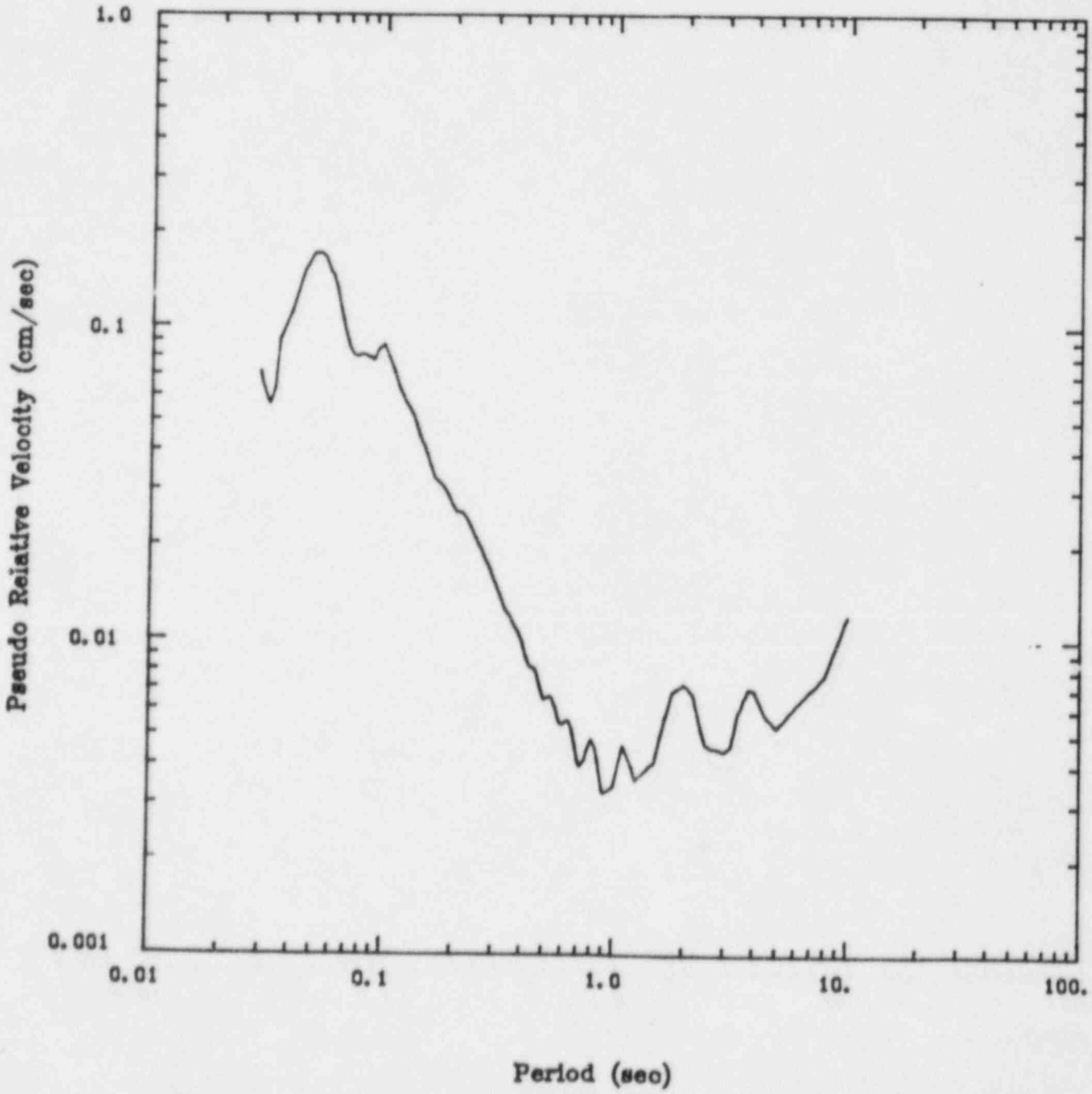
EVN04 WHOLE SIGNAL (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: NORTH INSTRUMENT CORRECTED



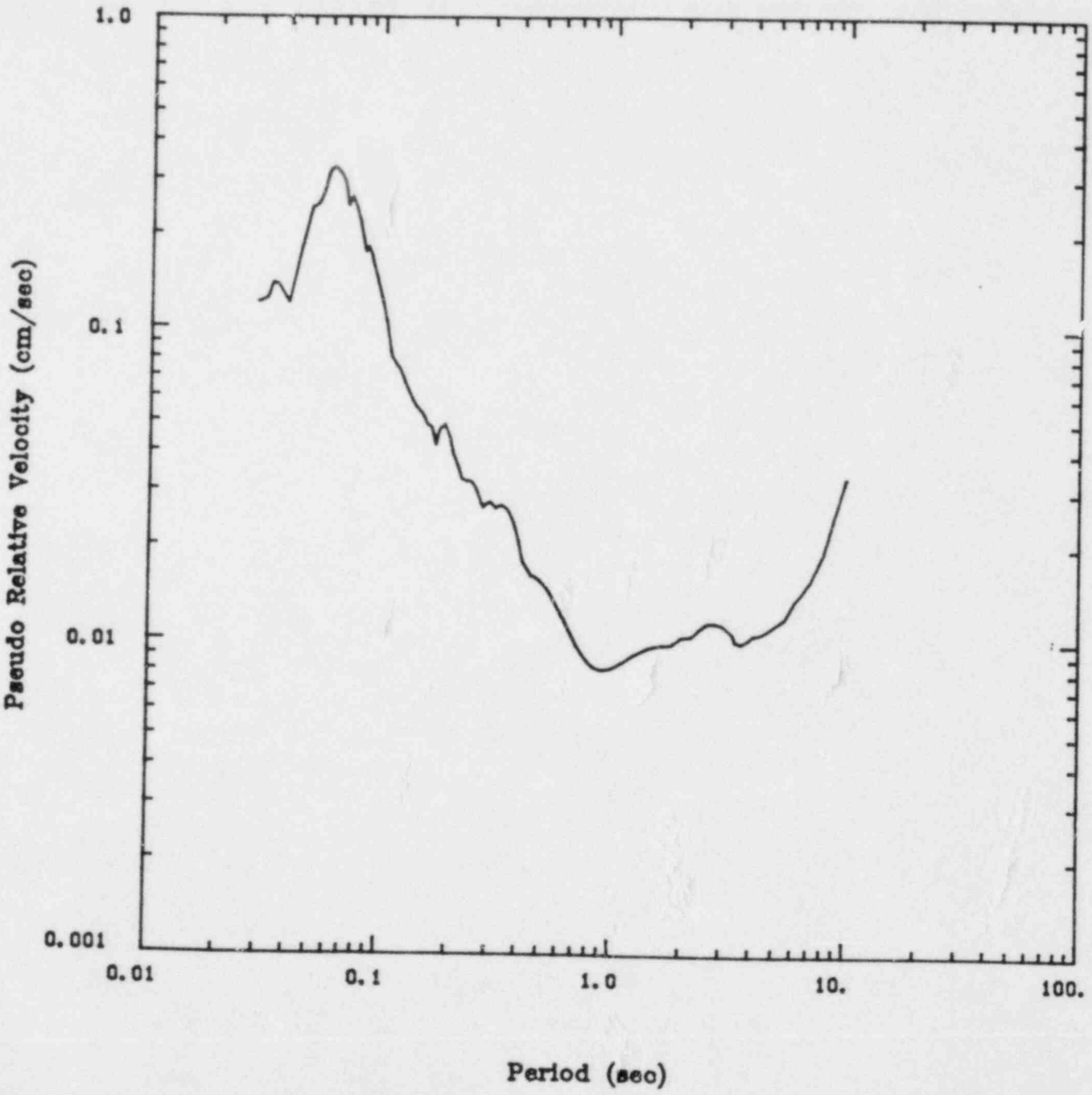
EVN04 WHOLE SIGNAL (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: EAST INSTRUMENT CORRECTED



EVN20 P-WAVE (WEAKLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



EVN20 S-WAVE (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



EVN20 P-WAVE
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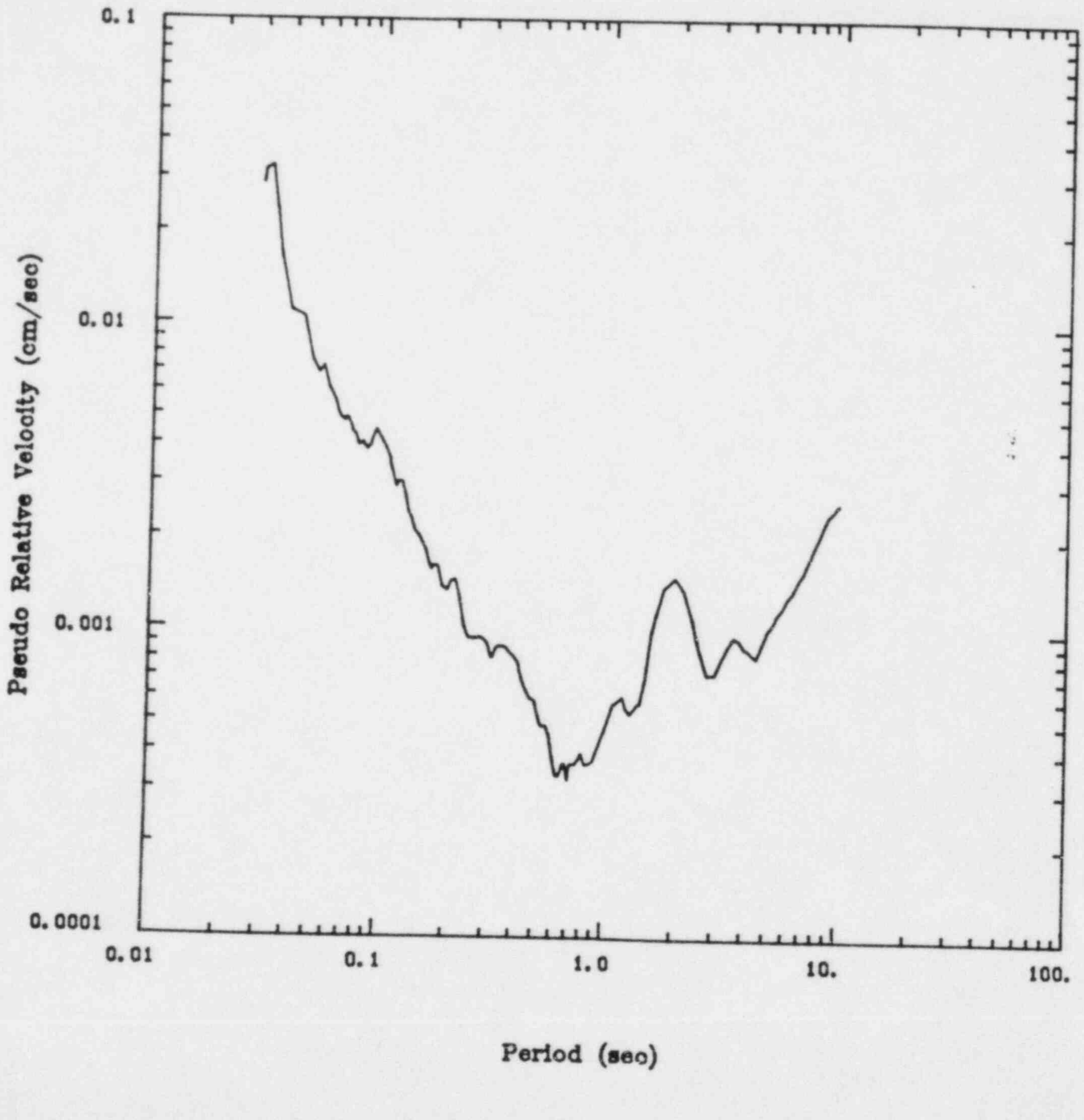
Component: NORTH INSTRUMENT CORRECTED



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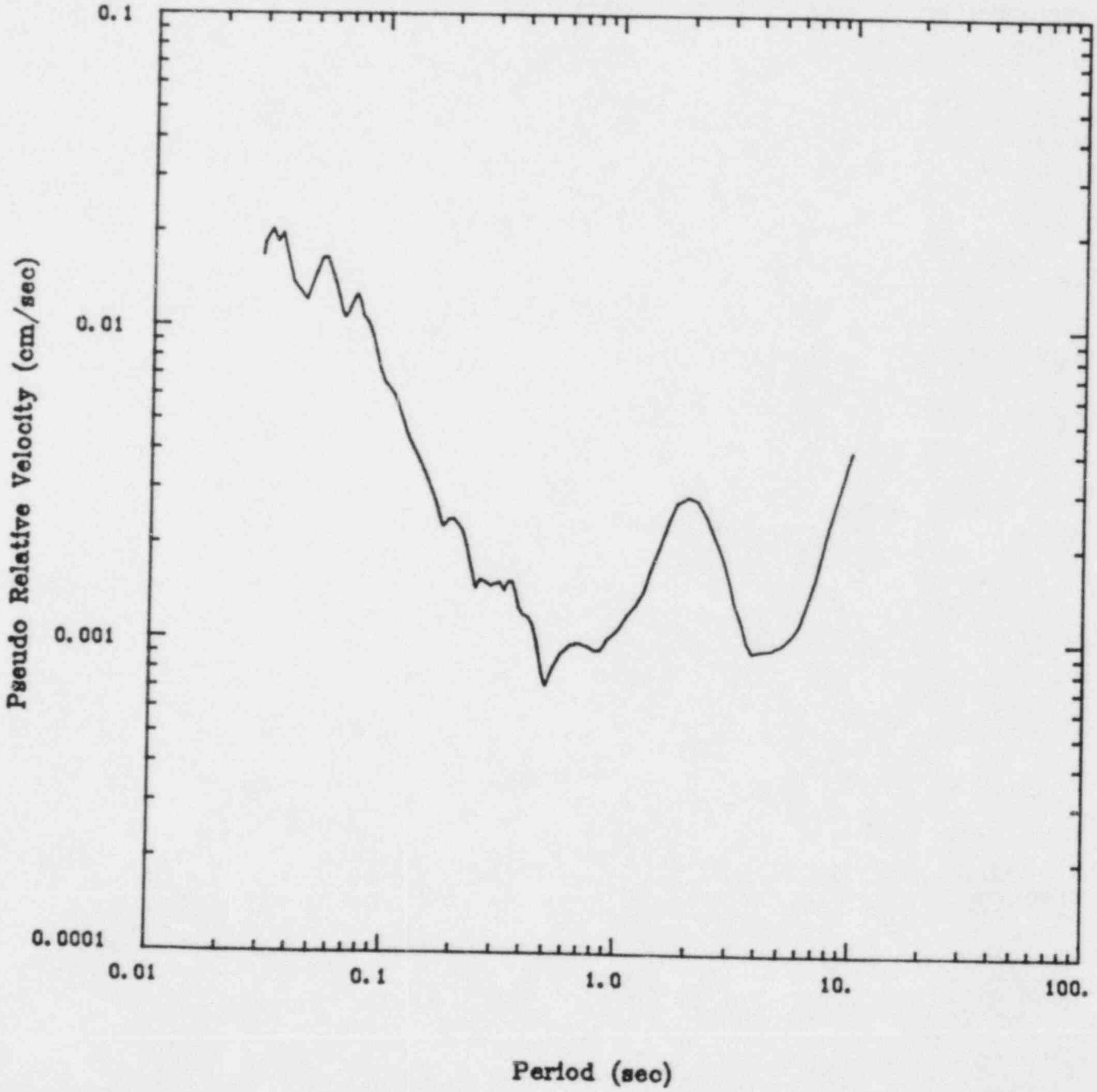

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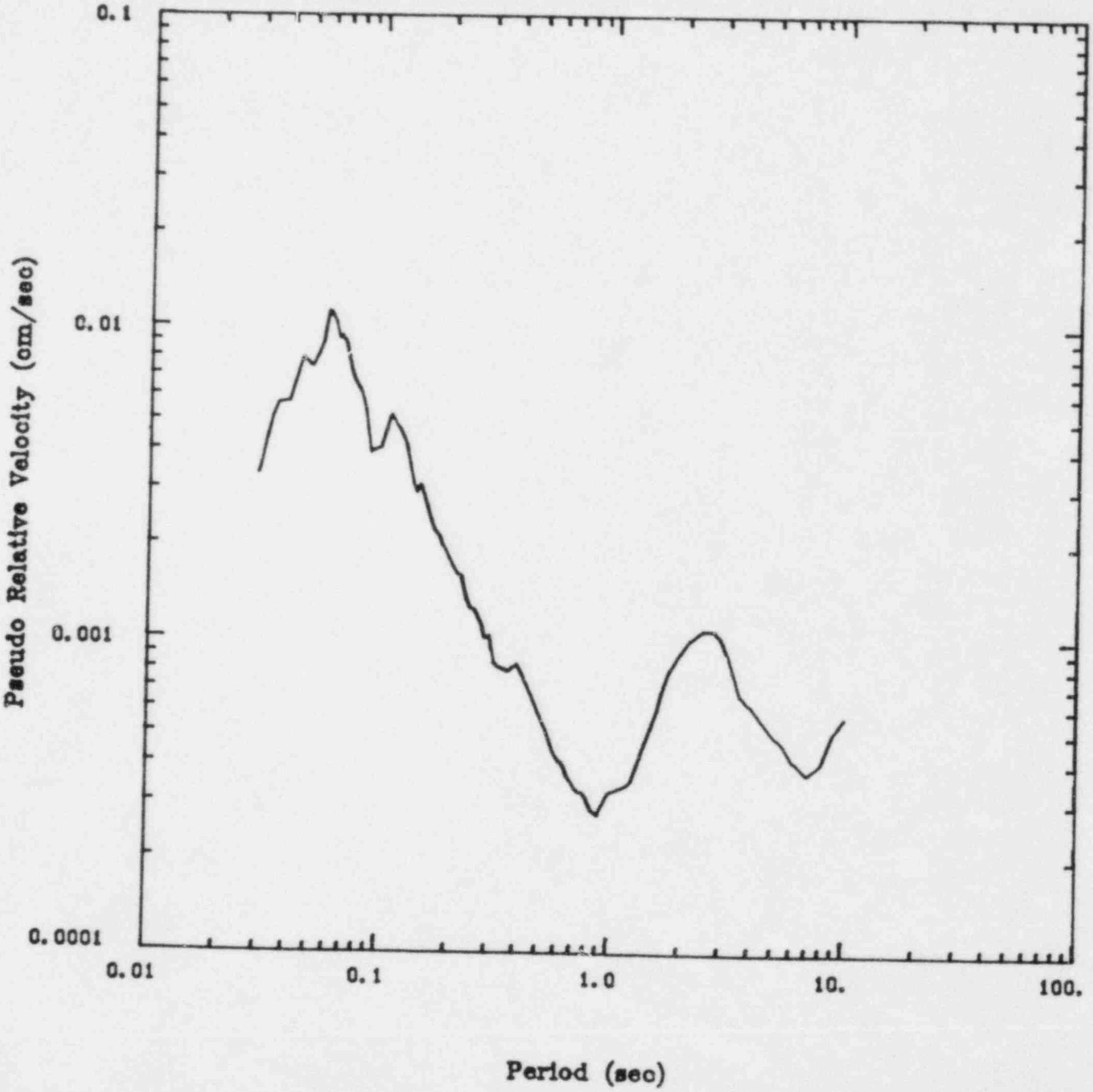
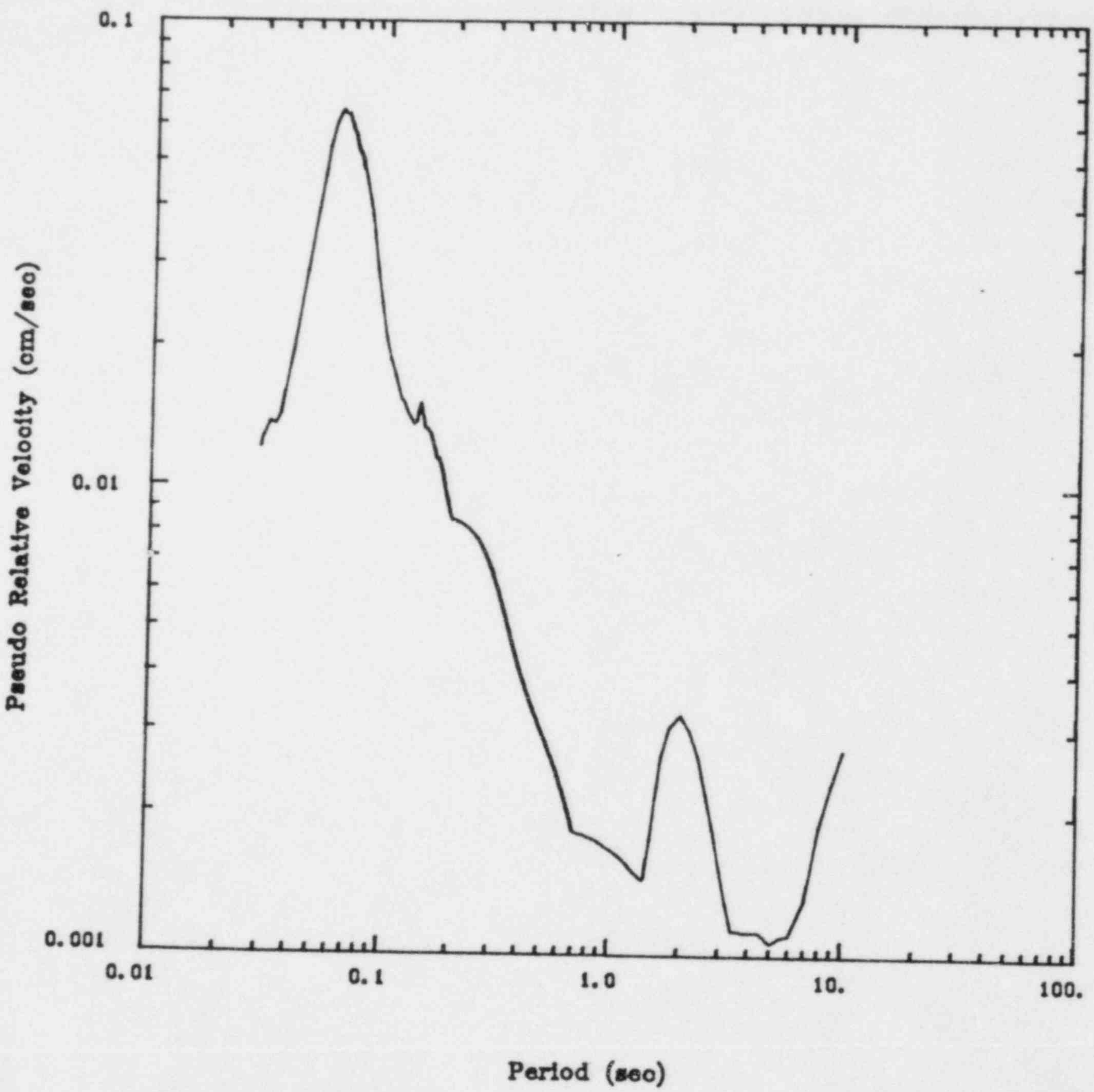
Component: EAST INSTRUMENT CORRECTED



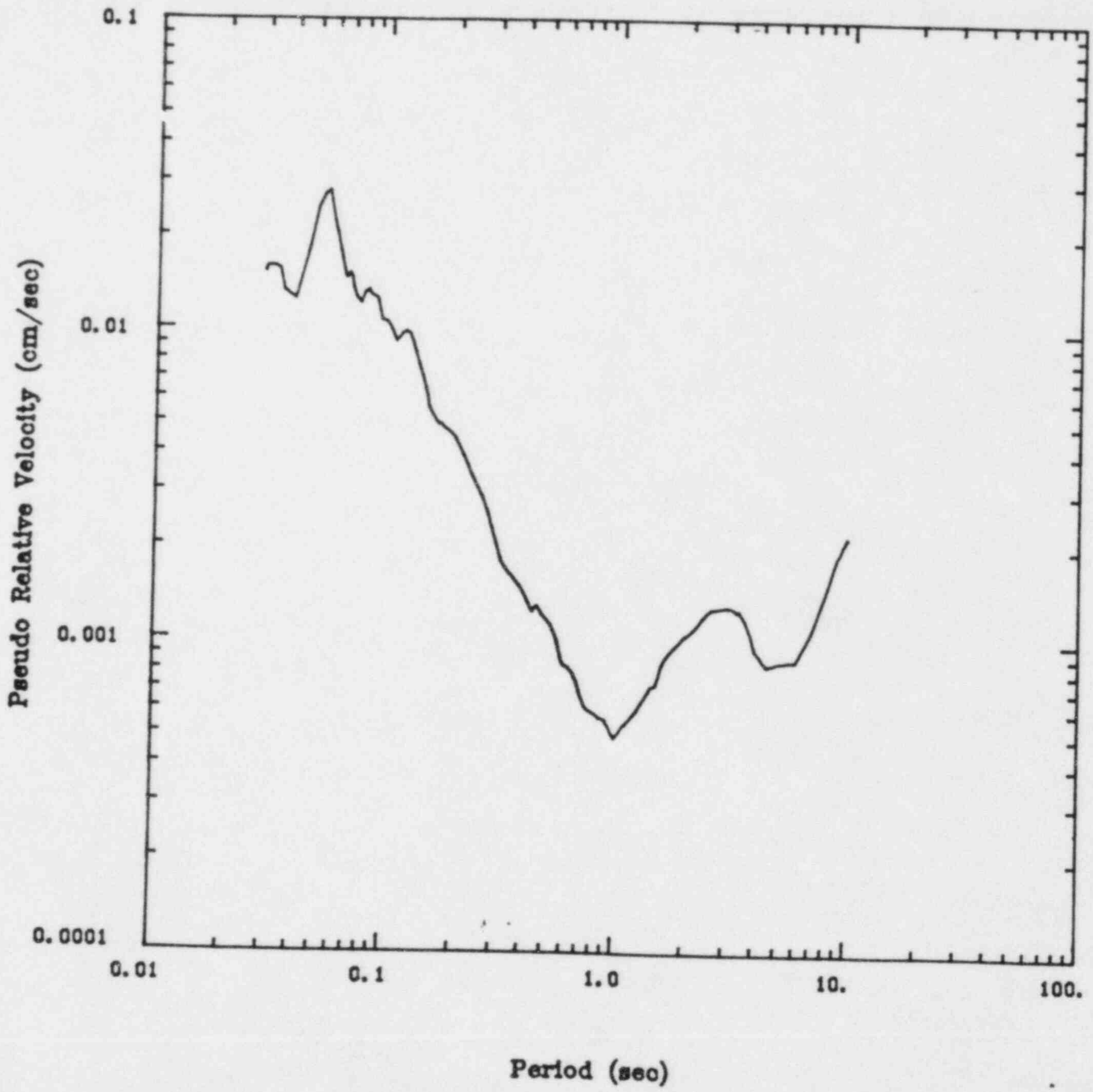
EVN20 S-WAVE

0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL

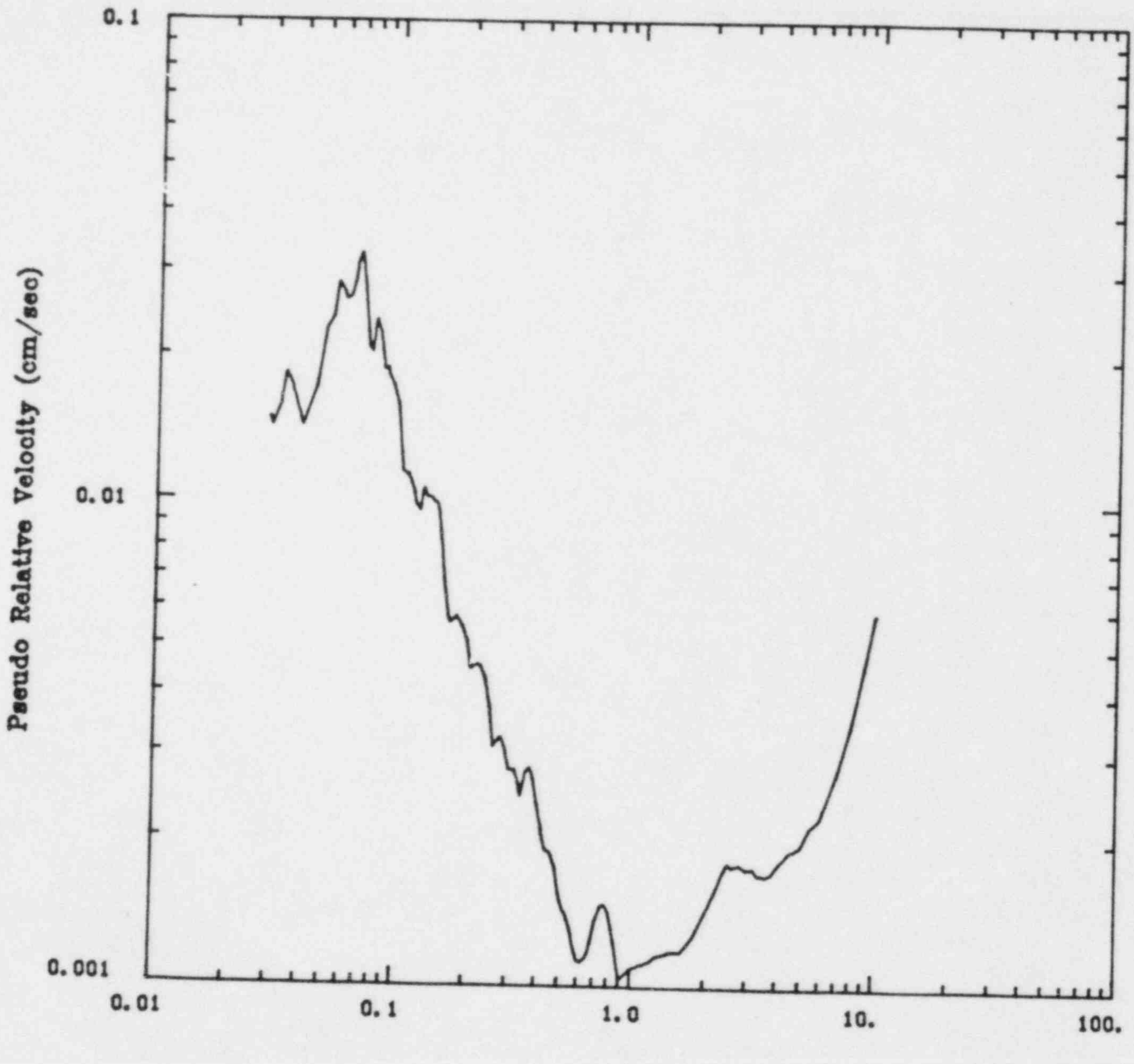
Component: EAST INSTRUMENT CORRECTED



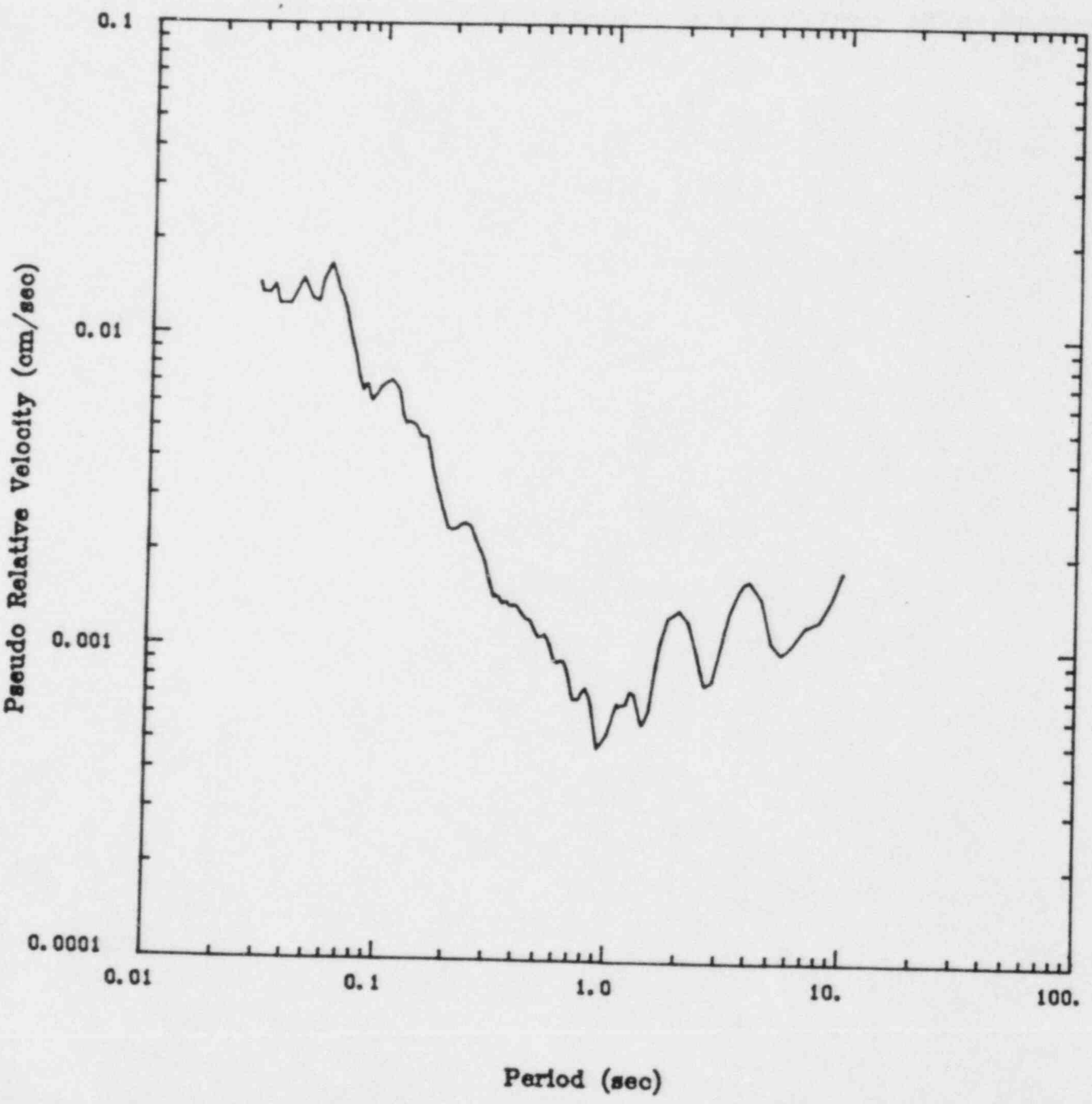
EVN04 P-WAVE (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



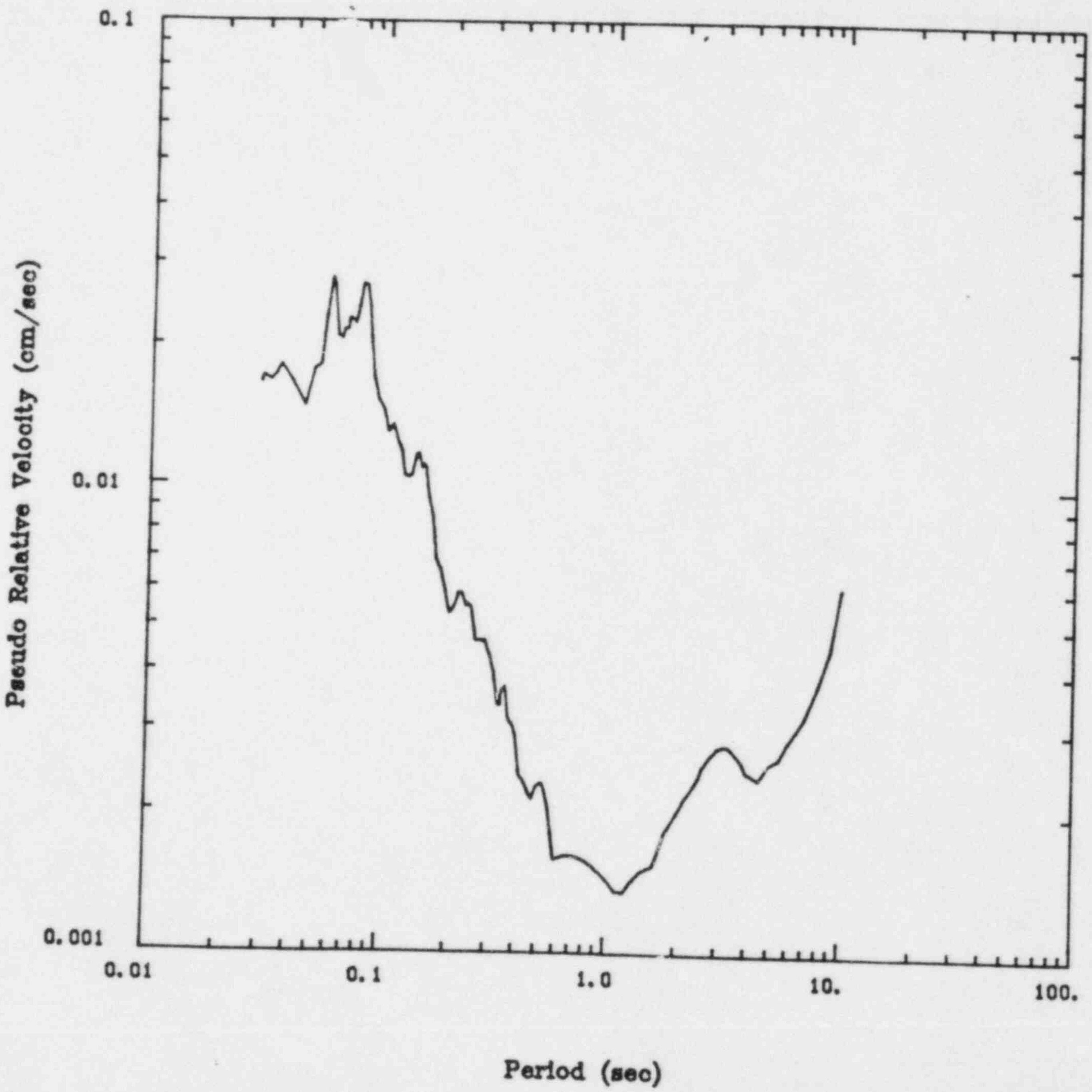
EVN04 S-WAVE (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: VERTICAL INSTRUMENT CORRECTED



EVN04 P-WAVE (WEAKLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: EAST INSTRUMENT CORRECTED



EVN04 S-WAVE (STRONGLY CLIPPED)
0.05 DAMPING, ABSOLUTE AMPLITUDES PROVISIONAL
Component: EAST INSTRUMENT CORRECTED



ATTACHMENT D

INFORMATION RELATED TO EARTHQUAKE EFFECTS ON LOCAL INJECTION WELL OPERATION

Attachment D
PY-CEI/NRR-0440 L

Introduction

The following information summarizes the meeting held with CALHIO representatives and CEI and their consultants on February 27, 1986.

LOCATION:	Perry Plant Site TEC Building Room # 208
SUBJECT:	Effects of the January 31, 1986 Earthquake on Operations of the CALHIO Perry Plant
ATTENDEES:	Representatives of Cleveland Electric Illuminating, Gilbert/Commonweath, Stauffer Chemical (Calhio), Resources Services Inc. and Weston Geophysical

Calhio operates two deep injection wells to dispose of a non-hazardous (under RCRA classification) process waste water, principally brine, resulting from the manufacturing of agricultural fungicides.

As can be seen from the Injection Well Permit the wells are drilled to a depth of approximately 6000/6100 feet. These wells stop at the top of the PRECAMBRIAN foundation with a penetration of less than 10 feet.

Well No. 1 has been in service since about 1976 and well No. 2 since about 1980. There has been no unusual operating experiences (sudden pressure swings, sudden loss of pumping media, ground movement or unusual sounds other than the 1/31/86 earthquake)

These wells are located approximately three miles from the site and approximately 7 to 10 miles from the epicentral area. A "typical" sketch of injection well No. 2 is attached.

The wells are routinely examined per permit requirements and are known to be in excellent shape. During development tests of well No. 2, it was determined that there was no interaction between the two wells due to the extensive reservoir these wells penetrate.

Also during development of these wells, there was no evidence of faulting identified from the coring samples or "loss of fluids" during pressure tests.

Well Status During Event

During the 1/31/86 earthquake only well no. 1 was operating. About 1/2 hour prior to the earthquake the well no. 1 pumping rate was lowered from 85 gpm to about 65 gpm. As a result of the seismic event Pump No. 1 automatically tripped off by design from high vibration. There were no unusual well/system disturbances before, during or after the earthquake. Examination of the well pressure logs show no sudden pressure changes other than the natural well decay pressure following the pump trip.

Well No. 2, which was not operating, showed no pressure changes from the seismic event. It's possible to read system operating pressures to within + 5 psig on the strip charts. There was no detectable pressure changes identified on the strip charts.

Conclusion

It was determined that due to the shallow depth of these wells, their large distance from the epicentral area, no previous unusual operating experiences, lack of development problems and no unusual operating symptons during this event that the Calhio wells had no relationship to the earthquake of 1/31/86

Conclusions of Weston Geophysical Corp.

Based on present information. the large distance of the wells from the epicenter. the competency and tightness of the Precambrian. the fact that there is no communication between Wells Nos. 1 and 2 which are 2.600 feet apart. and no evidence of a geological fault, shear or weak zone between the wells and the epicenter. there is no reason to believe that there is a relationship between the injection of fluids and the earthquake of January 31. 1986.

Well Descriptions

Well No. 1

OPERATING DATA

Maximum injection rate	86 gpm
Average injection rate	The well is operated at either 65 gpm or 86 gpm. The average injection rate varies but is never greater than 86 gpm.
Maximum injection pressure	1630 psi

NAME AND DEPTH OF INJECTION ZONES

Maynardville Dolomite (Kerbel Formation)	5473-5646 feet K.B.
Rome Formation	5716-5789 feet K.B.
Mt. Simon Sandstone	5936-6060 feet K.B.

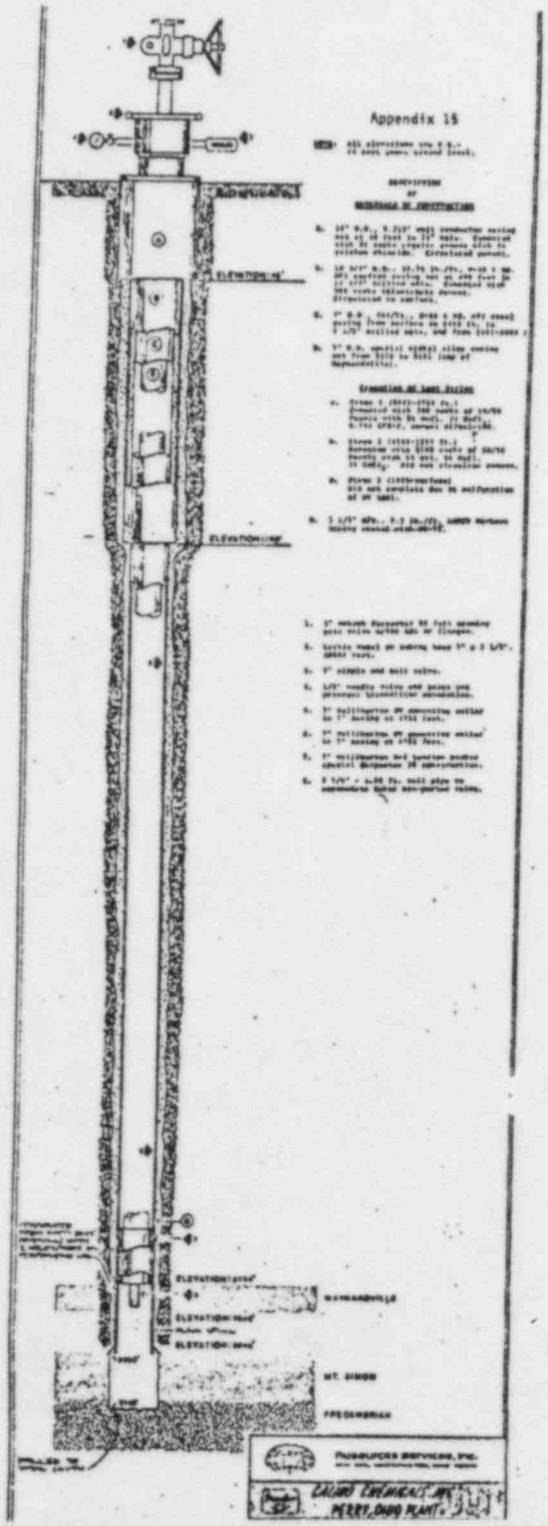
WELL NO. 2

OPERATING DATA

Maximum injection rate	73 gpm
Average injection rate	The well is operated at either 53 or 73 gpm. It is most commonly operated at 53 gpm; however, the average rate varies but is never more than 73 gpm.
Maximum injectio pressure	1600 psi

NAME AND DEPTH OF INJECTION ZONES

Maynardville Dolomite (Kerbel Formation)	5497-5660 feet K.B.
Mt. Simon Sandstone	5952-6096 feet K.B.


Appendix 15
MT. SIMON
PRECAMBRIAN
PERRY, OHIO PLANT

Procedure Improvements

Based on our experience during the 1986 earthquake, we have identified a number of improvements to our operating and emergency procedures. The following provides a discussion of the nature of the changes we are implementing to enhance the operators ability to identify associated earthquake levels and emergency actions.

EPI-A1 "Emergency Actions Levels" is being revised to better define the indications used to establish the emergency action levels. The revised procedure will utilize indications from both the Kinemetrics and Engdahl instruments.

ONI-D51 "Earthquake" is being revised to better define the meaning of the various alarms received from a seismic event. Specifically, reference to the "high" lights has been changed to refer to the "red" lights which are indicative of an OBE exceedance. Section 3.0 - Immediate Actions - has been expanded to include a clearer definition of what constitutes exceedance of an OBE (i.e., receipt of 1 or more red lights).

In the longer term, we will be reviewing the basis for the alarm indications and their setpoints to more appropriately define an OBE or SSE exceedancy, in light of the engineering evaluation of the high frequency exceedances. We will propose approprate revisions to the staff by June 1986.