STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
OFFICE OF STRONG MOTION STUDIES
630 BERCUT DRIVE
SACRAMENTO, CA 95814-0189
(PHONE 916—322-3105)

Plots To Accompany Tapes:
LOMAPRIETA89-IL (Phase 1 data)
LOMAPRIETA89-L (Phases 2 & 3 data)

Processed Strong-Motion Data from the Loma Prieta Earthquake of 17 October 1989
Lifeline Records

California Strong Motion Instrumentation Program (CSMIP)

Report No. OSMS 91-08

The attached plots for the records from the 7 lifelines are excerpted from the forthcoming CSMIP report on the processed strong-motion data from the 1989 Loma Prieta earthquake.

The plots for these lifelines are arranged as follows:

No.	Lifeline Name	No. of Channels
1.	San Juan Bautista - 101/156 Overpass	12
2.	South San Francisco - Sierra Pt. Overpass and Ref. Free Field	16
3.	Hayward - BART Elevated Section and Ref. Free Field	18
4.	San Francisco Bay - Dumbarton Bridge and Ref. Free Field	28
5.	Lexington Dam	9
6.	Lower Crystal Springs Dam	13
7.	Oakland - Outer Harbor Wharf	11

The set of plots for each lifeline is identified by the above lifeline number at the upper corner of each page. For each lifeline, four sets of plots are presented in the following order:

1. Phase 1 (Vol. 1) data: uncorrected accelerations. Acceleration for the first 30 seconds are plotted with a common amplitude scaling factor for all channels. Eight channels are plotted on one page. The full processed length is 30 seconds for most lifelines. The plots for the data beyond 30 seconds are also included for long duration records. For lifelines with a reference free-field, the difference of recorder starting times is given on the plot of the reference free-field record.

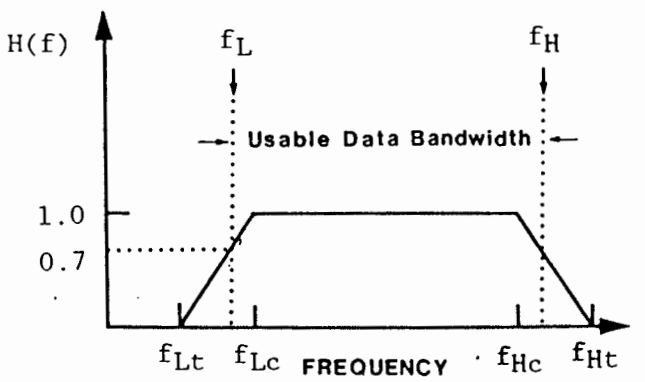
2. Phase 2 (Vol. 2) data: instrument and baseline-corrected acceleration, velocity and displacement. The data for the first 30 seconds are plotted with equal scaling for all channels unless otherwise specified. Three channels are plotted on each page. The plots for the data beyond 30 seconds are also included in the case of long duration records. The usable frequency bandwidth of the Phase 2 data, as determined during processing, is indicated on the plots.

3. Phase 3 (Vol. 3) data: response spectra. The pseudo-velocity spectra (PSV), the pseudo-acceleration spectra (PSA), the displacement spectra (SD) for 0%, 2%, 5%, 10%, and 20% dampings are presented on a tripartite logarithmic plot for each channel. The spectra are plotted for periods within the usable data bandwidth.

4. Phase 3 (Vol. 3) data: response spectra. The absolute acceleration spectra (SA) for 0%, 2%, 5%, 10% and 20% dampings are plotted against period with linear-linear scaling.

DEFINITION OF USABLE DATA BANDWIDTH

The usable data bandwidth for each record is indicated on the plots for the Phase 2 and Phase 3 data. The user should only use these data for analyses within this bandwidth. As described in the section on Accelerogram Digitization and Processing, the digitized data are processed and filtered using Ormsby filters. The data are first low-pass filtered by a high-frequency filter (typically with a corner frequency of 23 Hz and a roll-off termination frequency of 25 Hz), and then high-pass filtered by a low-frequency filter. The corner frequency of the low-frequency filter may be different for different records. Therefore, the Phase 2 data is the result of the digitized data being filtered by the bandpass filter H(f) with ramps as shown in the figure:



The usable data bandwidth is defined as the band between frequencies f_H and f_L where f_H and f_L are the -3 dB points on the high-frequency and low-frequency ramps, respectively. The value of H(f) is approximately equal to 0.7 for -3 dB*.

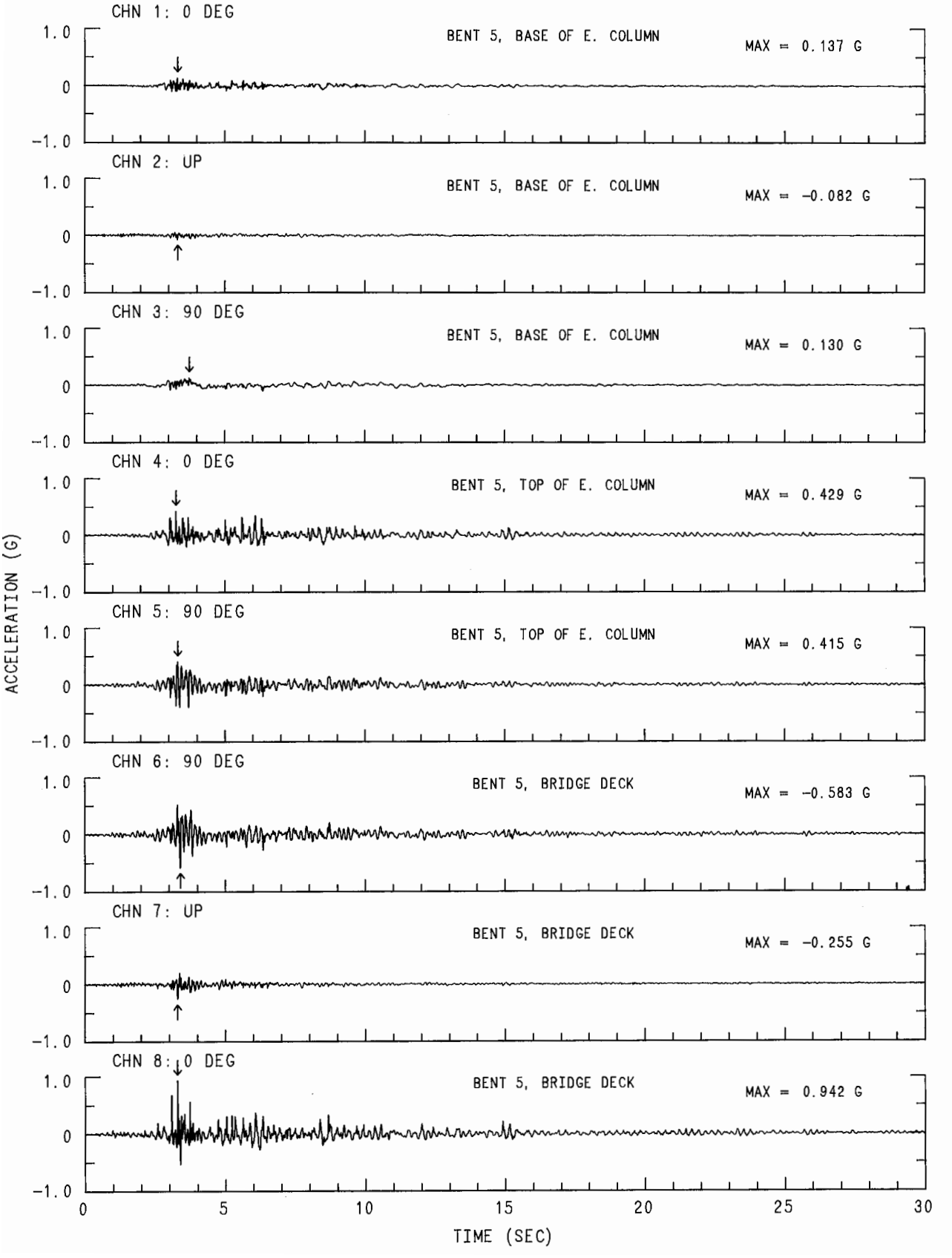
The values of f_H and f_L can be calculated from the corner frequencies (f_{Hc}, f_{Lc}) and the roll-off termination frequencies (f_{Ht}, f_{Lt}) by using the formulas $f_H = f_{Hc} + 0.3 * (f_{Ht} - f_{Hc})$ and $f_L = f_{Lc} - 0.3 * (f_{Lc} - f_{Lt})$. For example, the usable data bandwidth for data bandpass-filtered with ramps at 0.25 to 0.50 Hz and 23.0 to 25.0 Hz is 0.42 to 23.6 Hz.

* Note on dB: It is common in signal processing to plot 20 $\log_{10}[H(f)]$ versus frequency, and express the ordinate value in decibels (abbreviated dB). Accordingly, 0 dB corresponds to a value of H(f) equal to 1; 20 dB is equivalent to H(f) = 10; -20 dB corresponds to H(f) = 0.1; and -3 dB corresponds to H(f) = 0.7.

SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

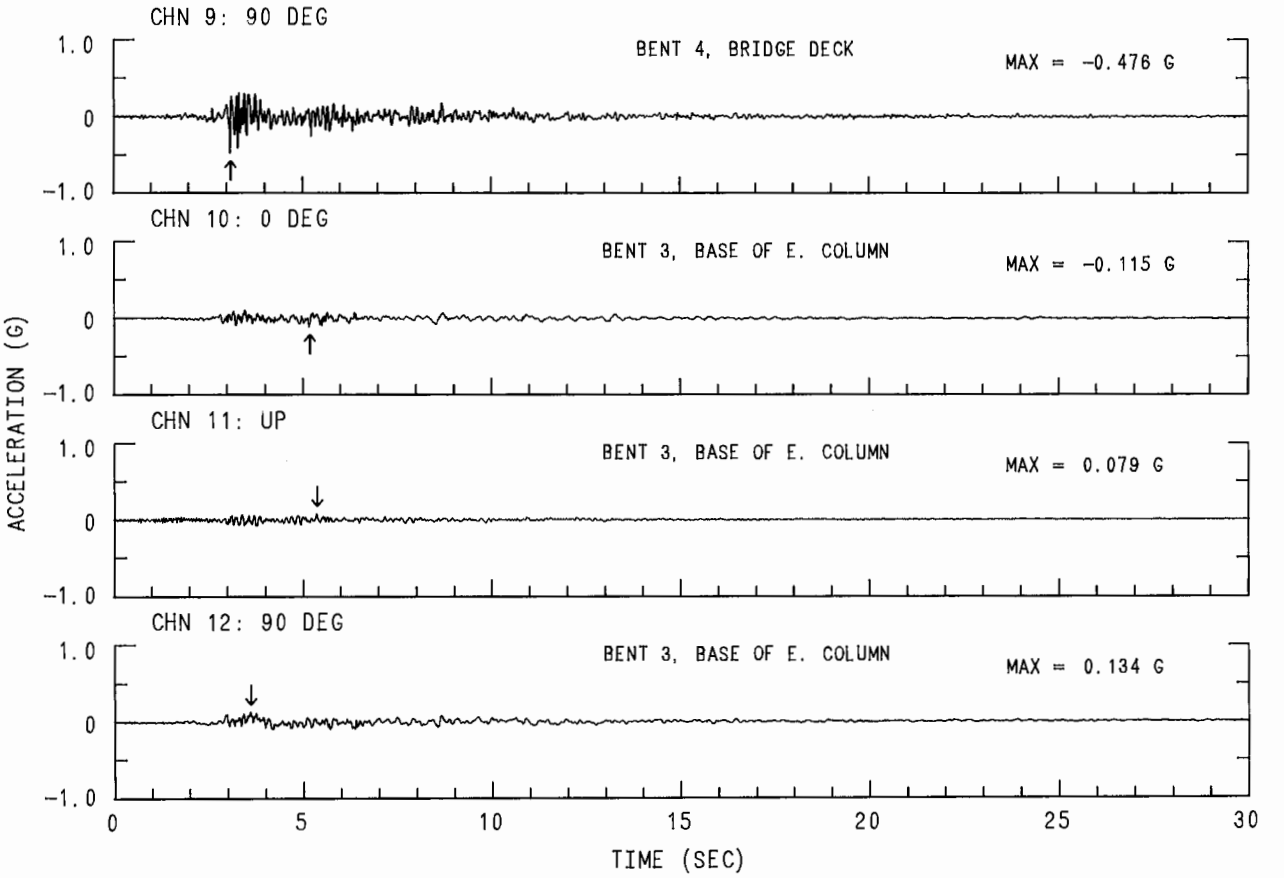
PHASE 1 ACCELERATION. RECORD ID: 47315-C0139-89291.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

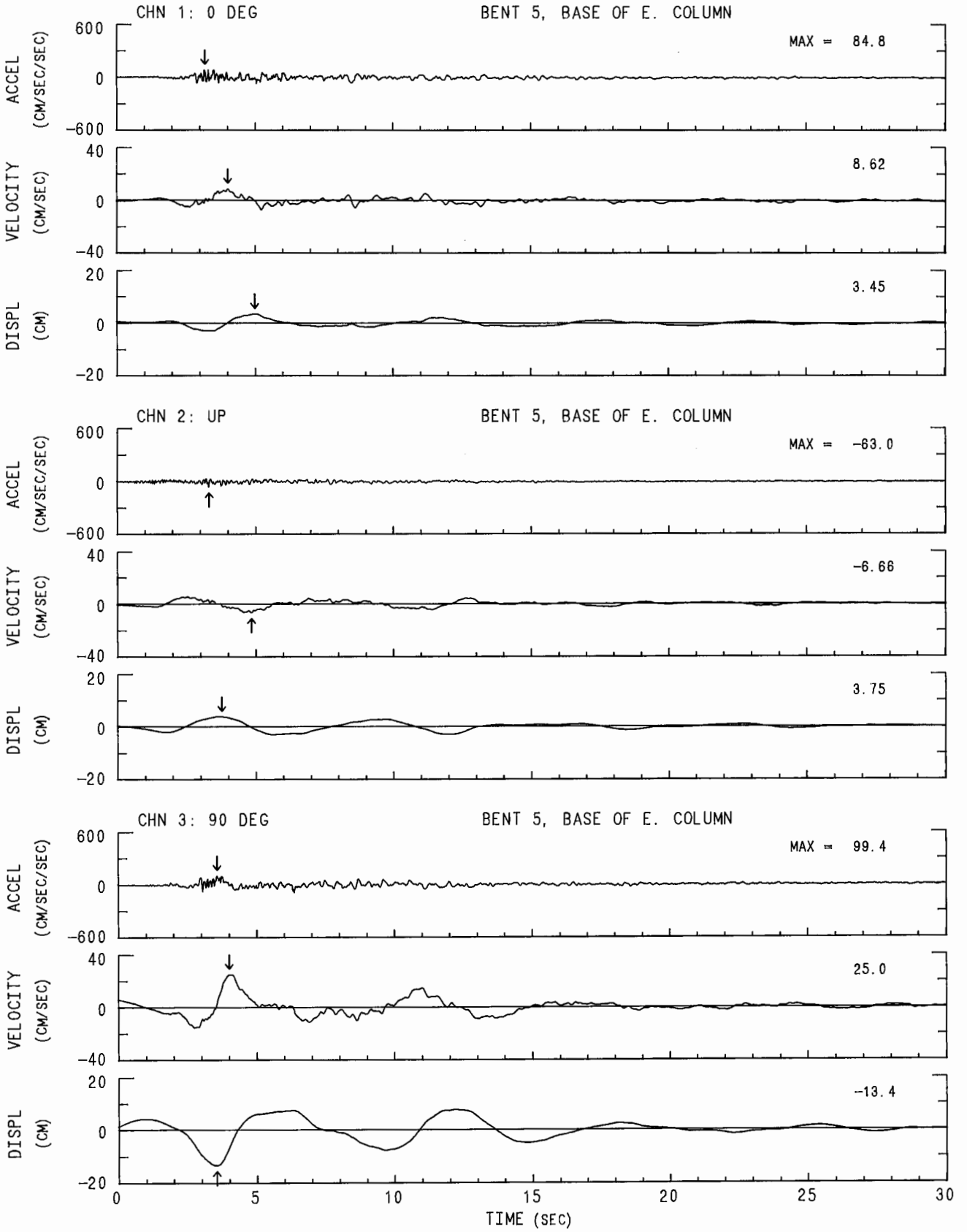
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

PHASE 1 ACCELERATION. RECORD ID: 47315-C0139-89291.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

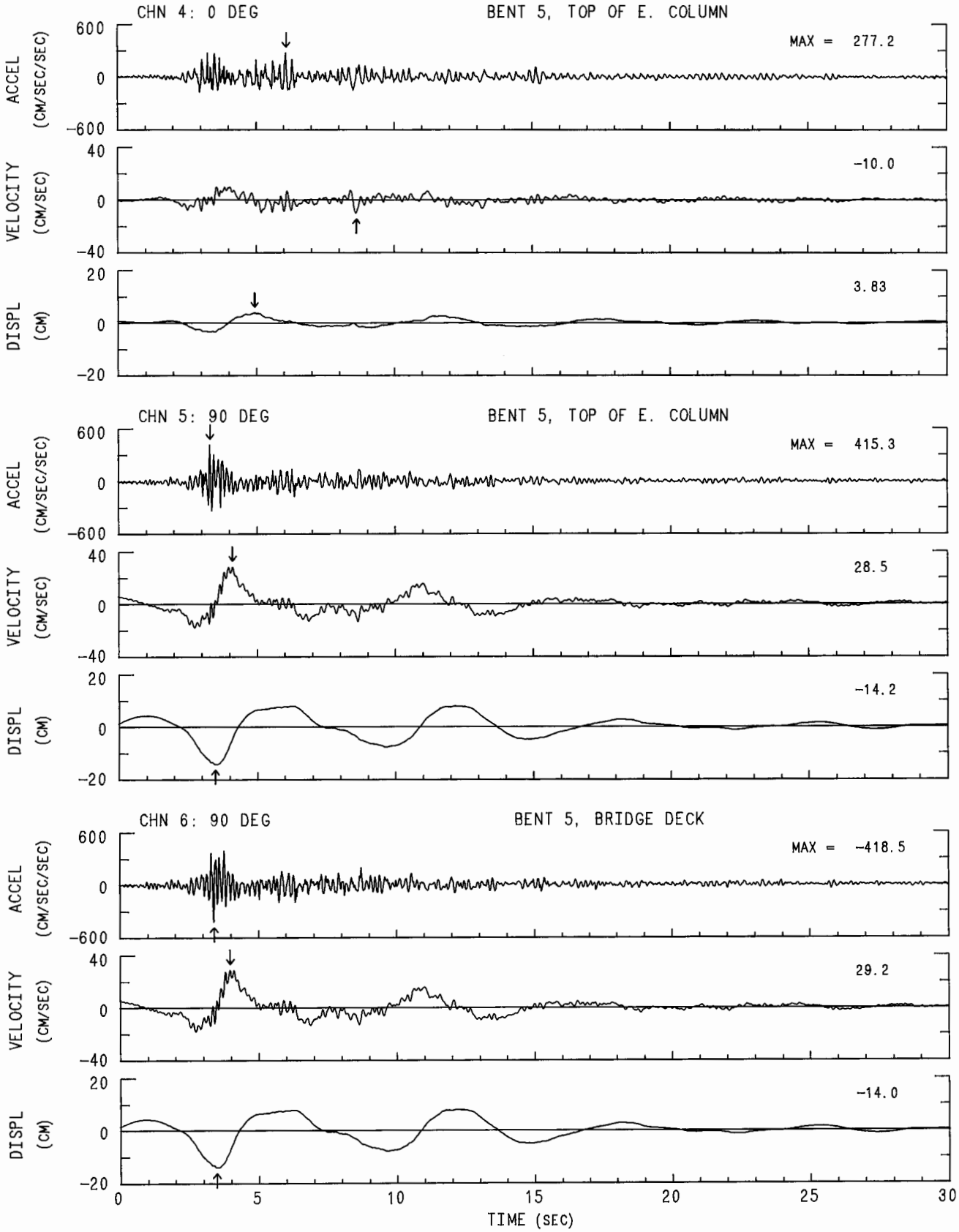
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC) RECORD ID: 47315-C0139-89291.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

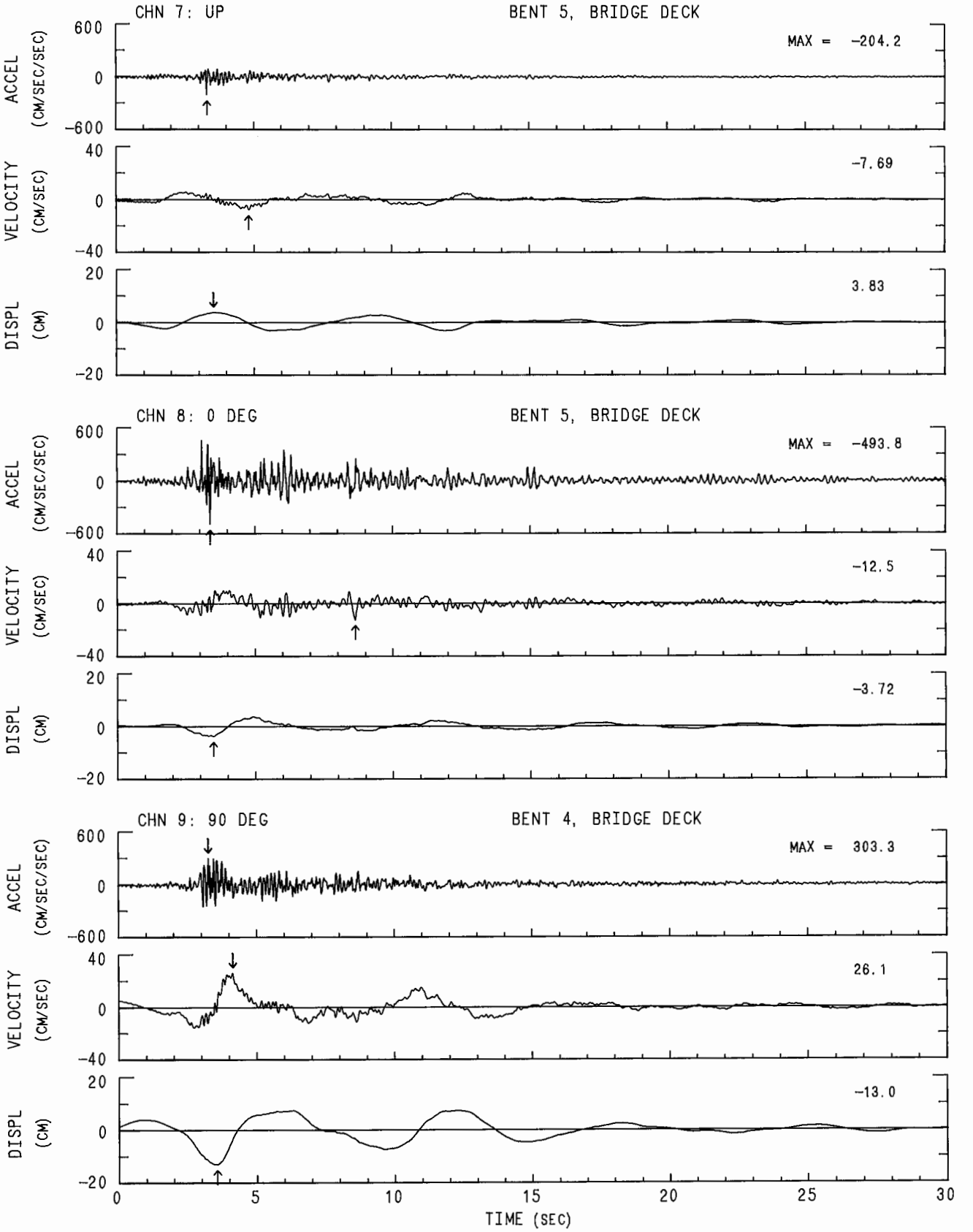
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC) RECORD ID: 47315-C0139-89291.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

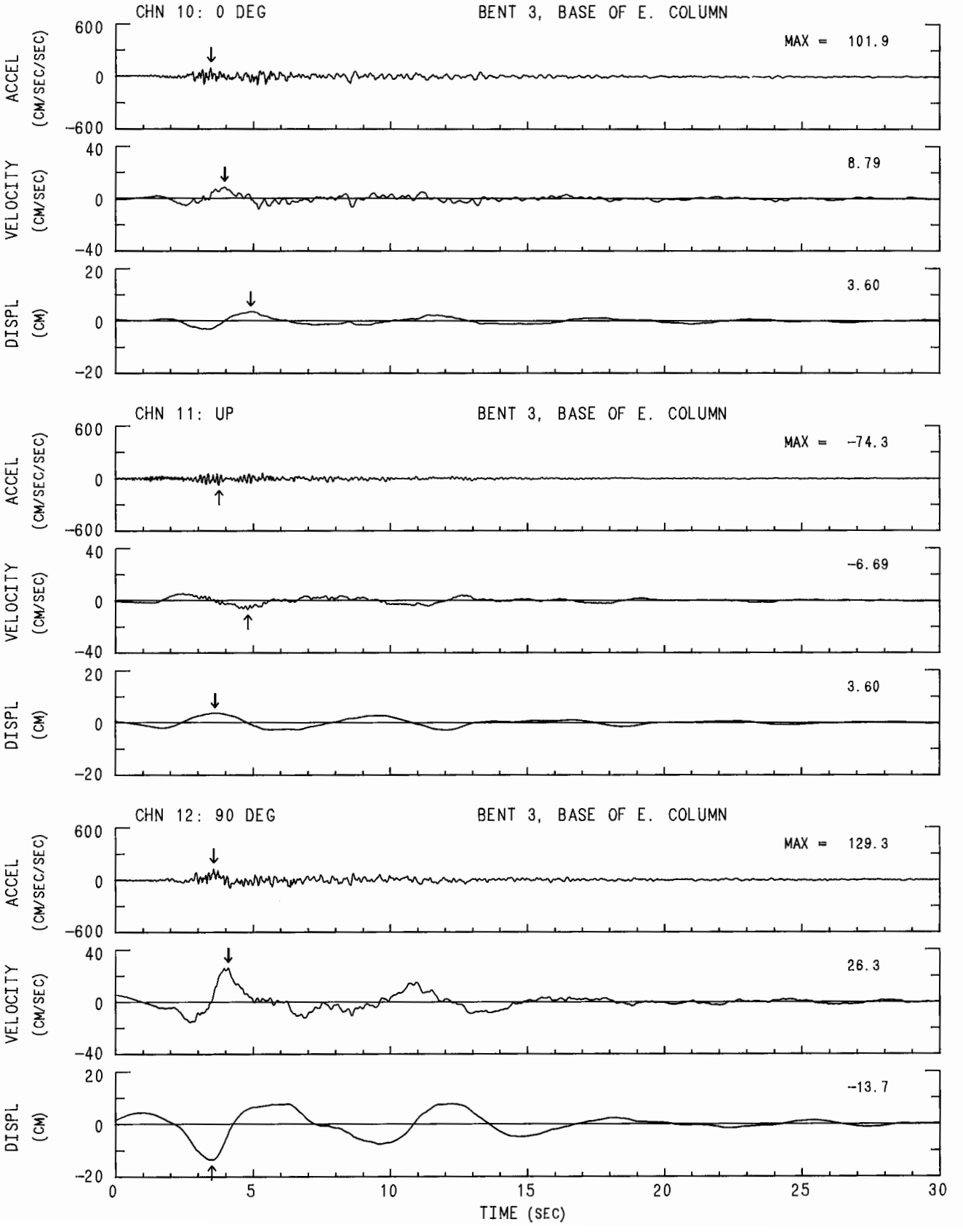
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC) RECORD ID: 47315-C0139-89291.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC) RECORD ID: 47315-C0139-89291.01



SAN JUAN BAUTISTA – 101/156 OVERPASS: CSMIP S/N 315

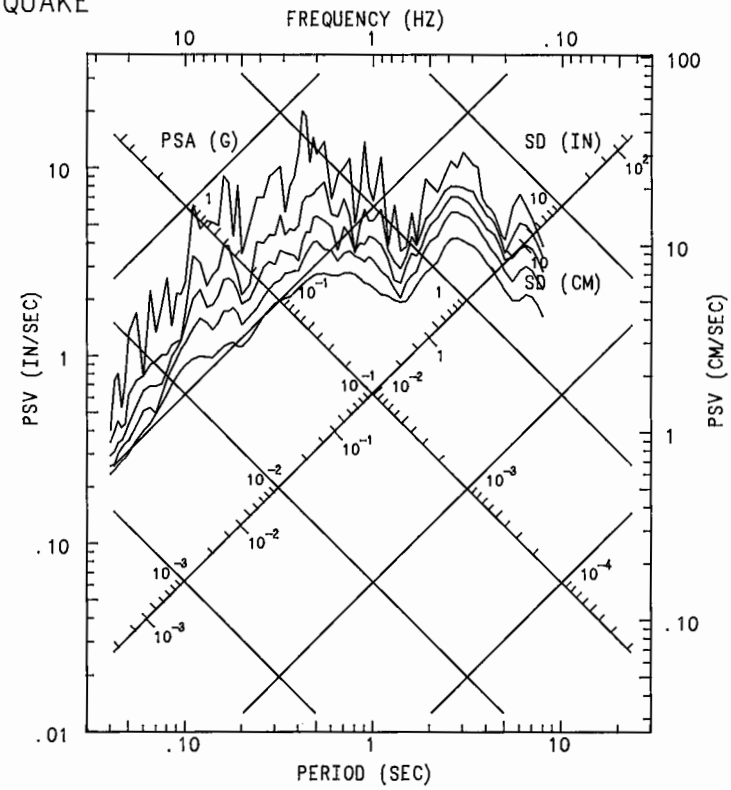
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ
(0.04 TO 7.35 SEC)

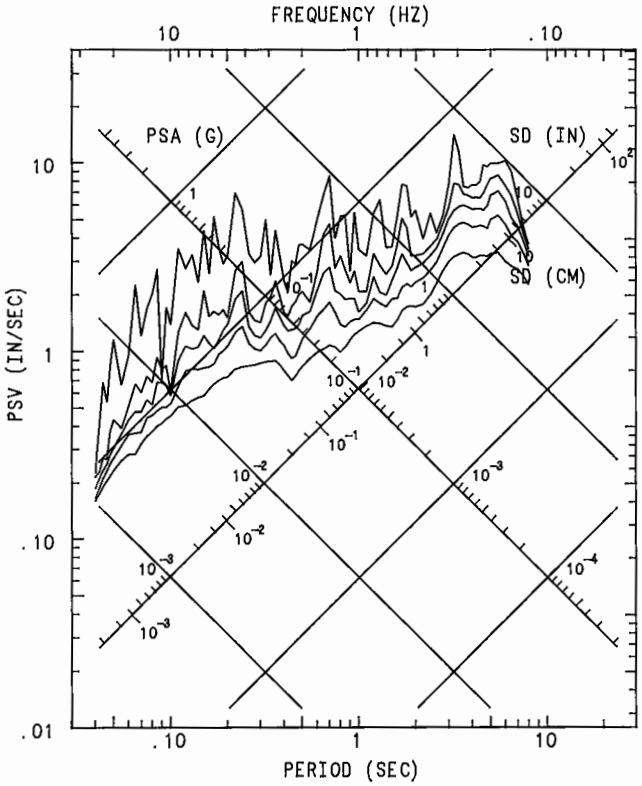
RECORD ID: 47315-C0139-89291.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

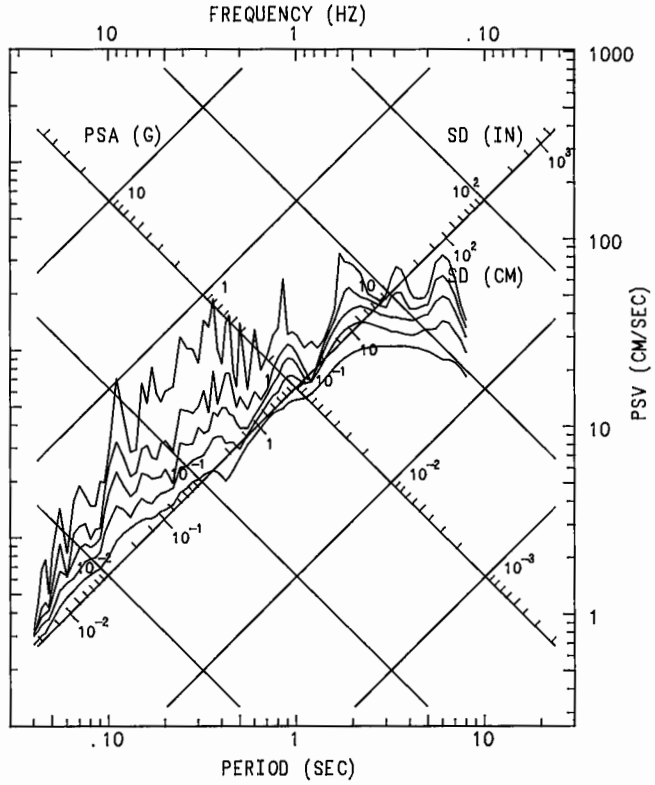
CHN 1: 0 DEG
BENT 5, BASE OF E. COLUMN



CHN 2: UP
BENT 5, BASE OF E. COLUMN



CHN 3: 90 DEG
BENT 5, BASE OF E. COLUMN



SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

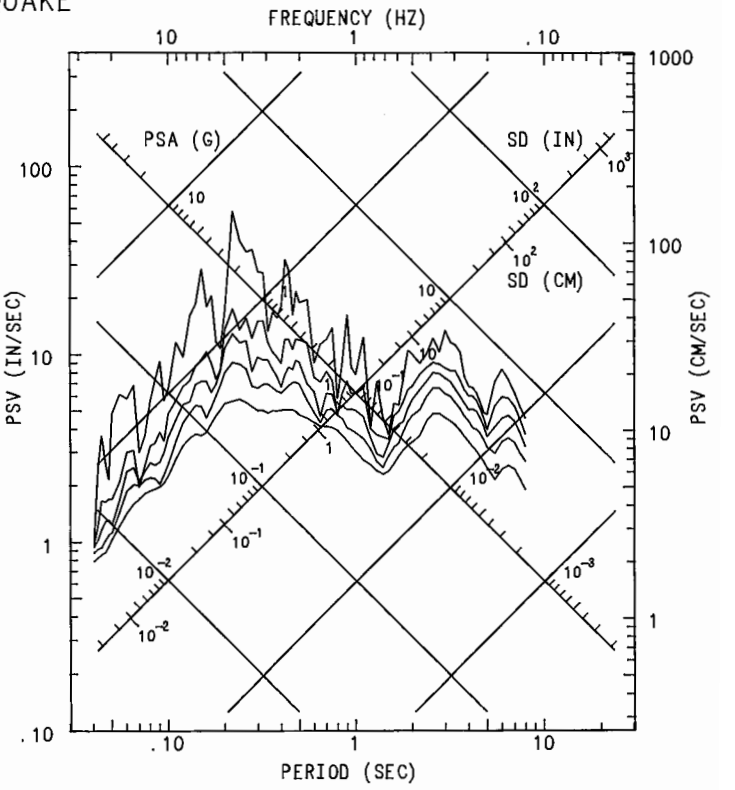
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ
(0.04 TO 7.35 SEC)

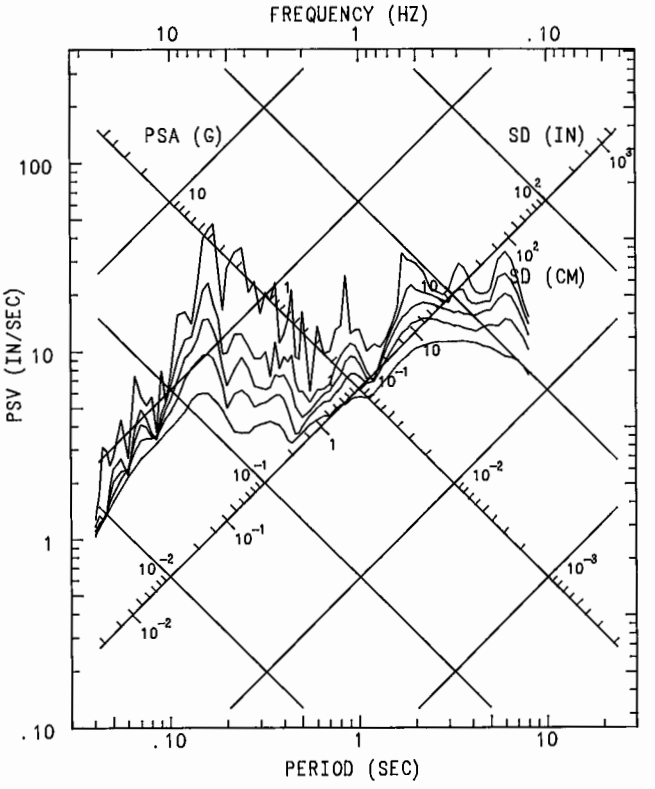
RECORD ID: 47315-C0139-89291.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

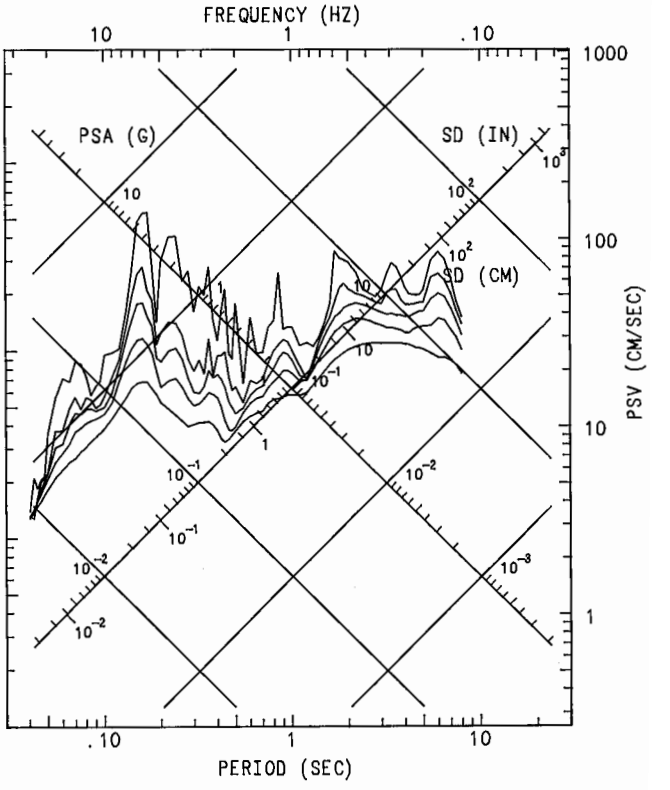
CHN 4: 0 DEG
BENT 5, TOP OF E. COLUMN



CHN 5: 90 DEG
BENT 5, TOP OF E. COLUMN



CHN 6: 90 DEG
BENT 5, BRIDGE DECK



SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

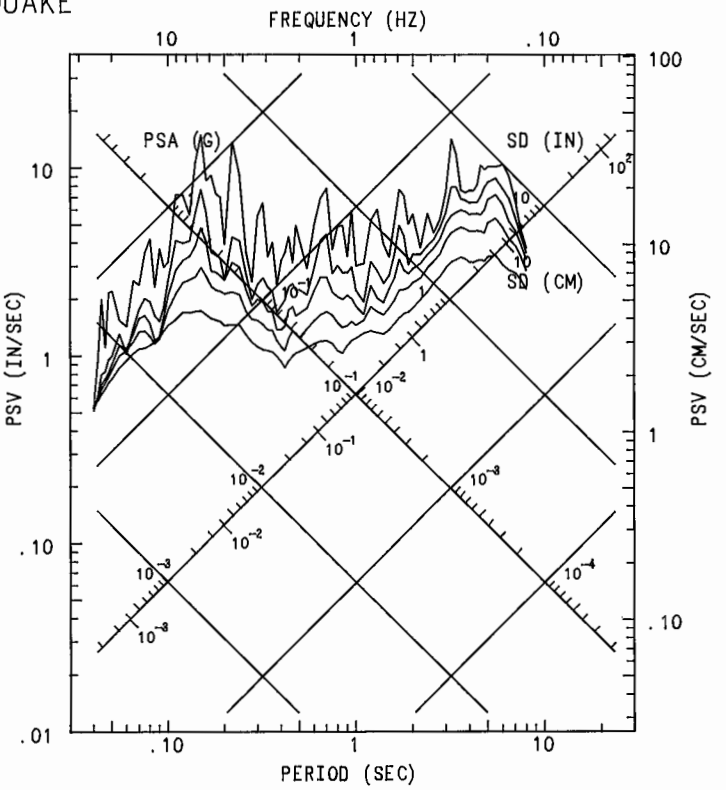
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ
(0.04 TO 7.35 SEC)

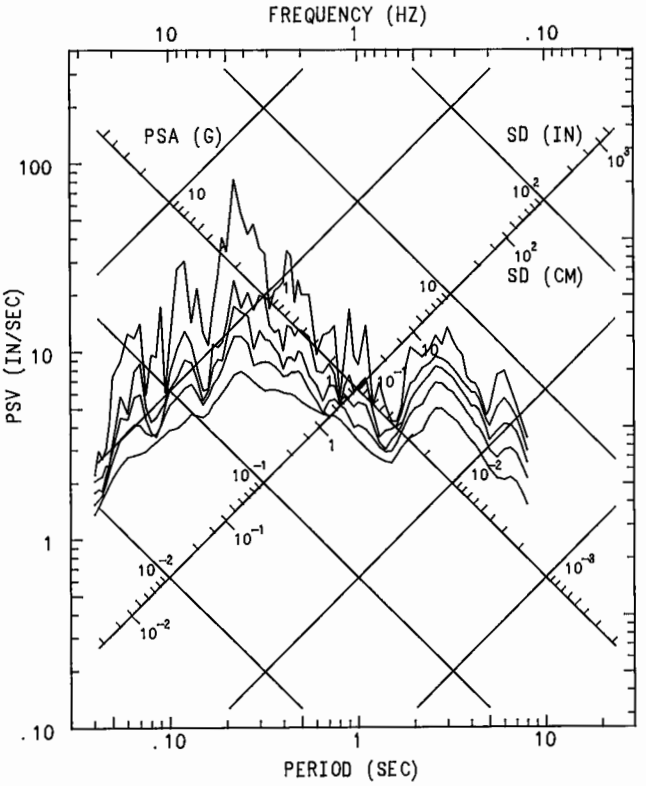
RECORD ID: 47315-C0139-89291.01

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

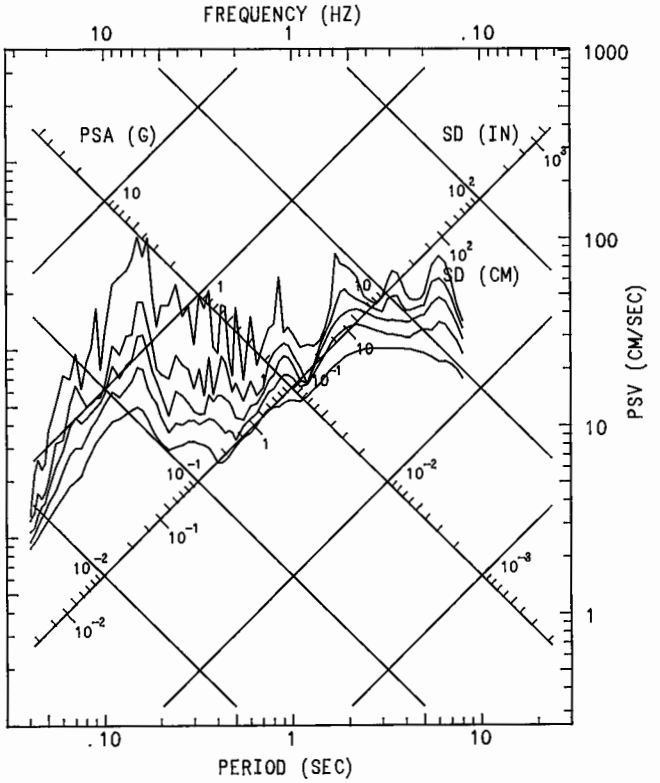
CHN 7: UP
BENT 5, BRIDGE DECK



CHN 8: 0 DEG
BENT 5, BRIDGE DECK



CHN 9: 90 DEG
BENT 4, BRIDGE DECK



SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

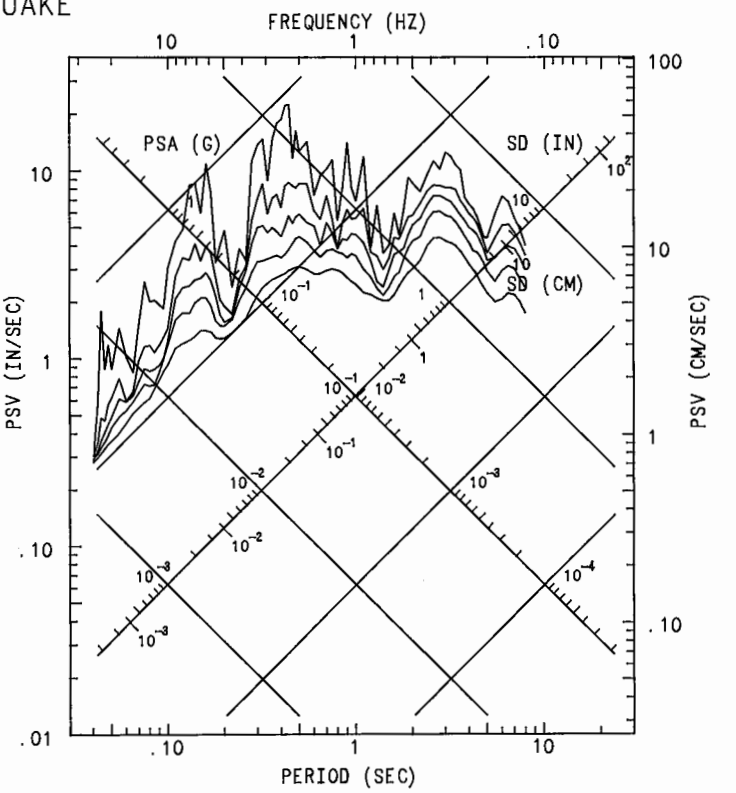
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ
(0.04 TO 7.35 SEC)

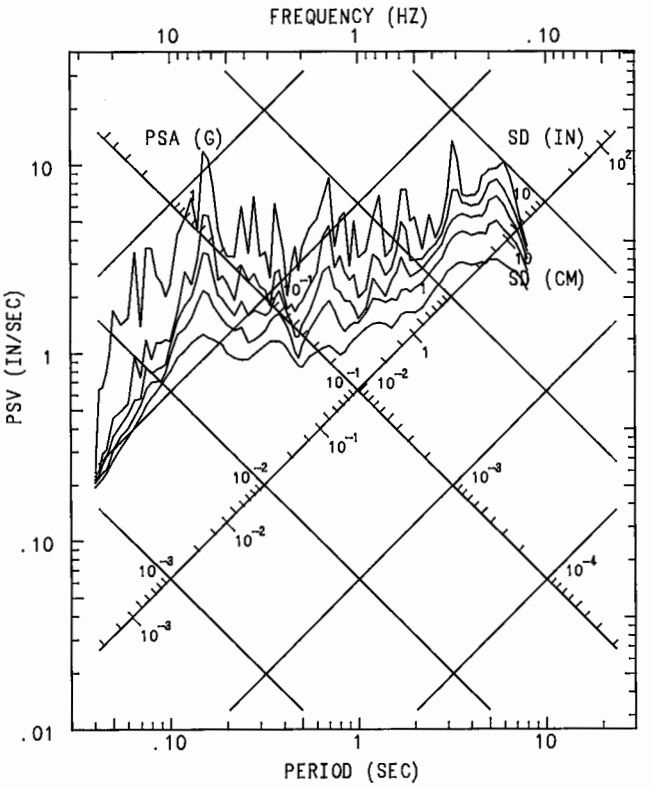
RECORD ID: 47315-C0139-89291.01

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

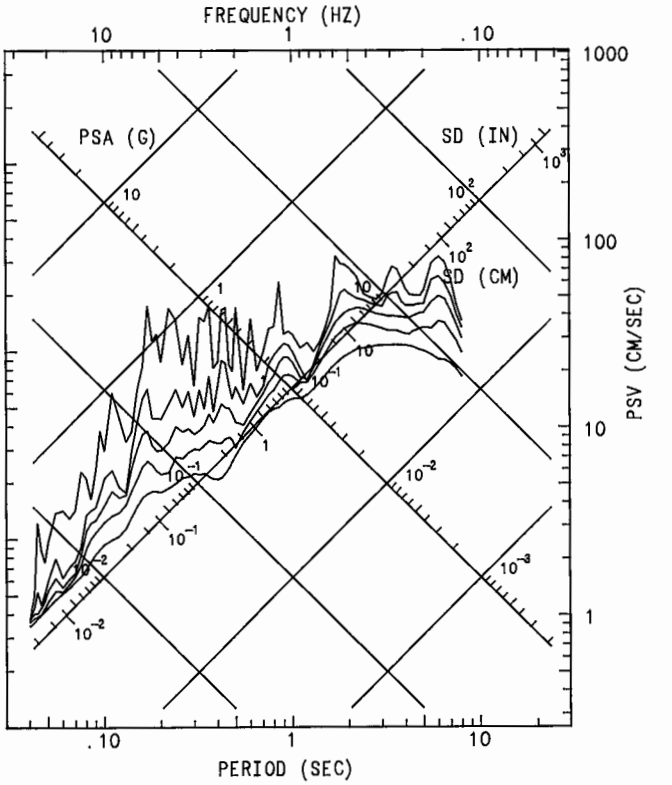
CHN 10: 0 DEG
BENT 3, BASE OF E. COLUMN



CHN 11: UP
BENT 3, BASE OF E. COLUMN

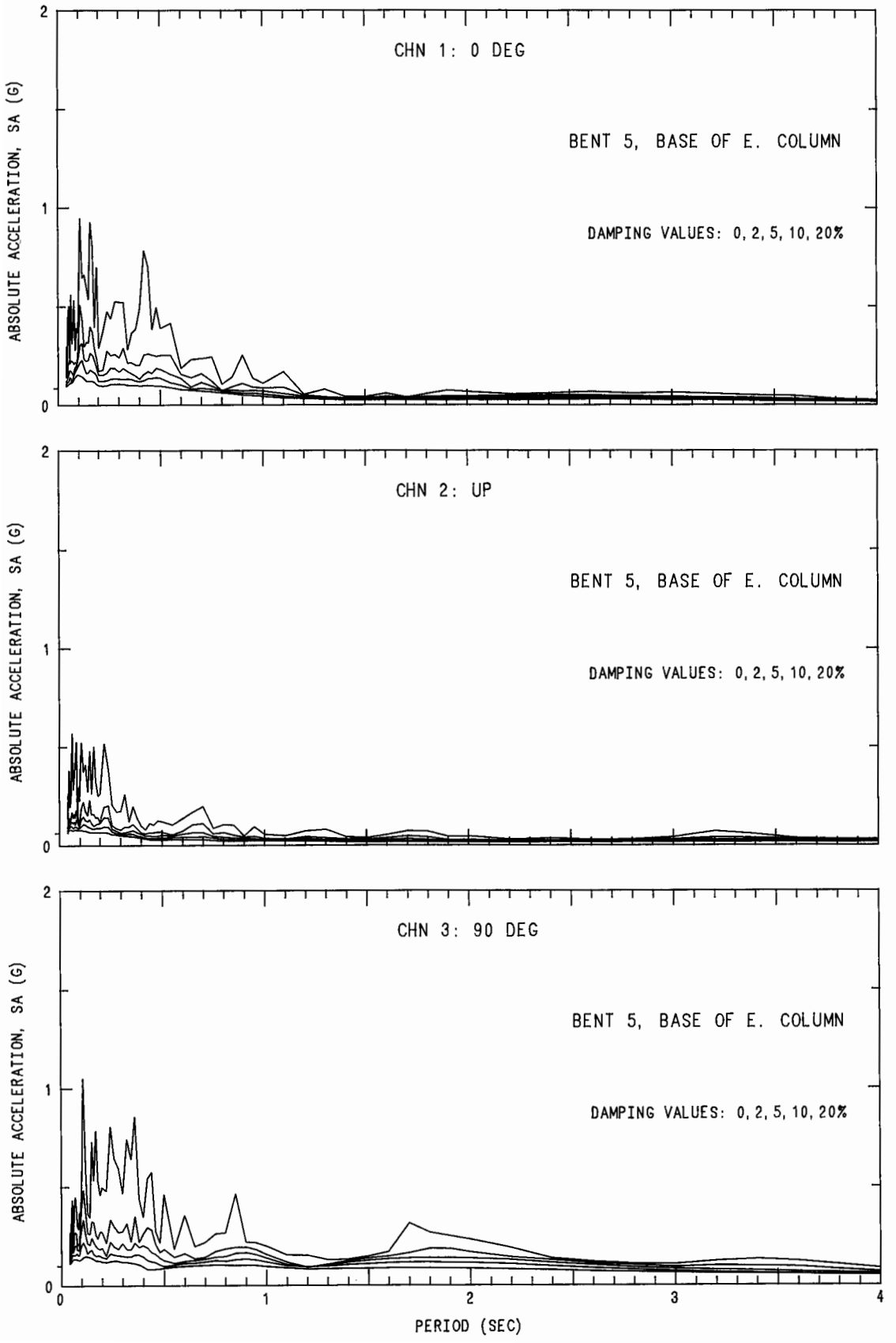


CHN 12: 90 DEG
BENT 3, BASE OF E. COLUMN



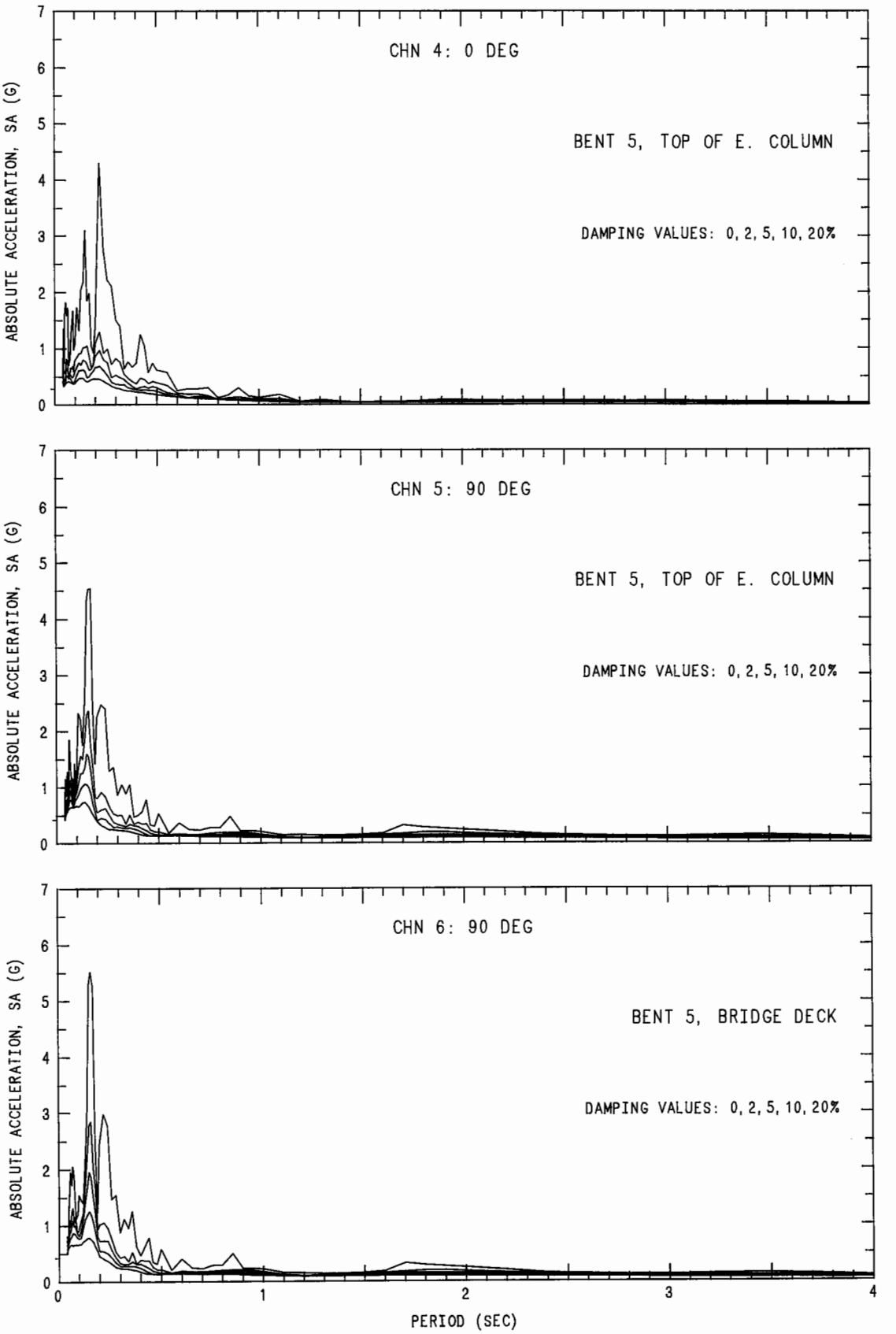
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 47315-C0139-89291.01
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC)



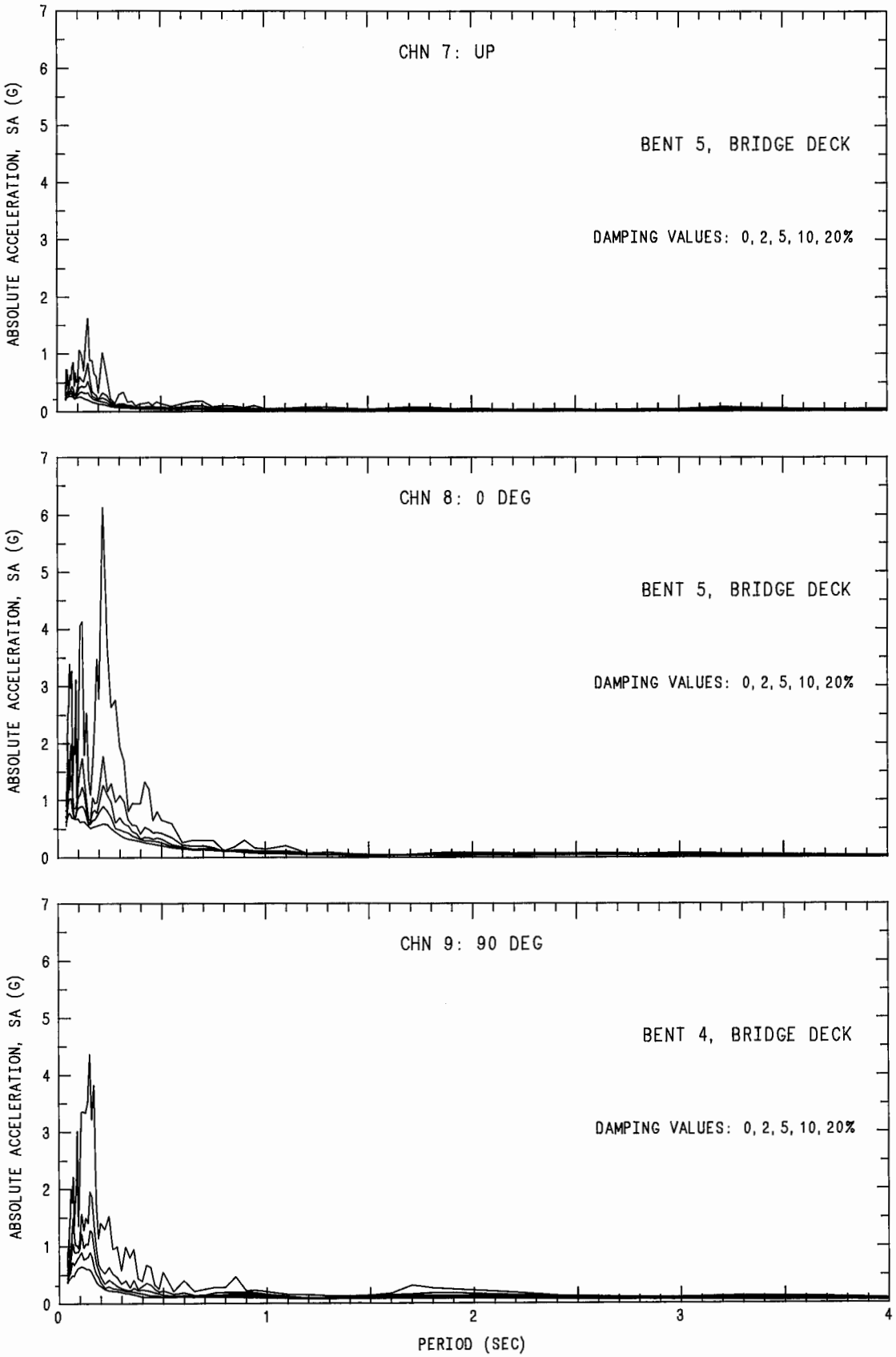
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 47315-C0139-89291.01
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC)



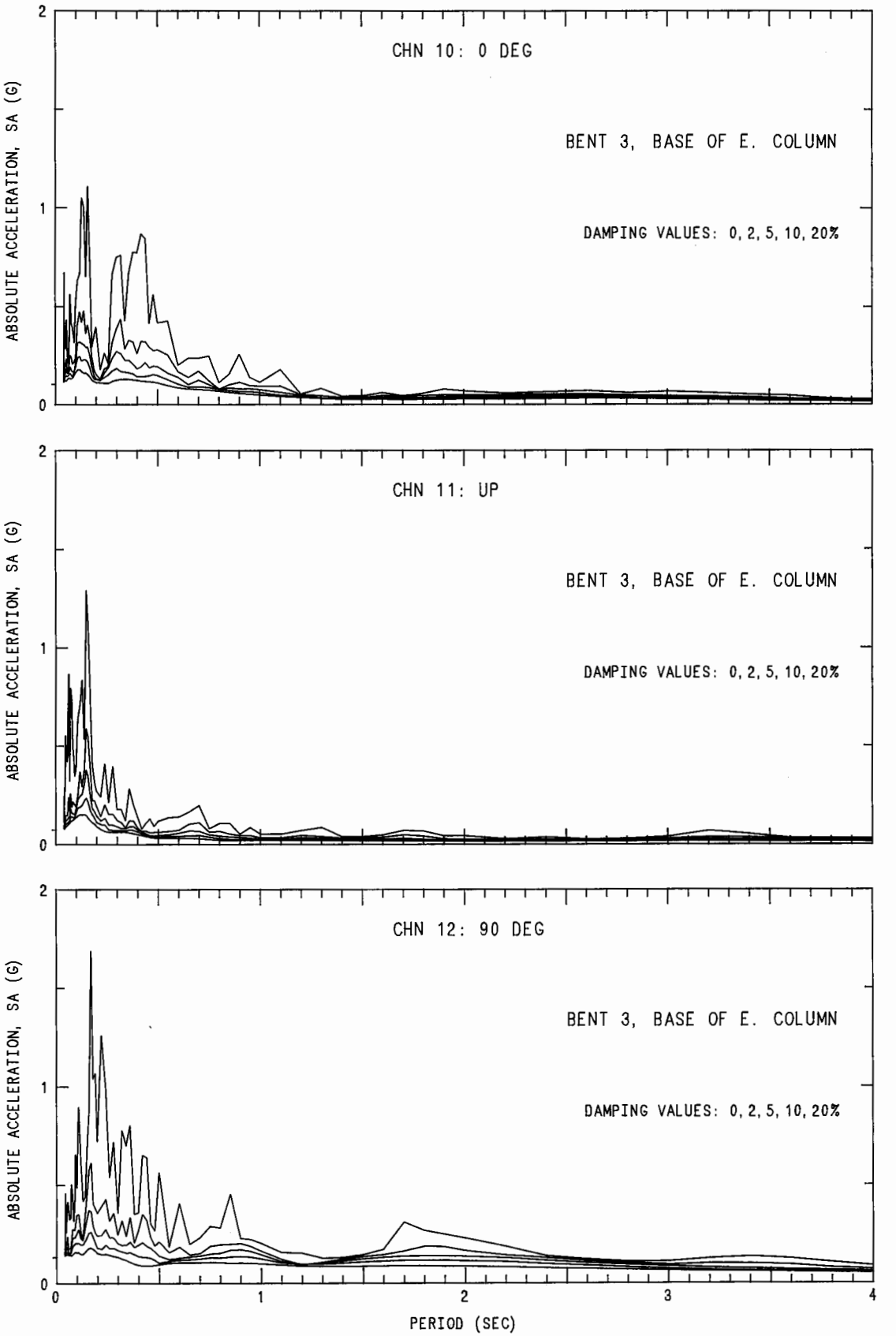
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 47315-C0139-89291.01
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN JUAN BAUTISTA - 101/156 OVERPASS: CSMIP S/N 315

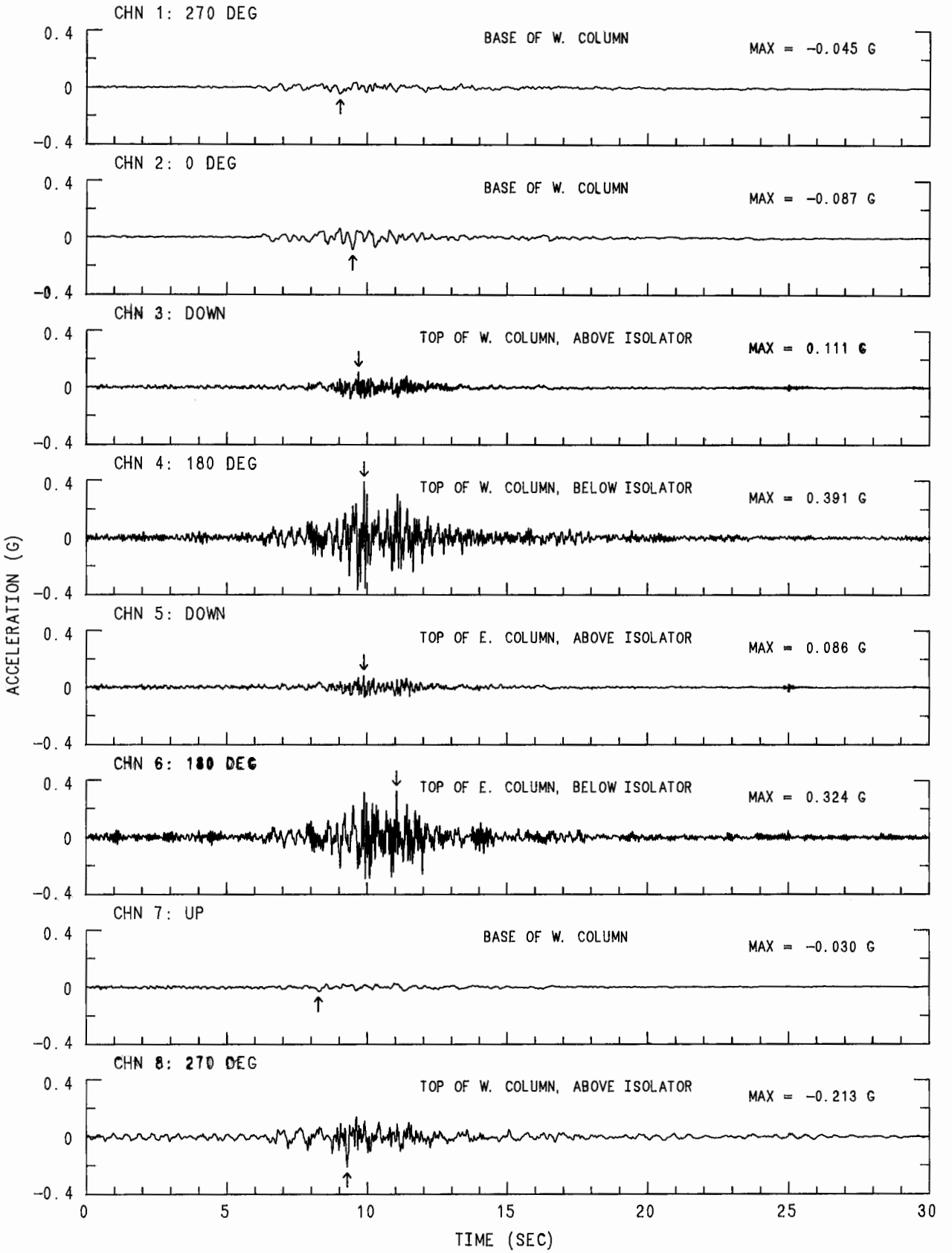
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 47315-C0139-89291.01
USABLE DATA BANDWIDTH: 0.14 TO 23.6 HZ (0.04 TO 7.35 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SO. SAN FRANCISCO – SIERRA PT. OVERPASS: CSMIP S/N 536

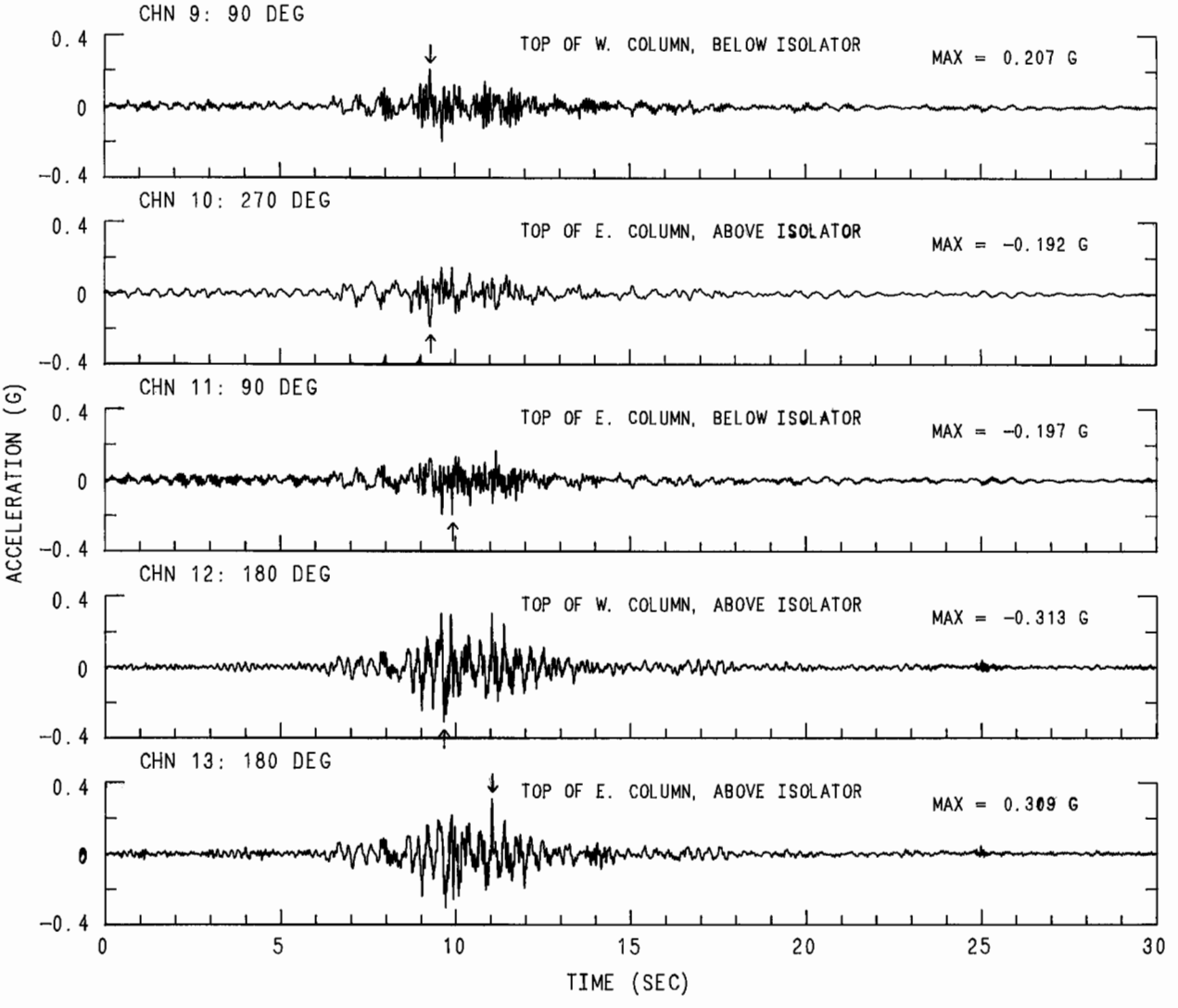
PHASE 1 ACCELERATION. RECORD ID: 58536-C0285-89294.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

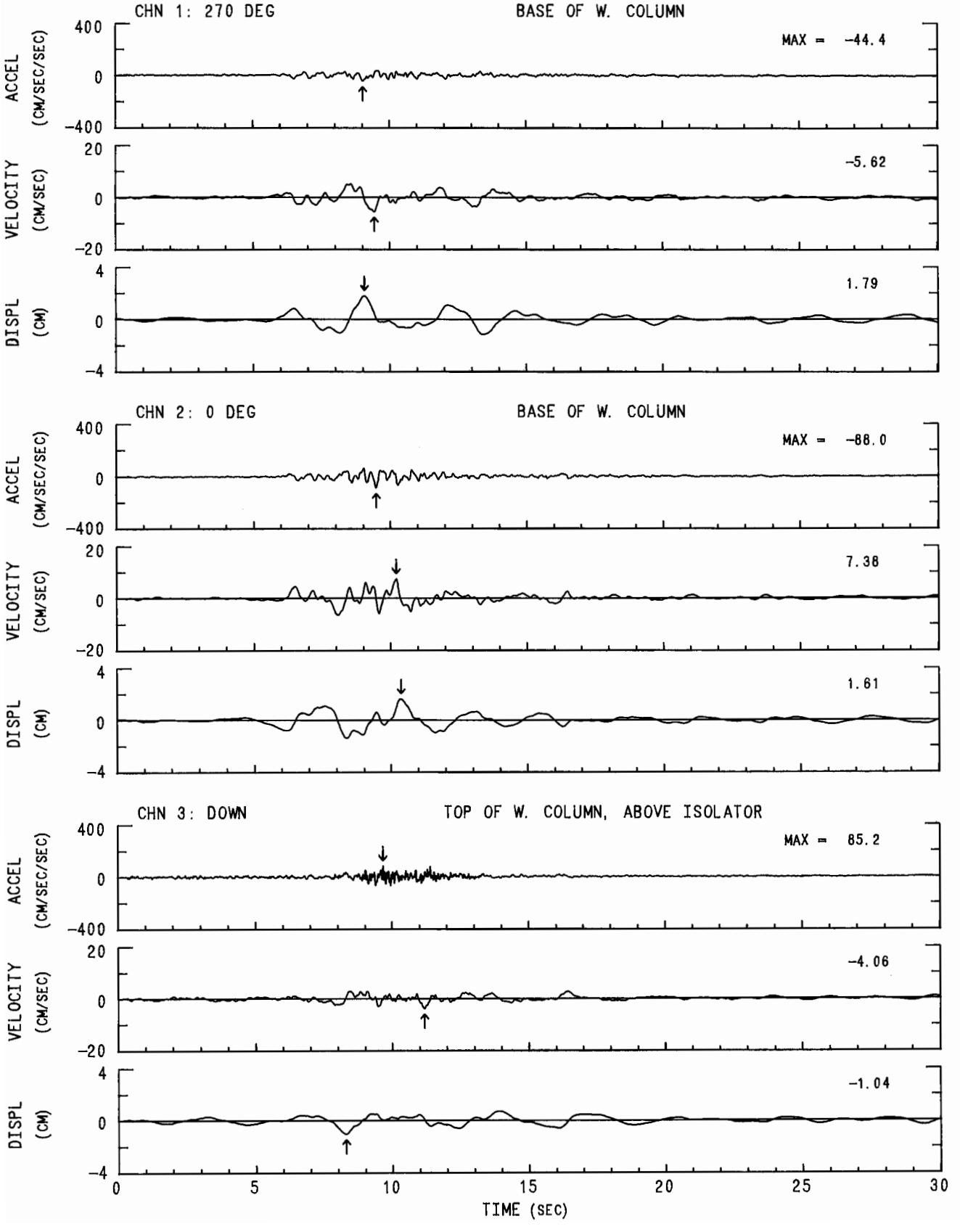
PHASE 1 ACCELERATION. RECORD ID: 58536-C0285-89294.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58536-C0285-89294.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

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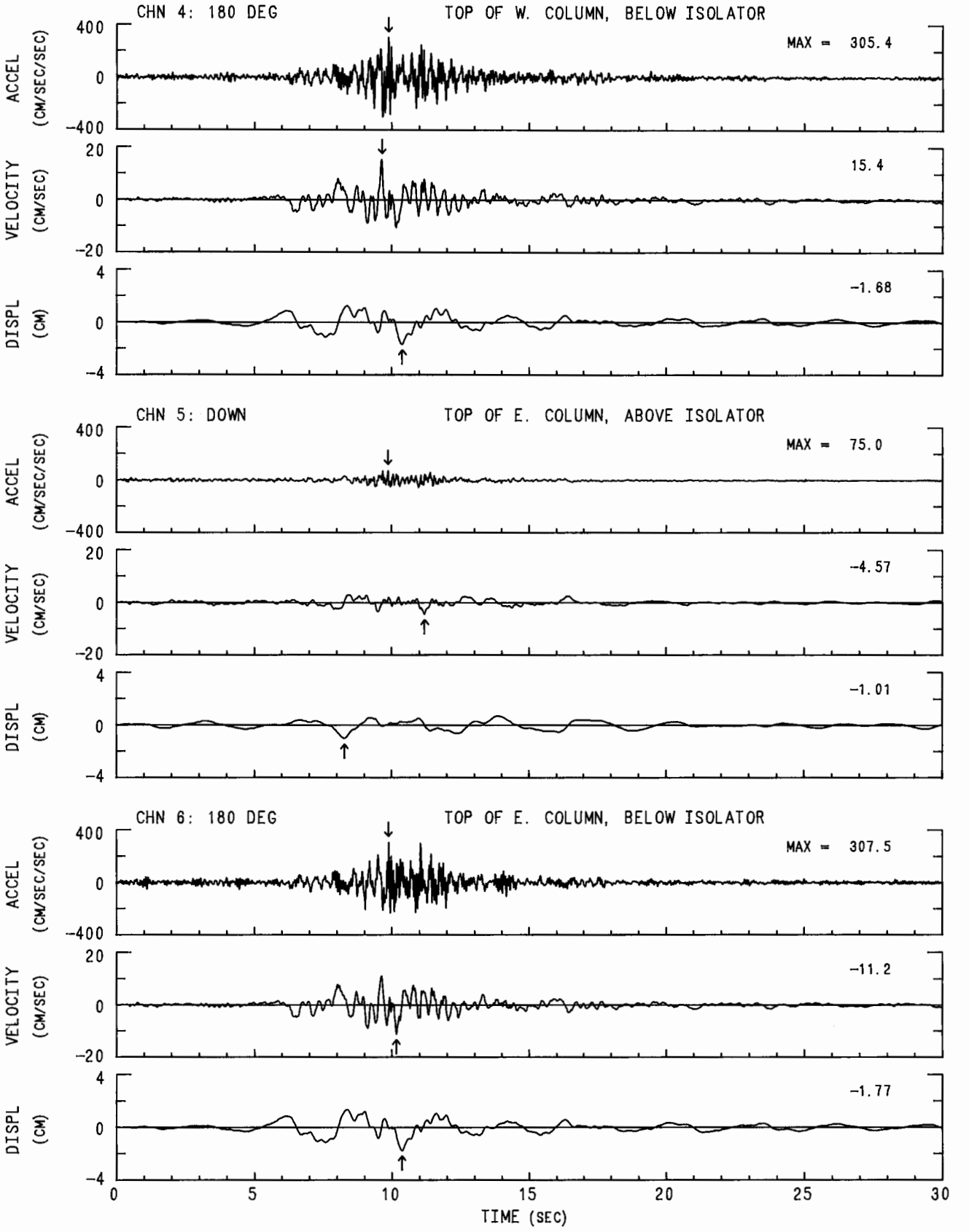
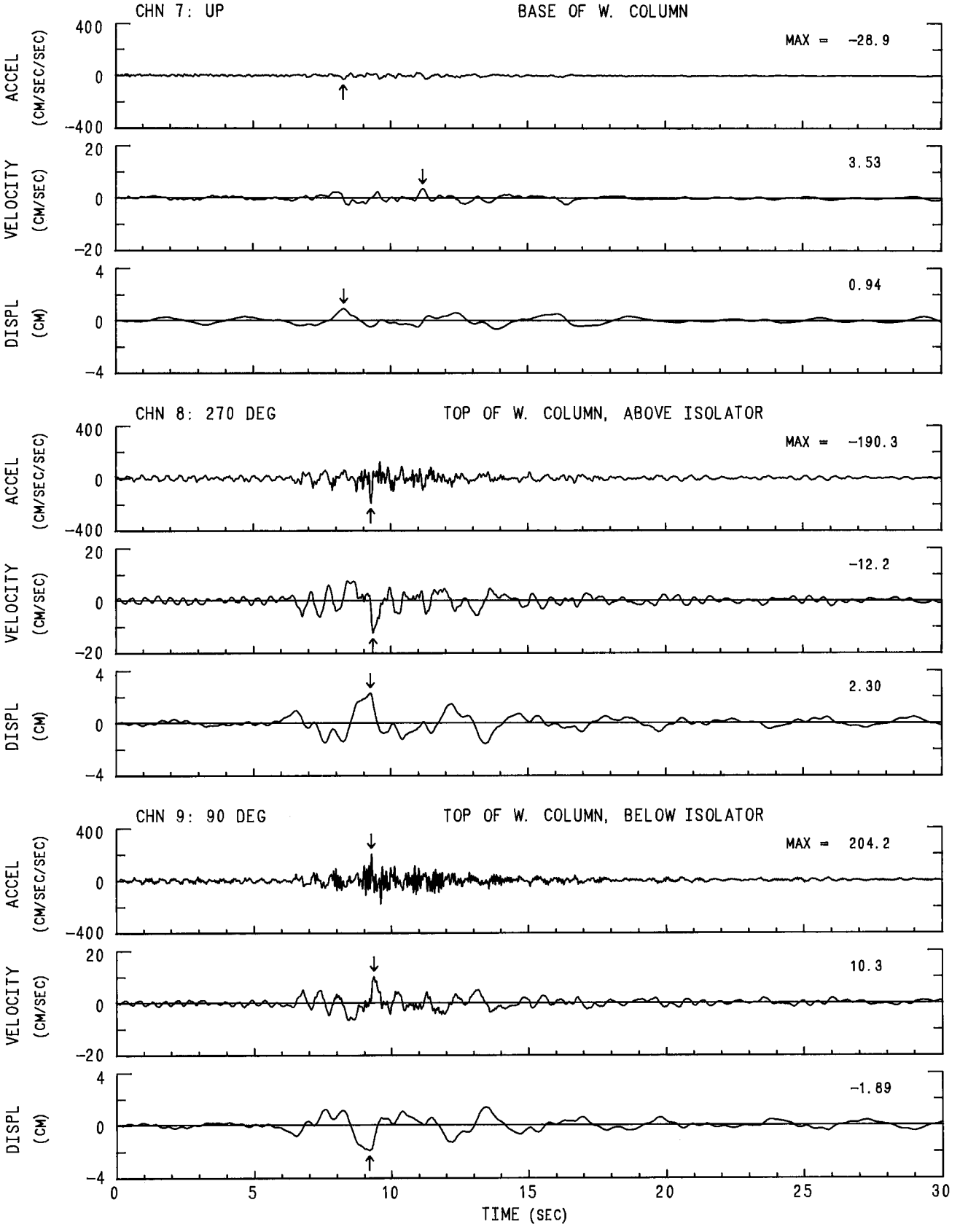


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

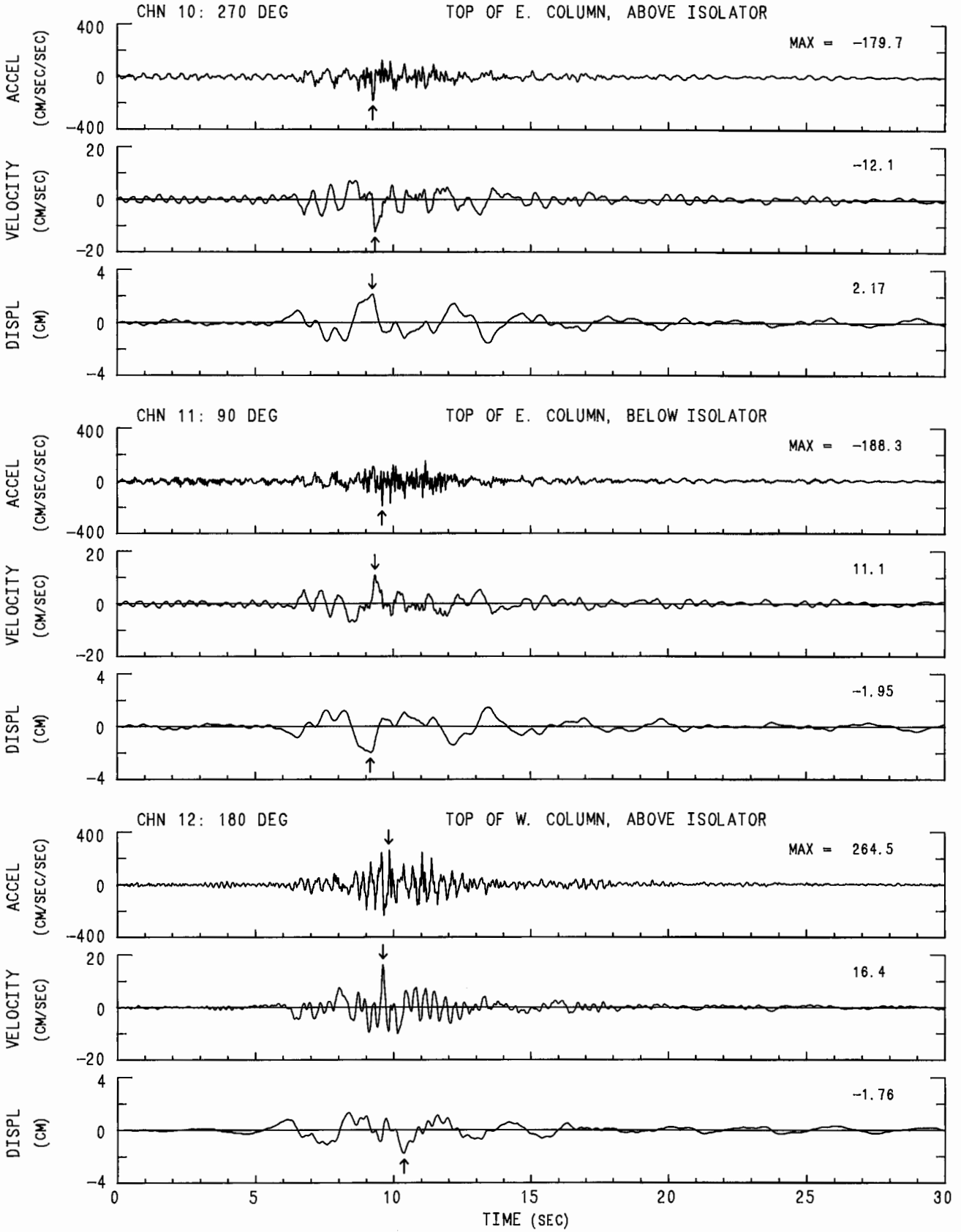
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58536-C0285-89294.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

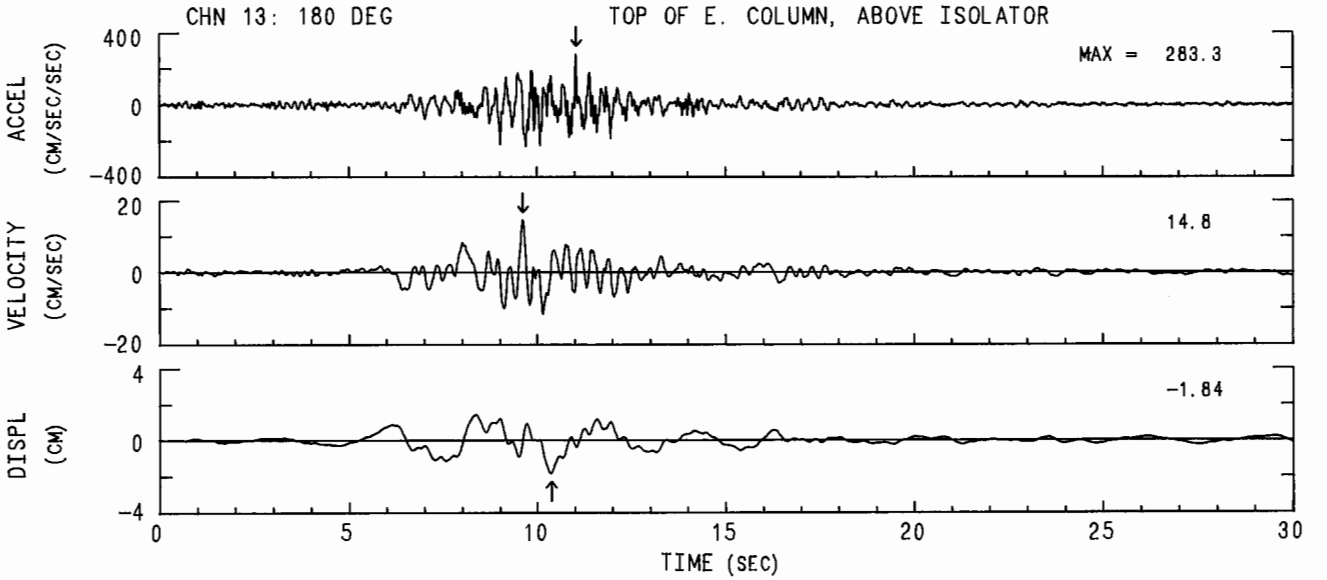
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58536-C0285-89294.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58536-C0285-89294.01



SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

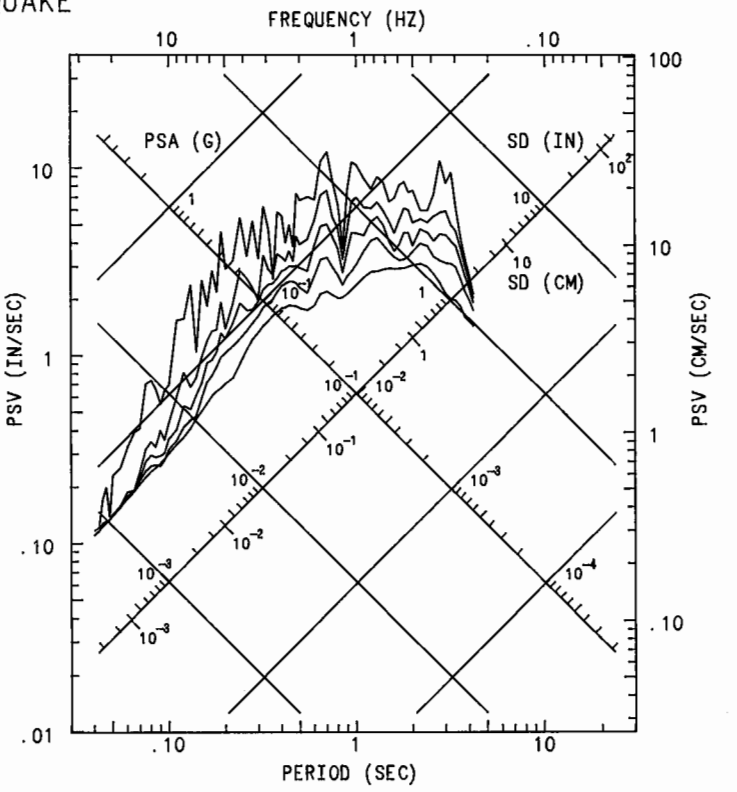
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

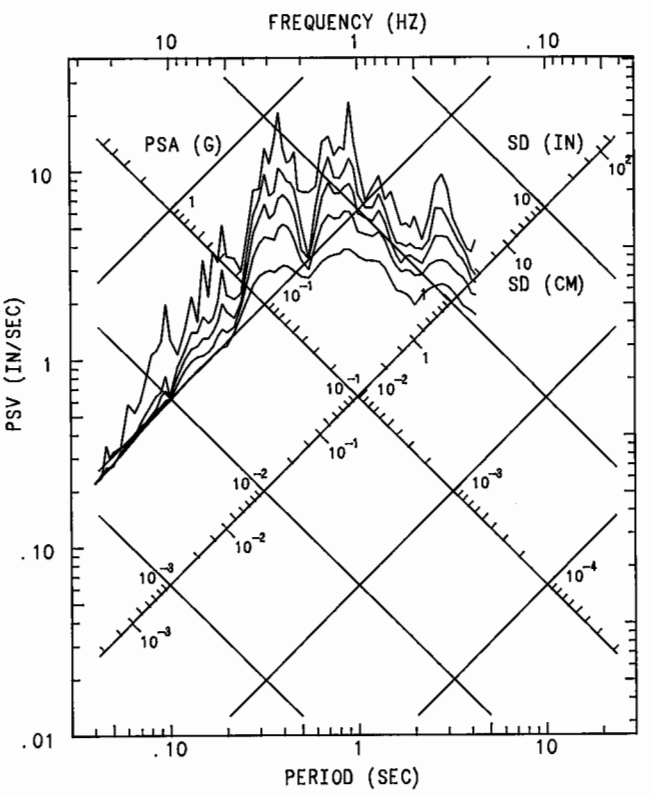
RECORD ID: 58536-C0285-89294.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

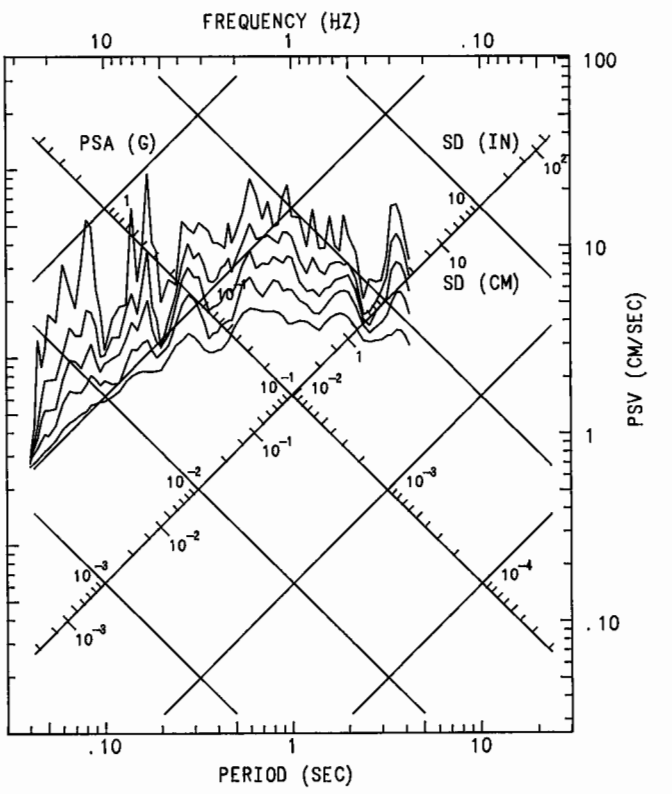
CHN 1: 270 DEG
BASE OF W. COLUMN



CHN 2: 0 DEG
BASE OF W. COLUMN



CHN 3: DOWN
TOP OF W. COLUMN, ABOVE ISOLATOR



SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

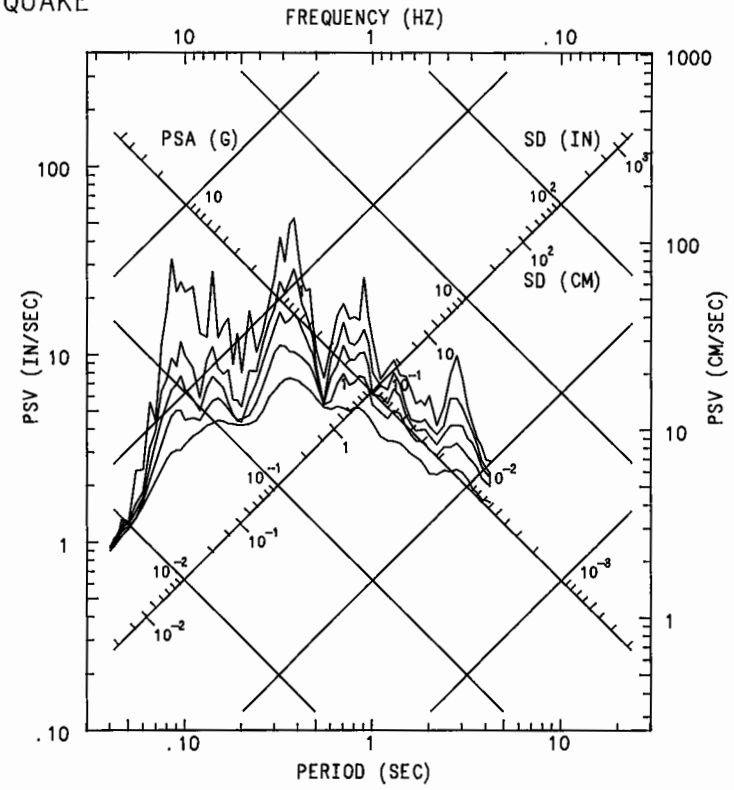
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

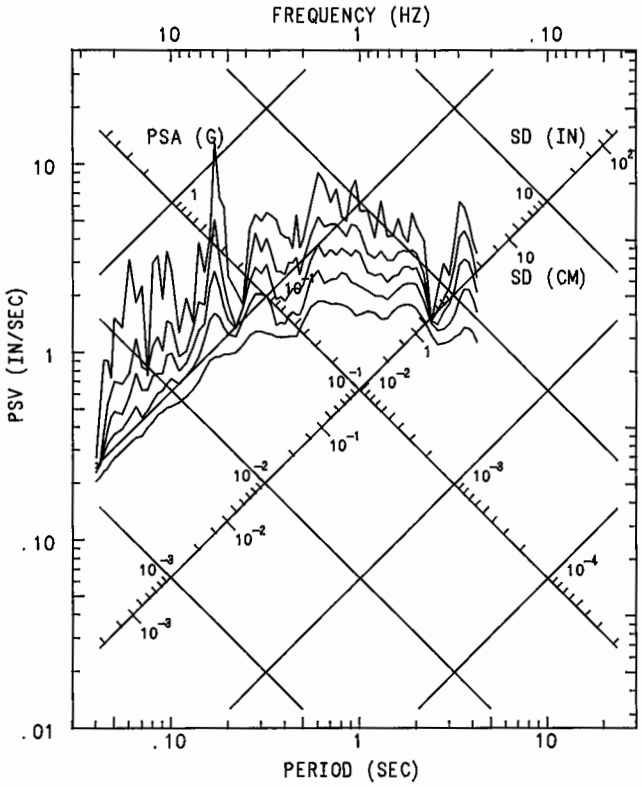
RECORD ID: 58536-C0285-89294.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

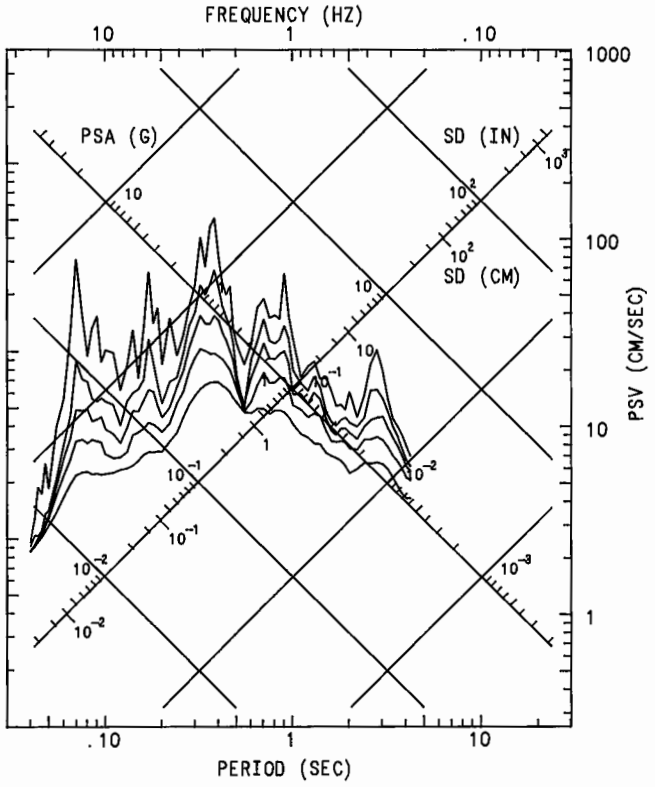
CHN 4: 180 DEG
TOP OF W. COLUMN, BELOW ISOLATOR



CHN 5: DOWN
TOP OF E. COLUMN, ABOVE ISOLATOR



CHN 6: 180 DEG
TOP OF E. COLUMN, BELOW ISOLATOR



SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

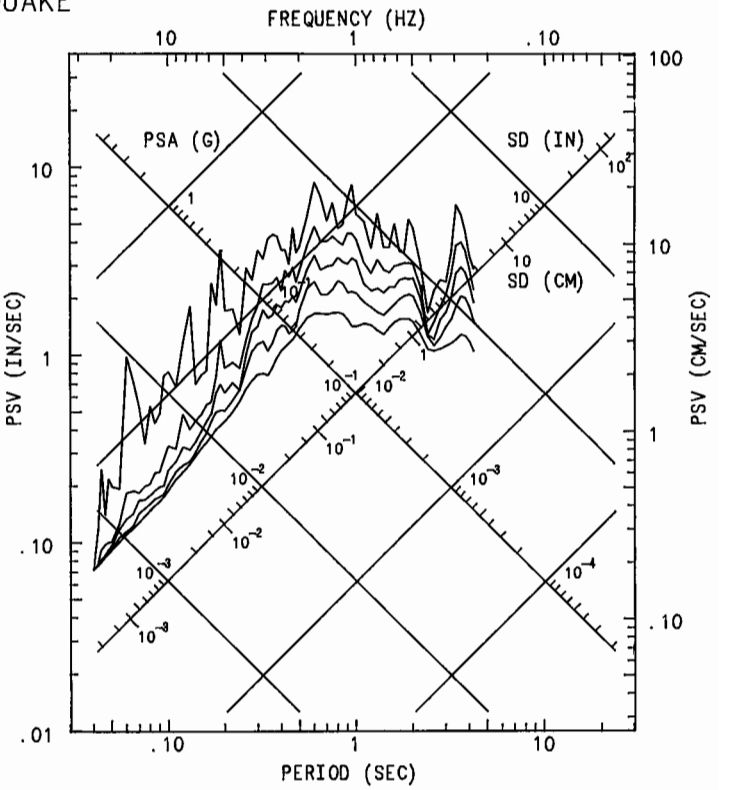
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

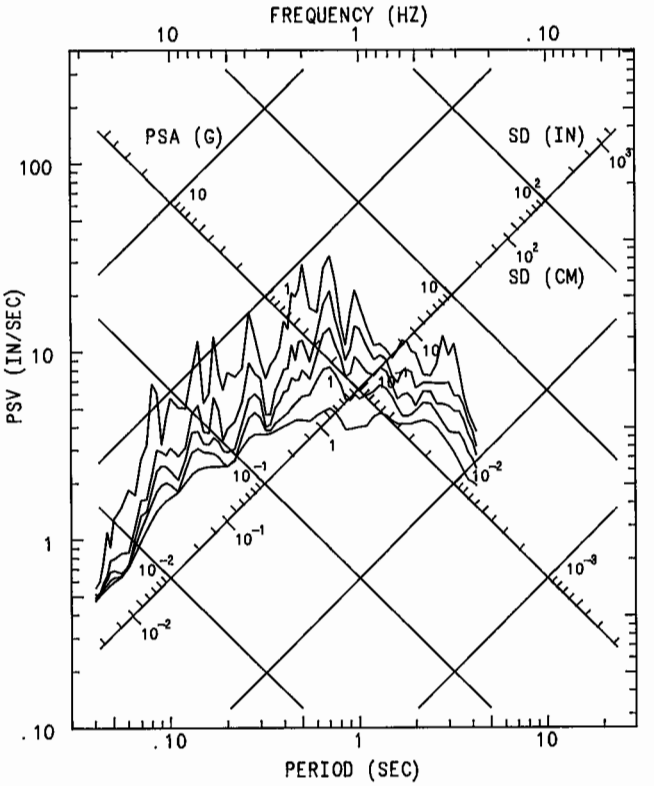
RECORD ID: 58536-C0285-89294.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

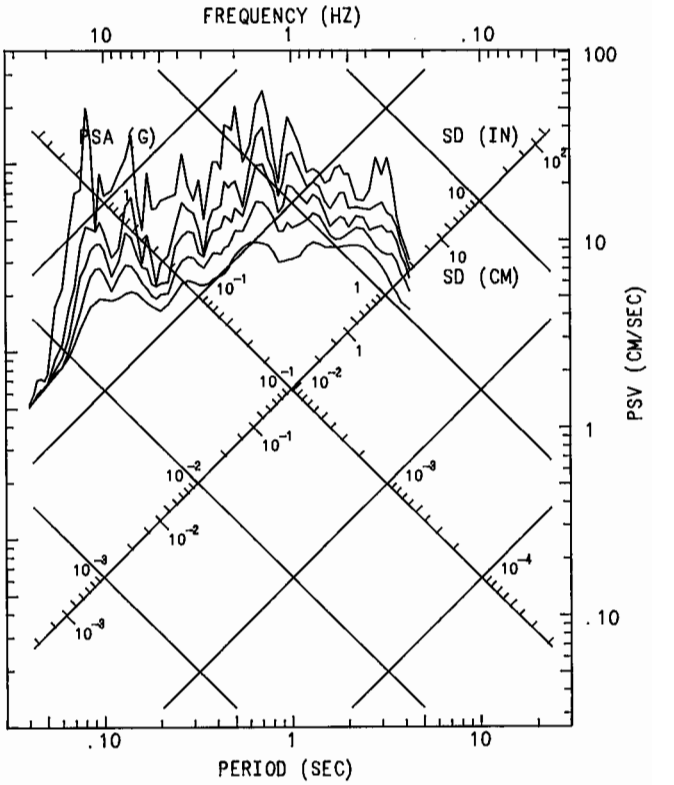
CHN 7: UP
BASE OF W. COLUMN



CHN 8: 270 DEG
TOP OF W. COLUMN, ABOVE ISOLATOR



CHN 9: 90 DEG
TOP OF W. COLUMN, BELOW ISOLATOR



SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

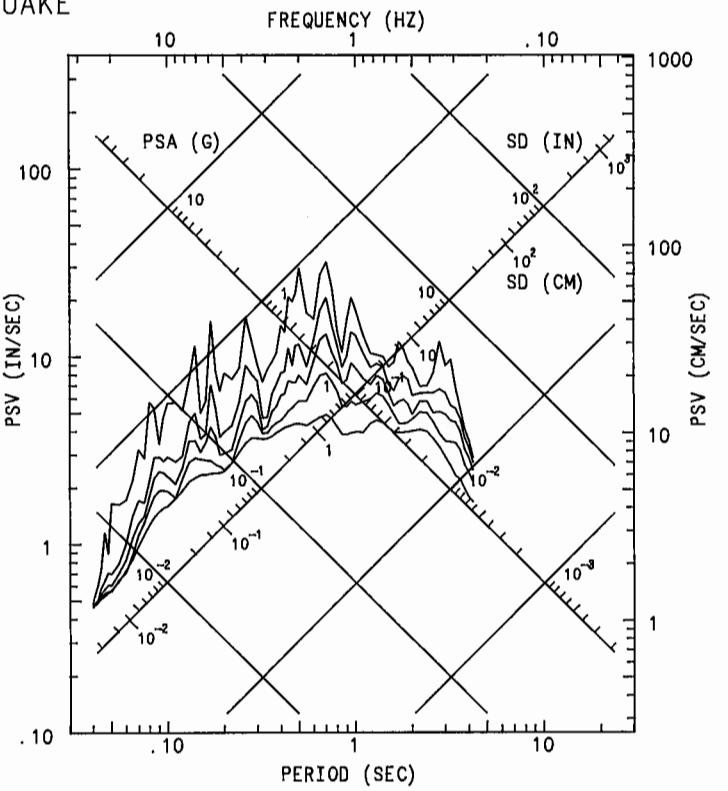
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

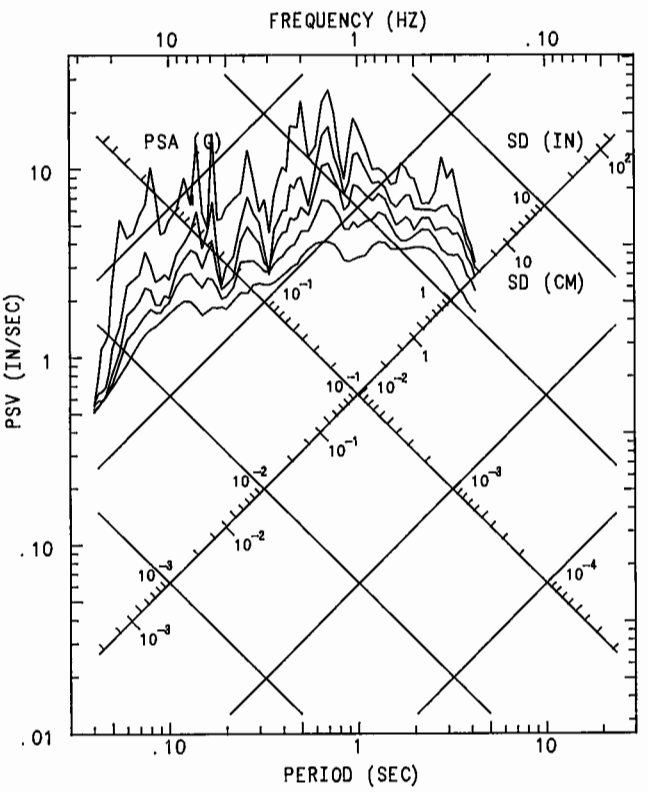
RECORD ID: 58536-C0285-89294.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

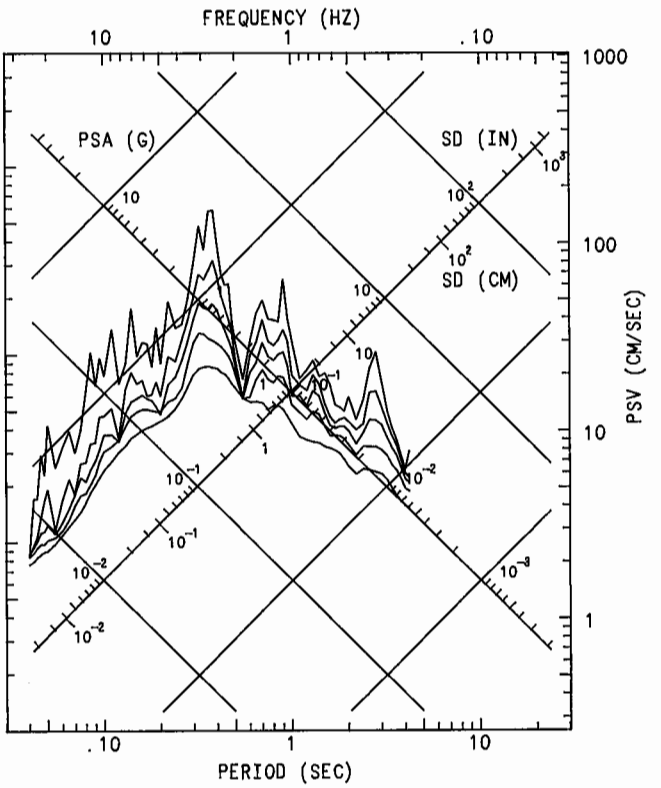
CHN 10: 270 DEG
TOP OF E. COLUMN, ABOVE ISOLATOR



CHN 11: 90 DEG
TOP OF E. COLUMN, BELOW ISOLATOR



CHN 12: 180 DEG
TOP OF W. COLUMN, ABOVE ISOLATOR



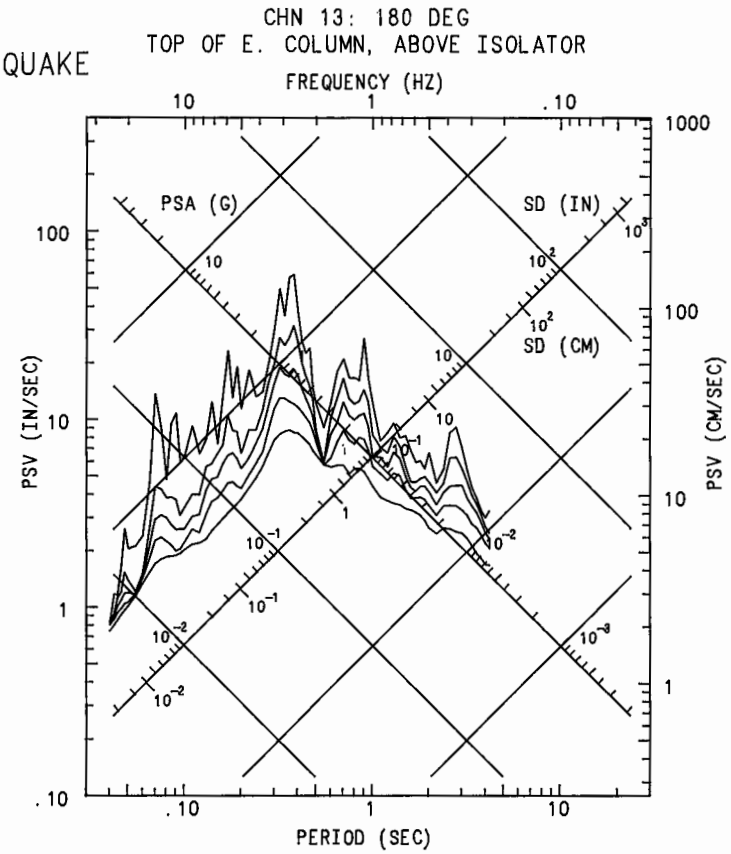
SO. SAN FRANCISCO – SIERRA PT. OVERPASS: CSMIP S/N 536

SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

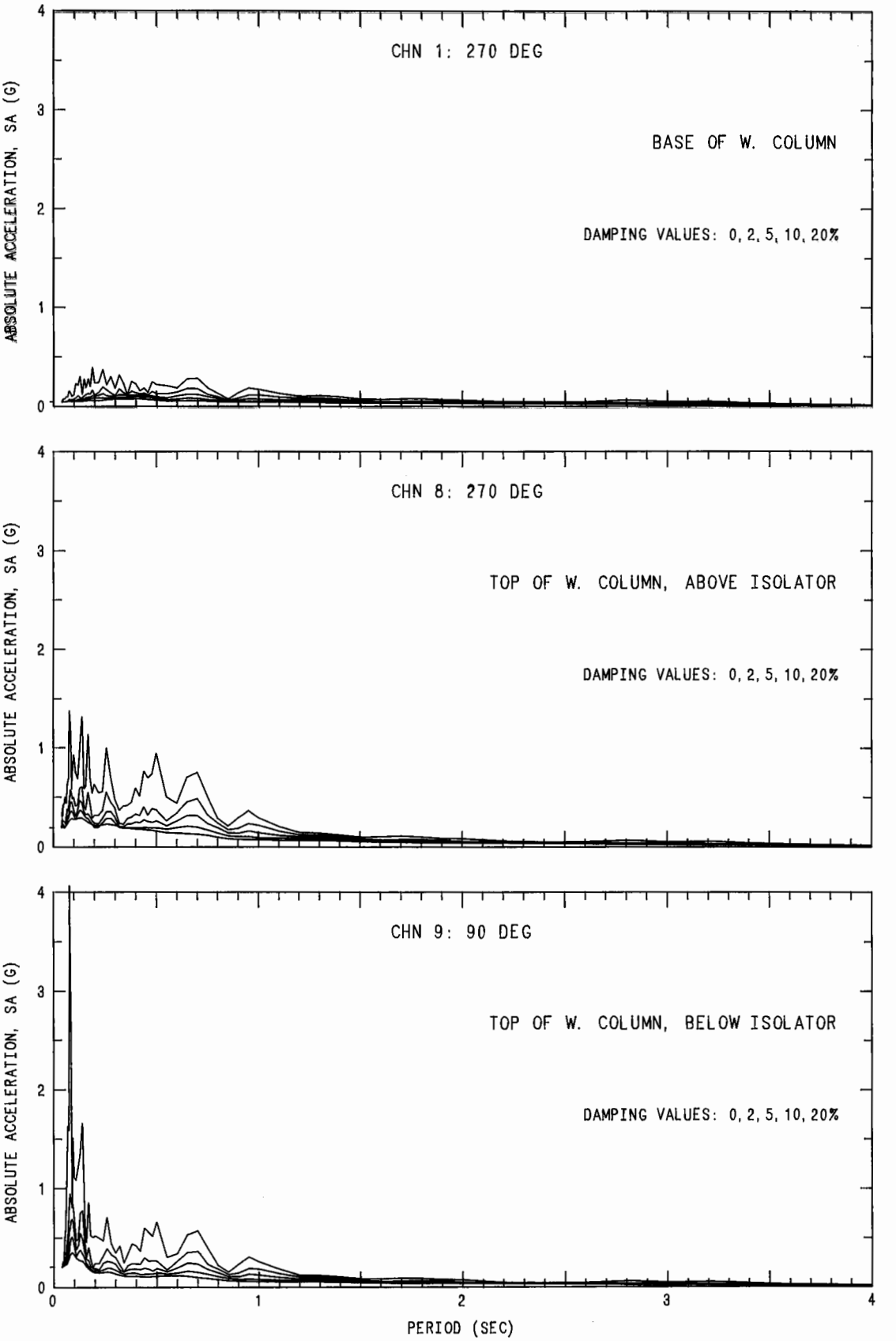
RECORD ID: 58536-C0285-89294.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

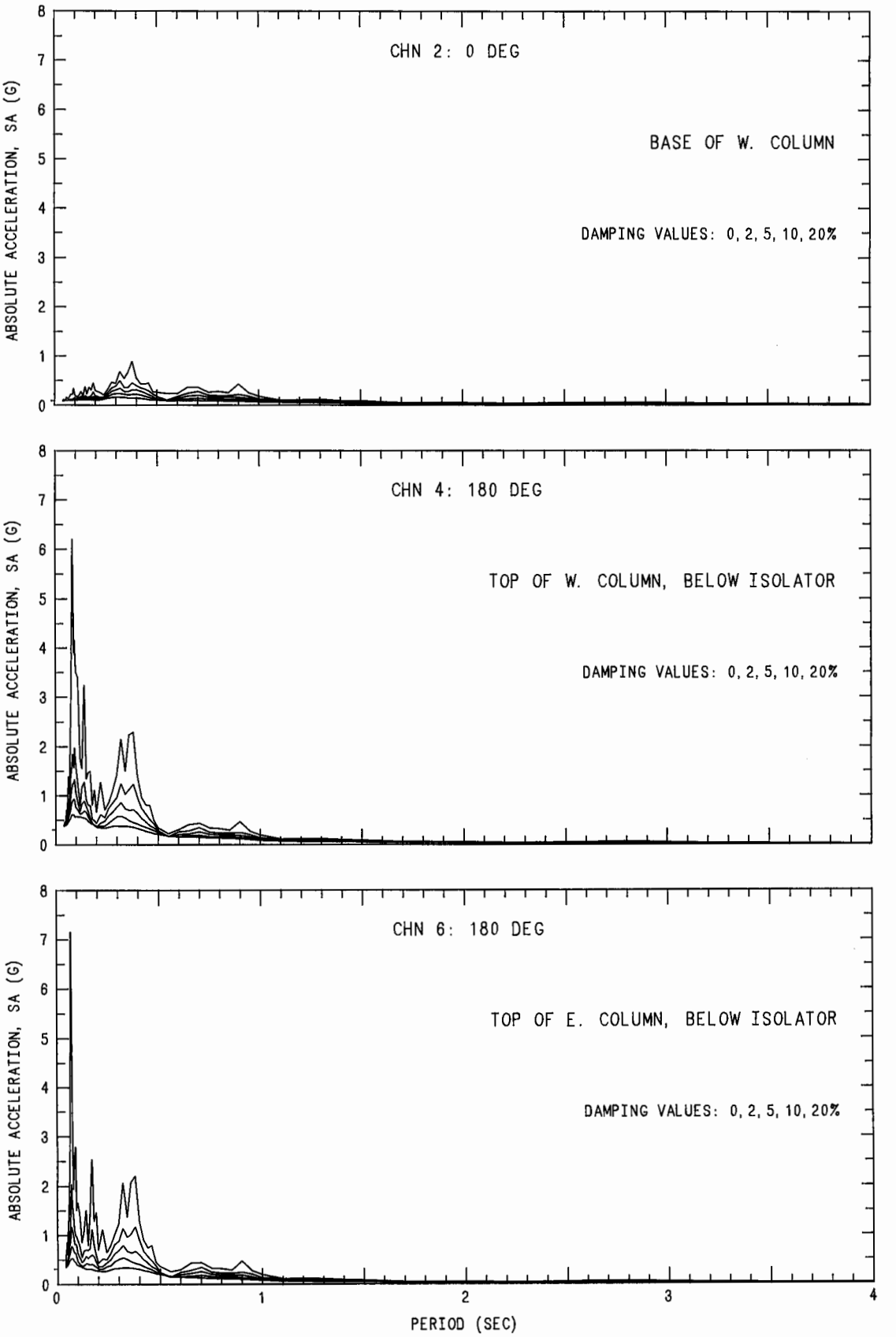


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58536-C0285-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)

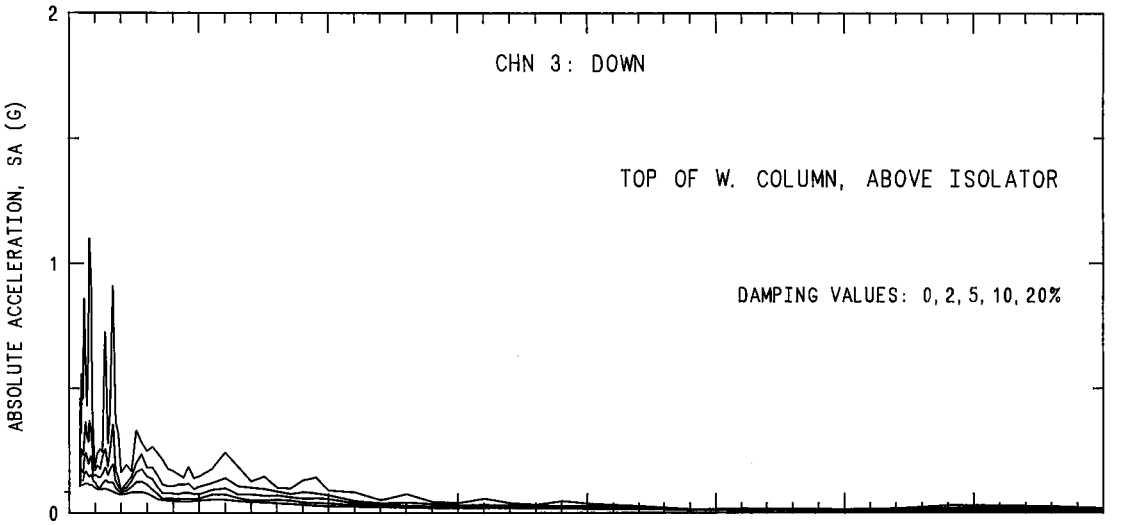


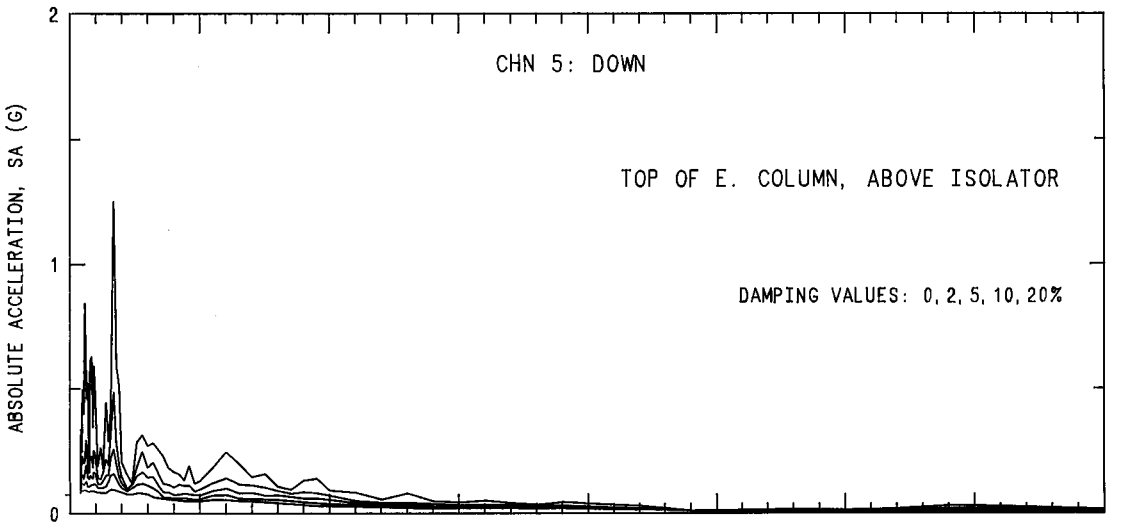
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58536-C0285-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)

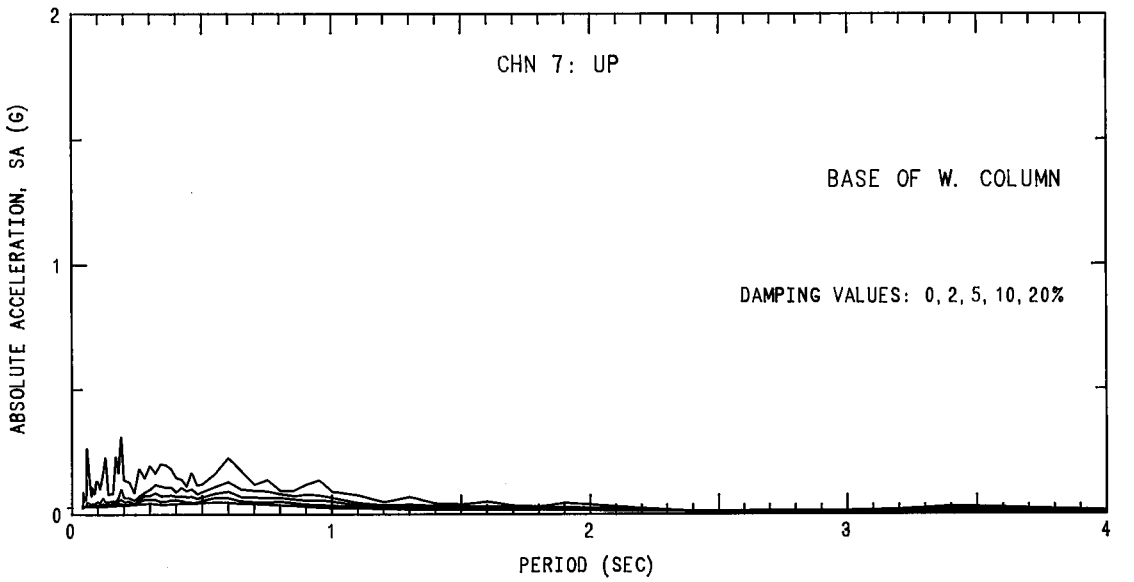


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536

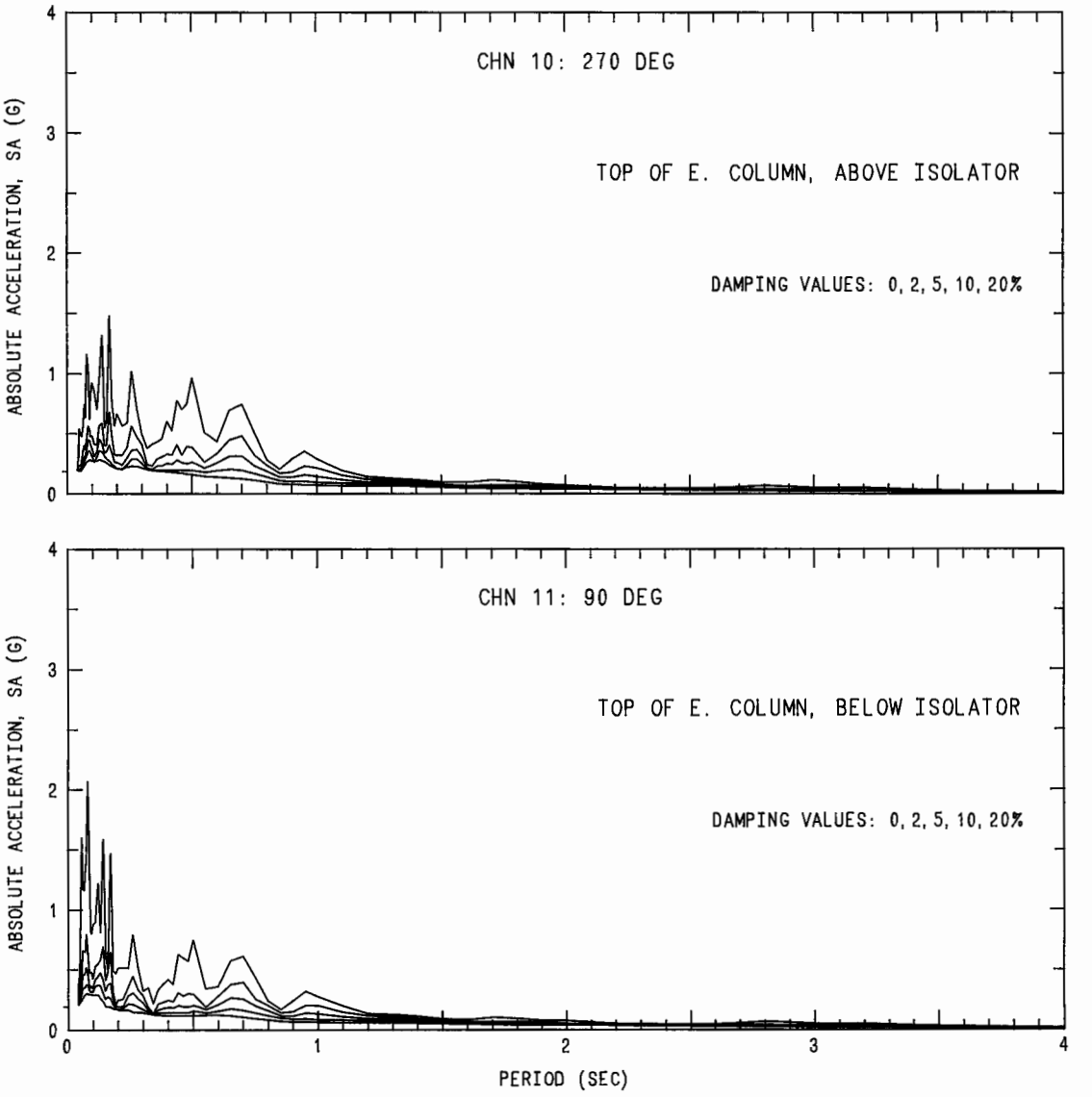
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58536-C0285-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



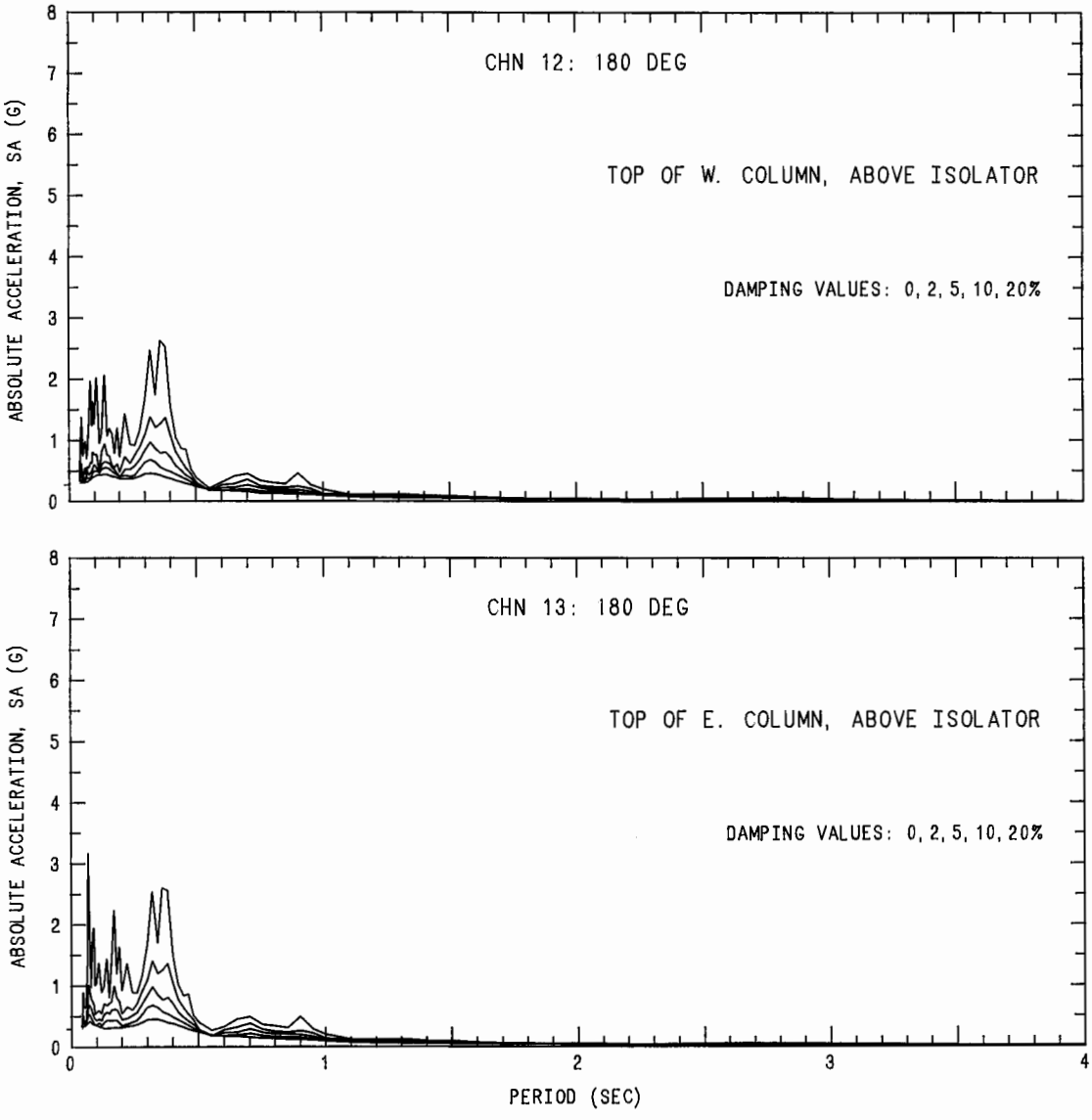




SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58536-C0285-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT. OVERPASS: CSMIP S/N 536
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58536-C0285-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



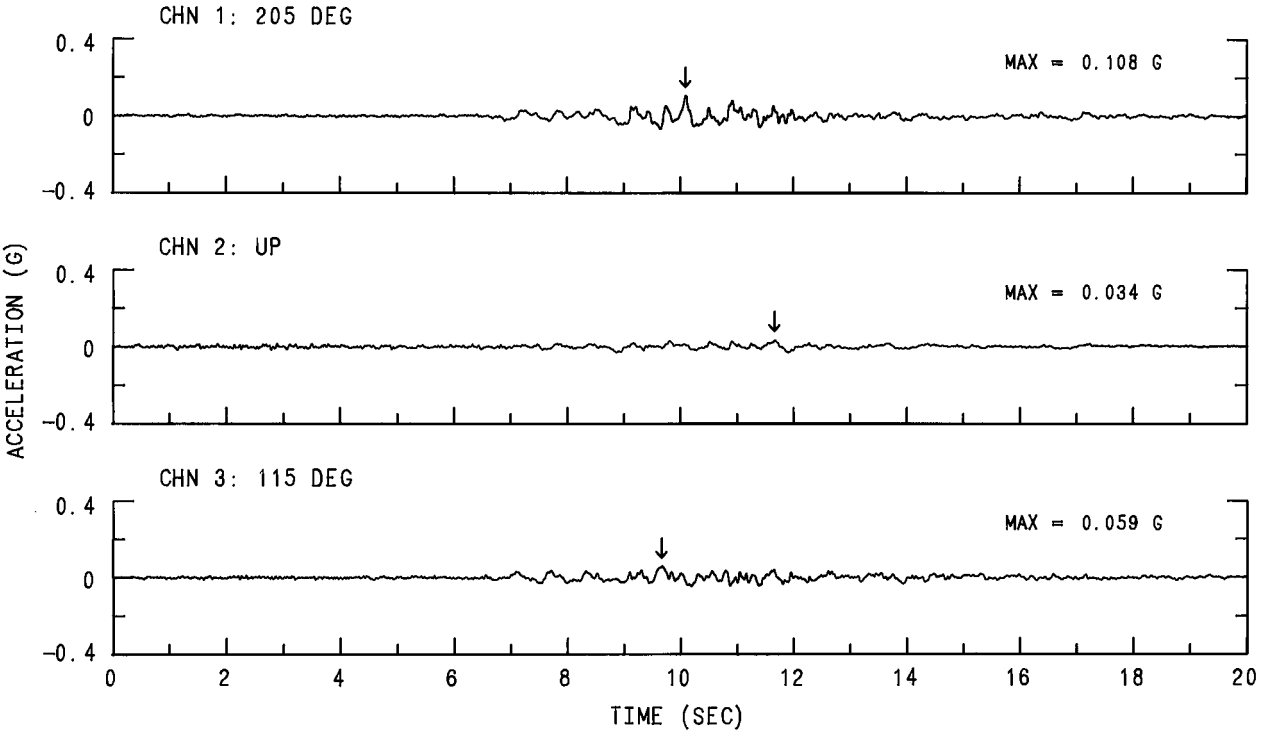
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

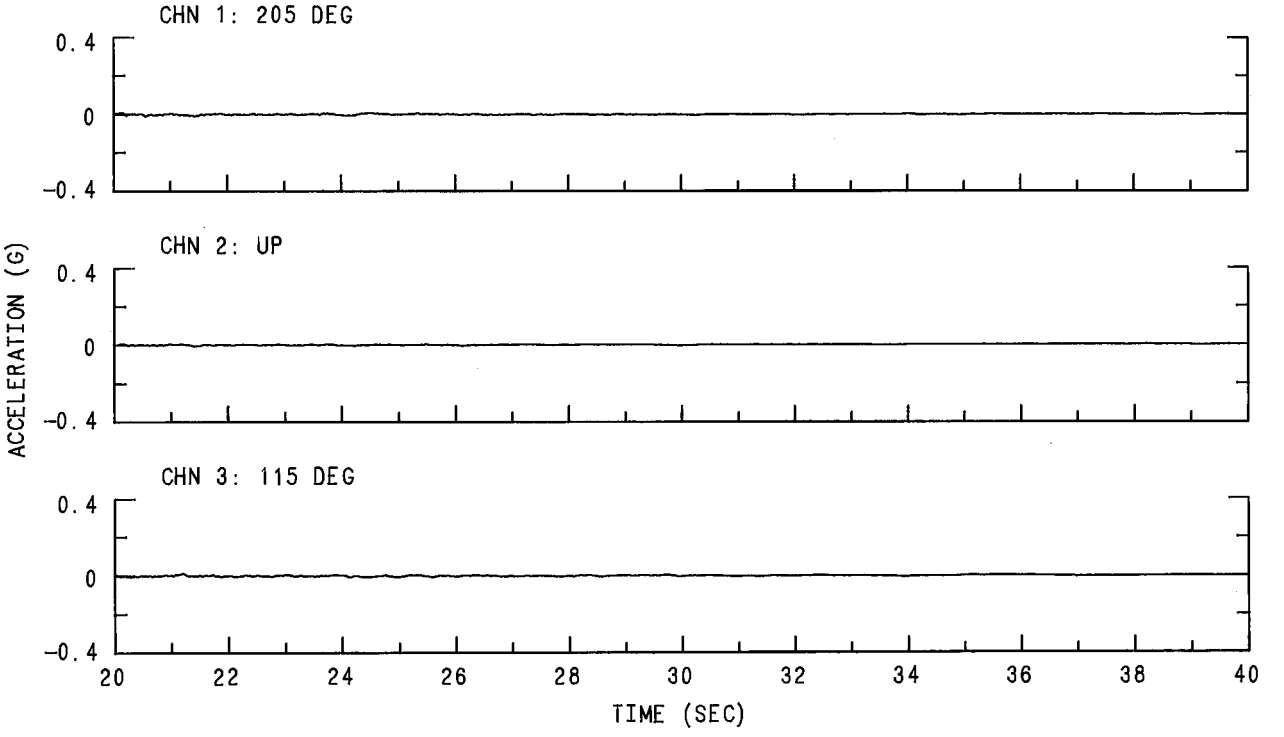
SO. SAN FRANCISCO - SIERRA PT.: CSMIP S/N 539

PHASE 1 ACCELERATION

RECORD ID: 58539-S5946-89294.01

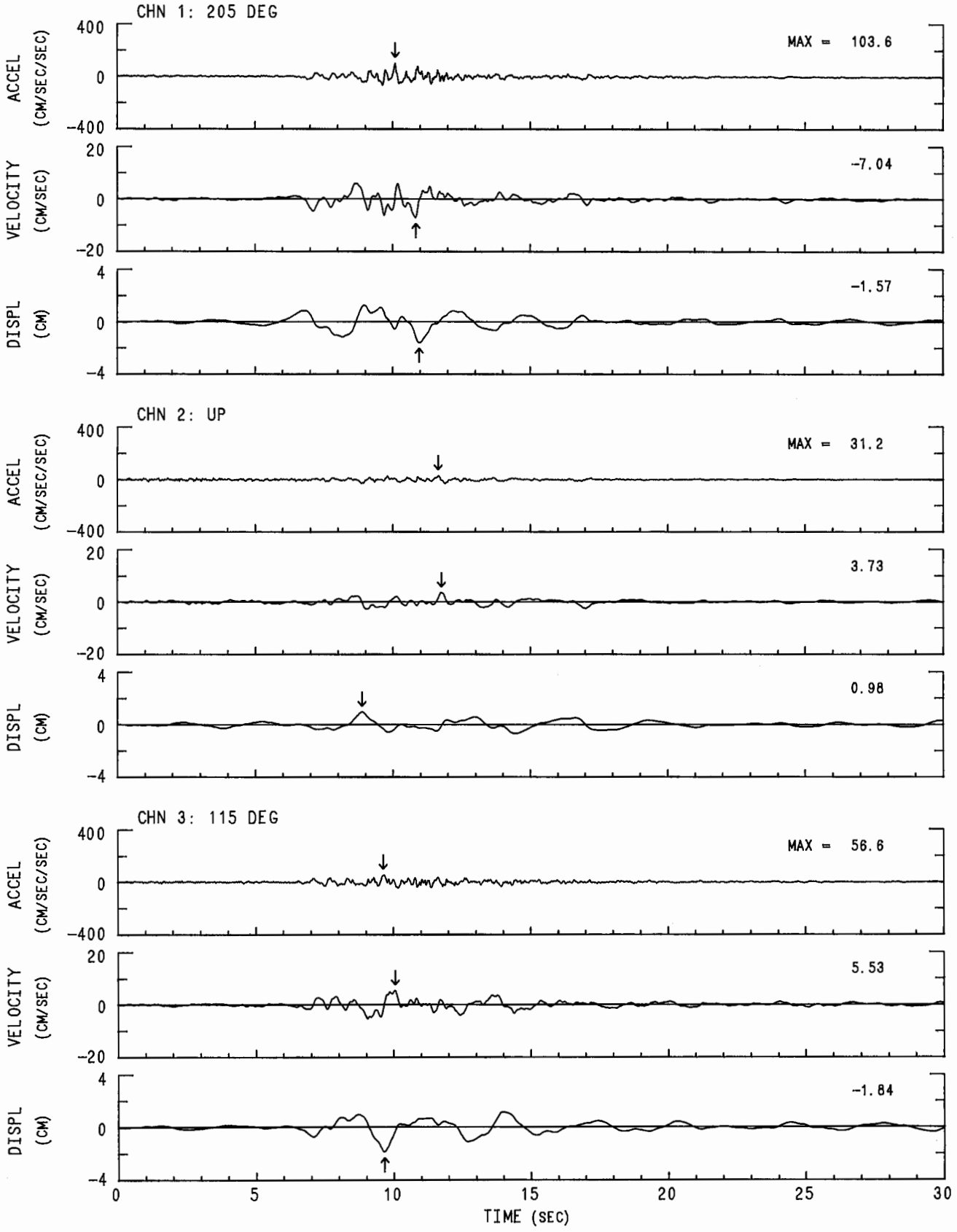
(The FF record started about 0.6 second earlier than the structure record)





SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT.: CSMIP S/N 539

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58539-S5946-89294.01



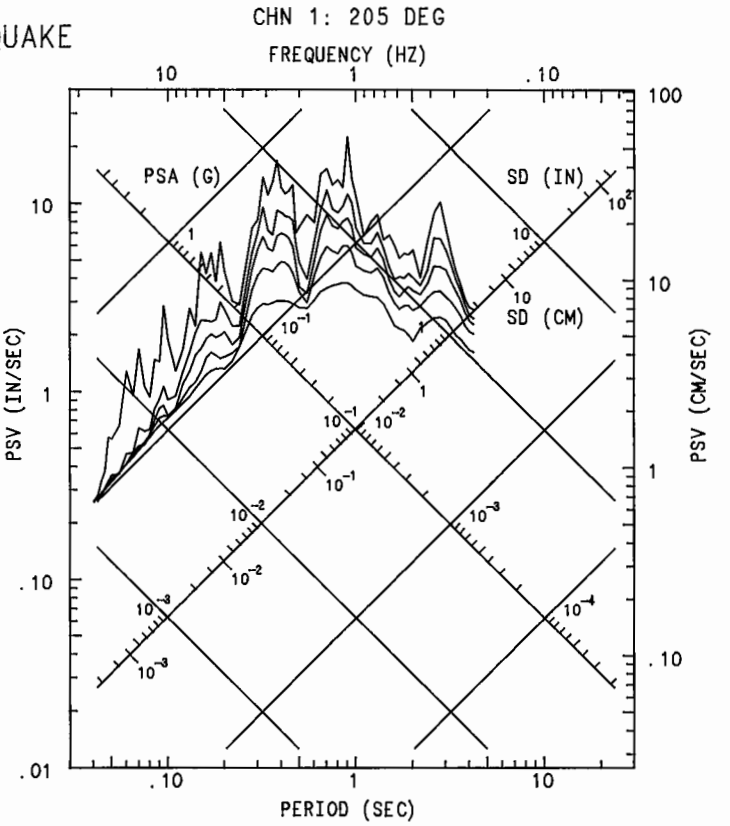
SO. SAN FRANCISCO - SIERRA PT.: CSMIP S/N 539

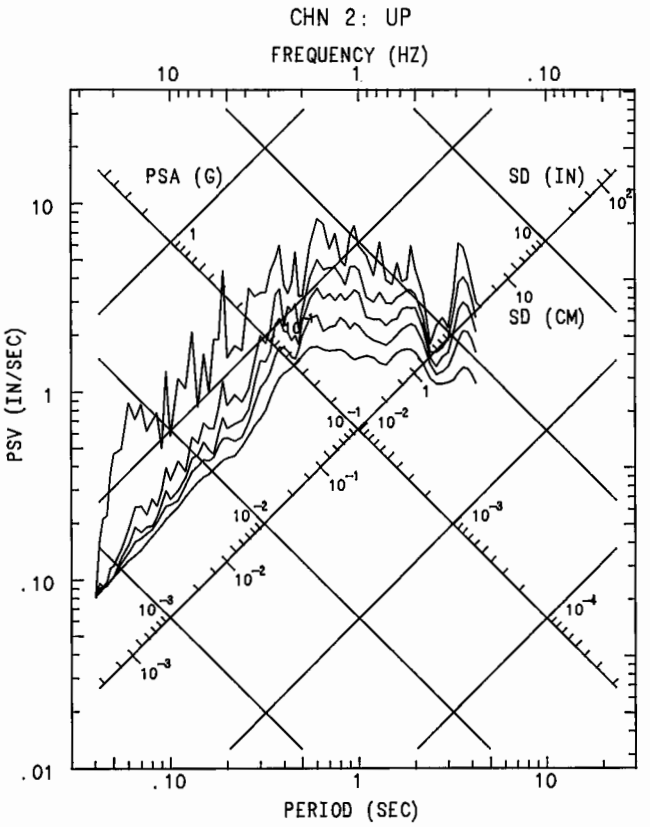
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

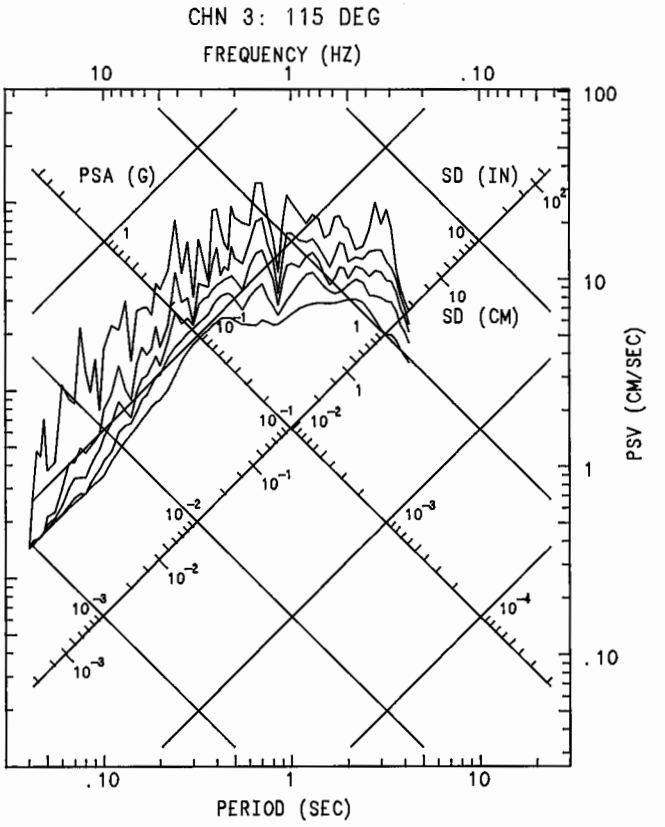
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

RECORD ID: 58539-S5946-89294.01

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

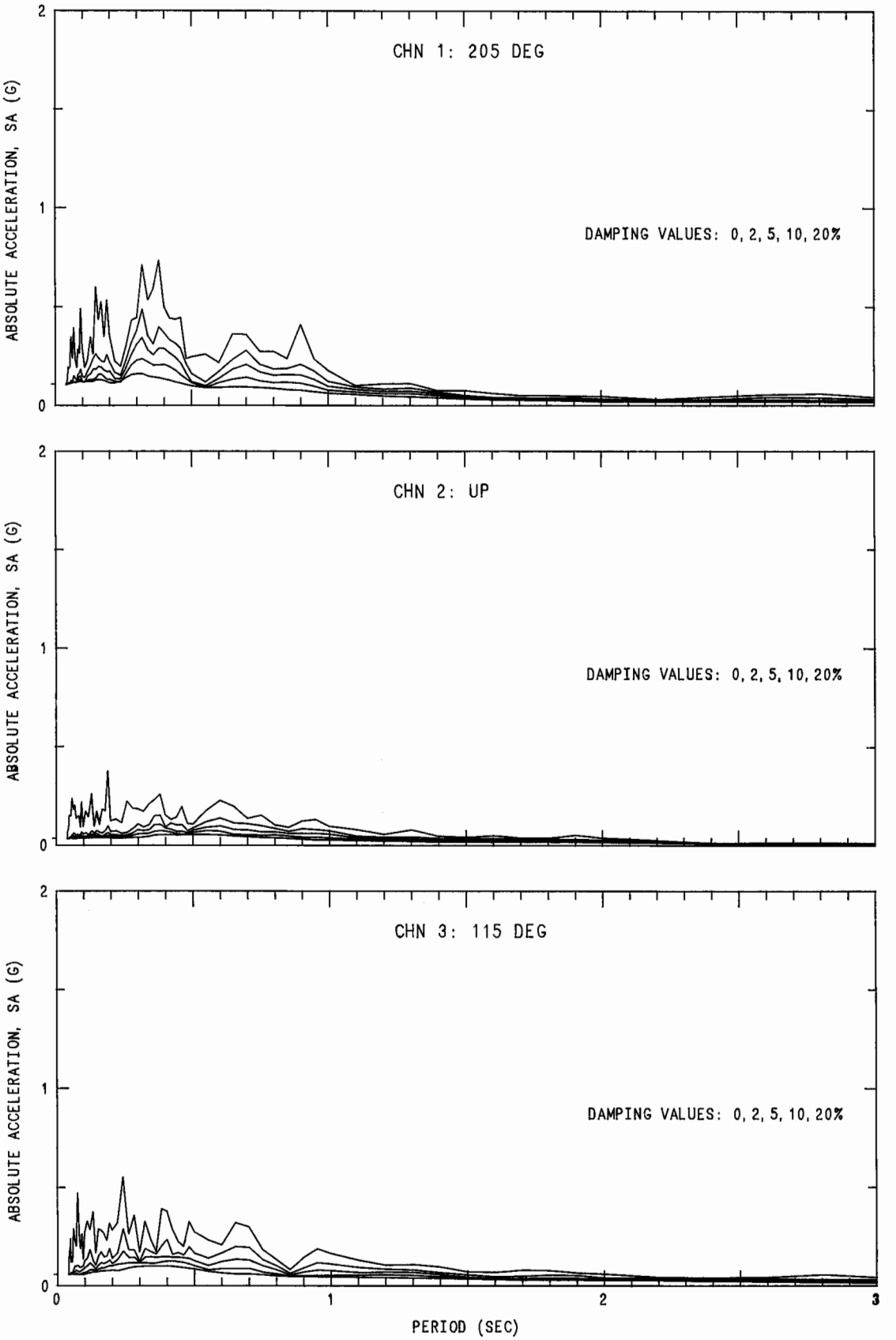






SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SO. SAN FRANCISCO - SIERRA PT.: CSMIP S/N 539

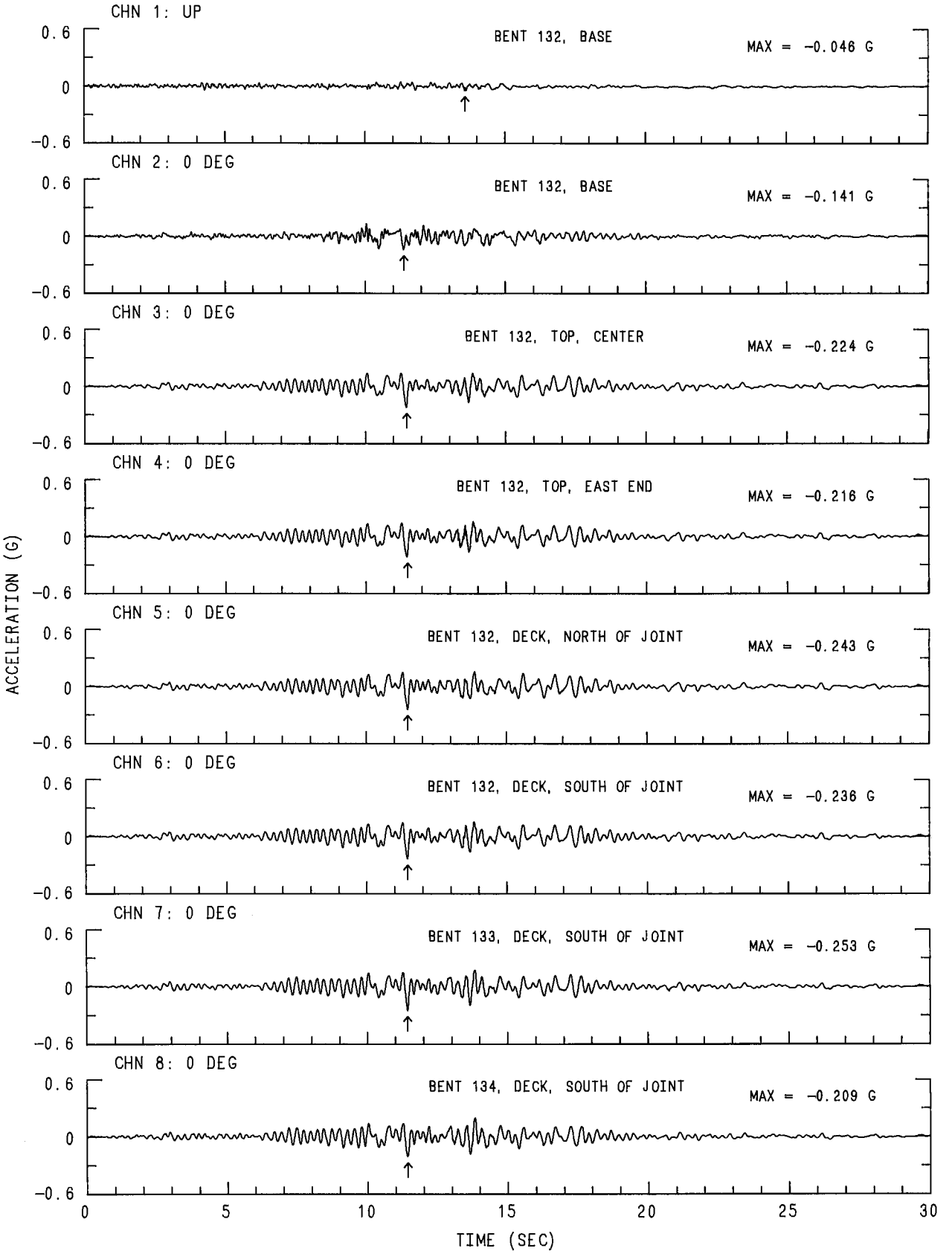
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58539-S5946-89294.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

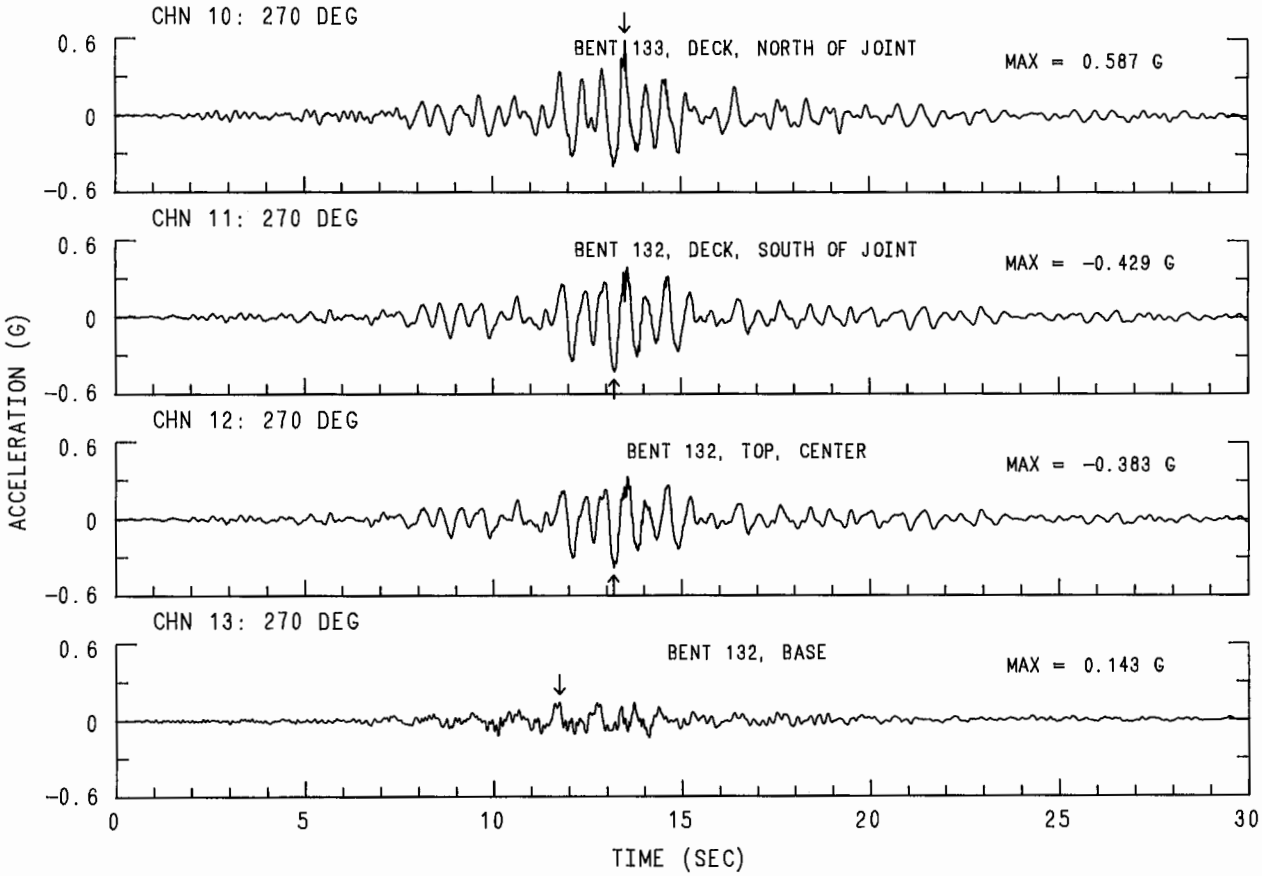
PHASE 1 ACCELERATION. RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

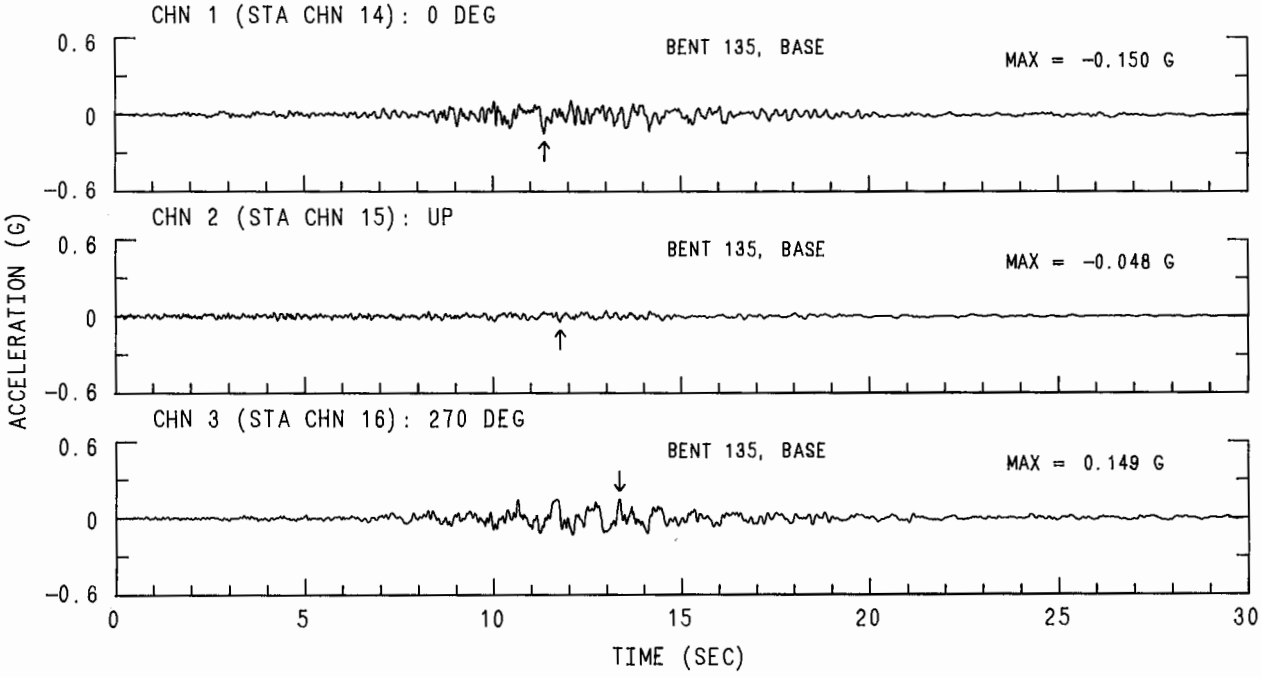
PHASE 1 ACCELERATION. RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

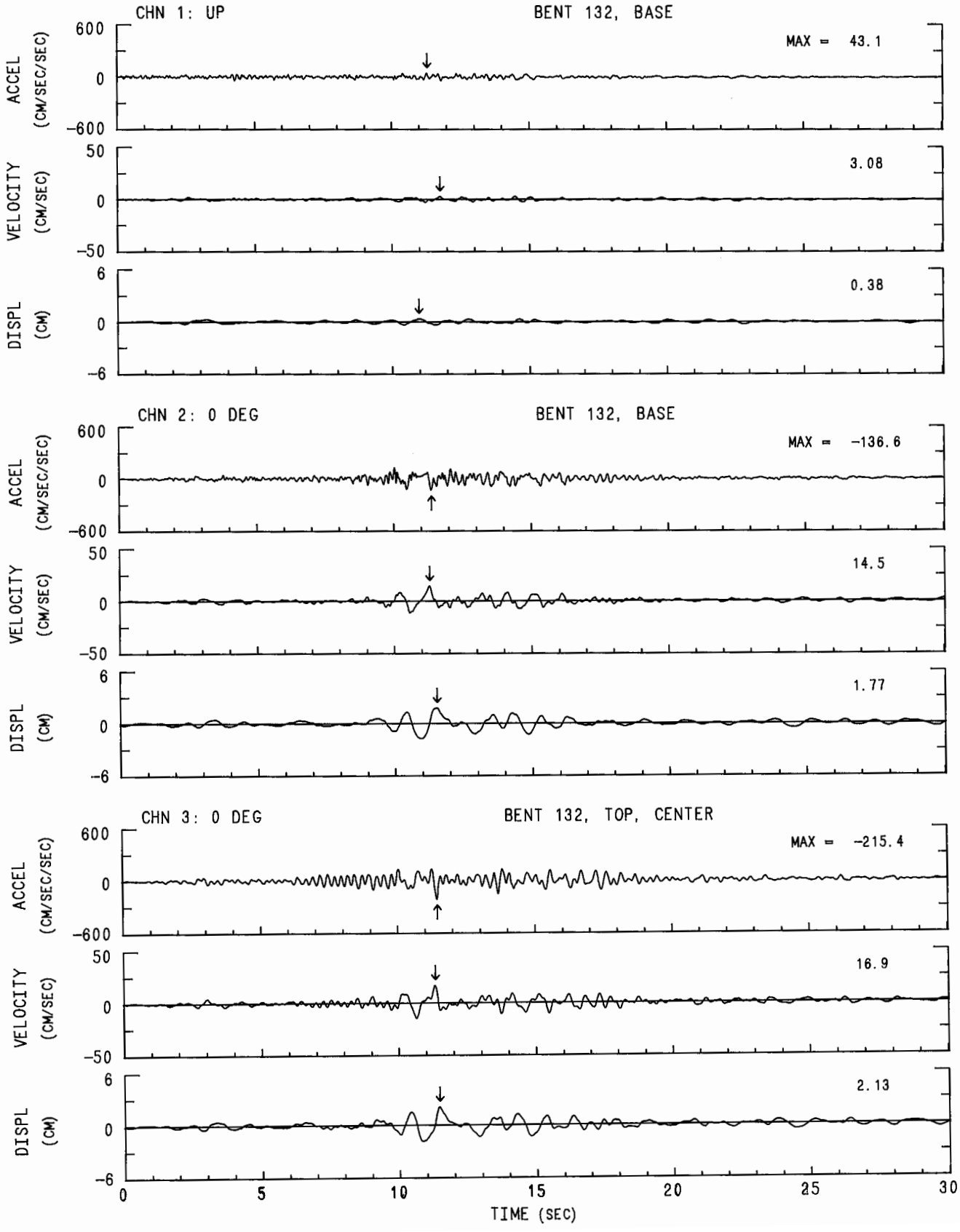
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 1 ACCELERATION. RECORD ID: 58501-S1694-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

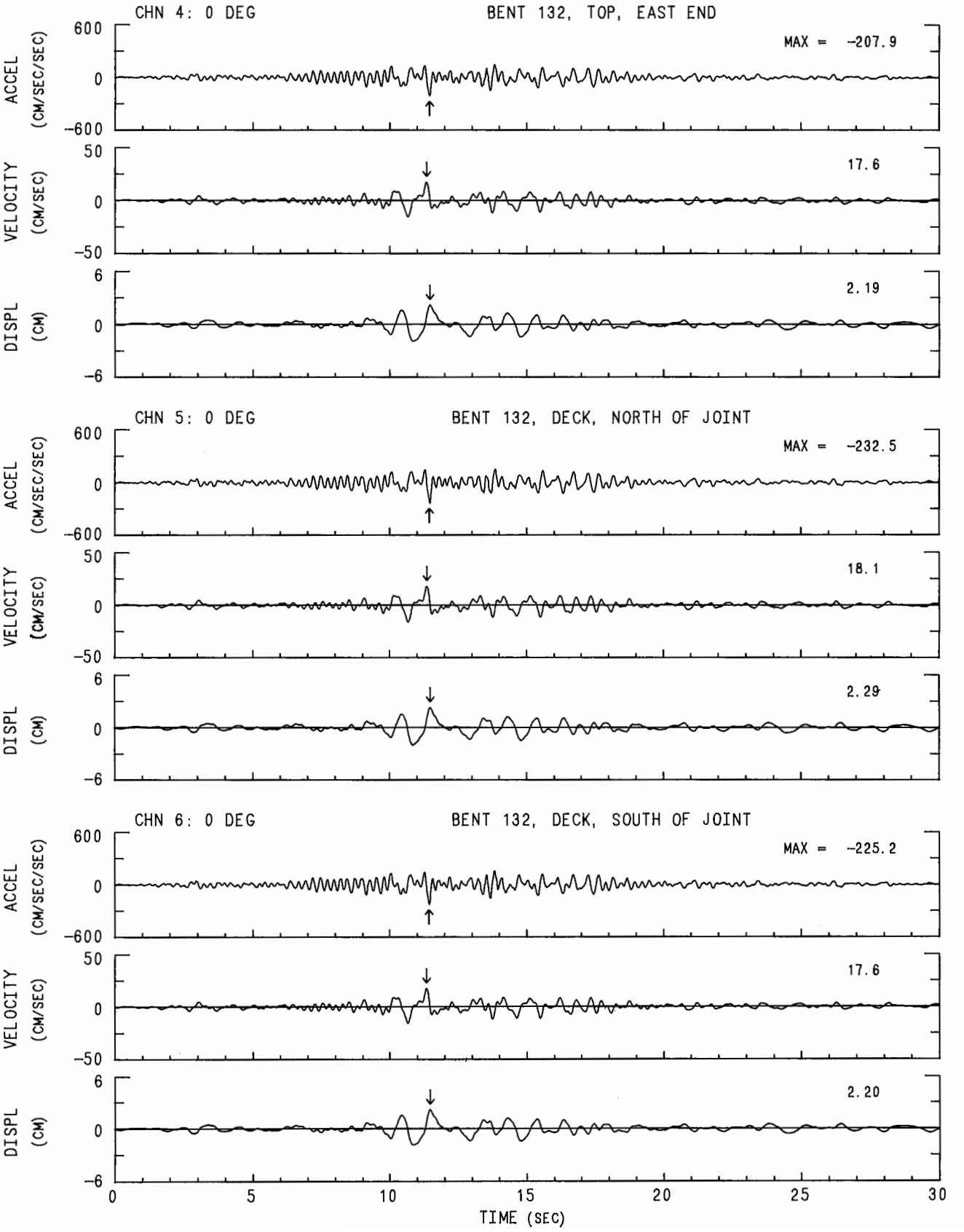
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

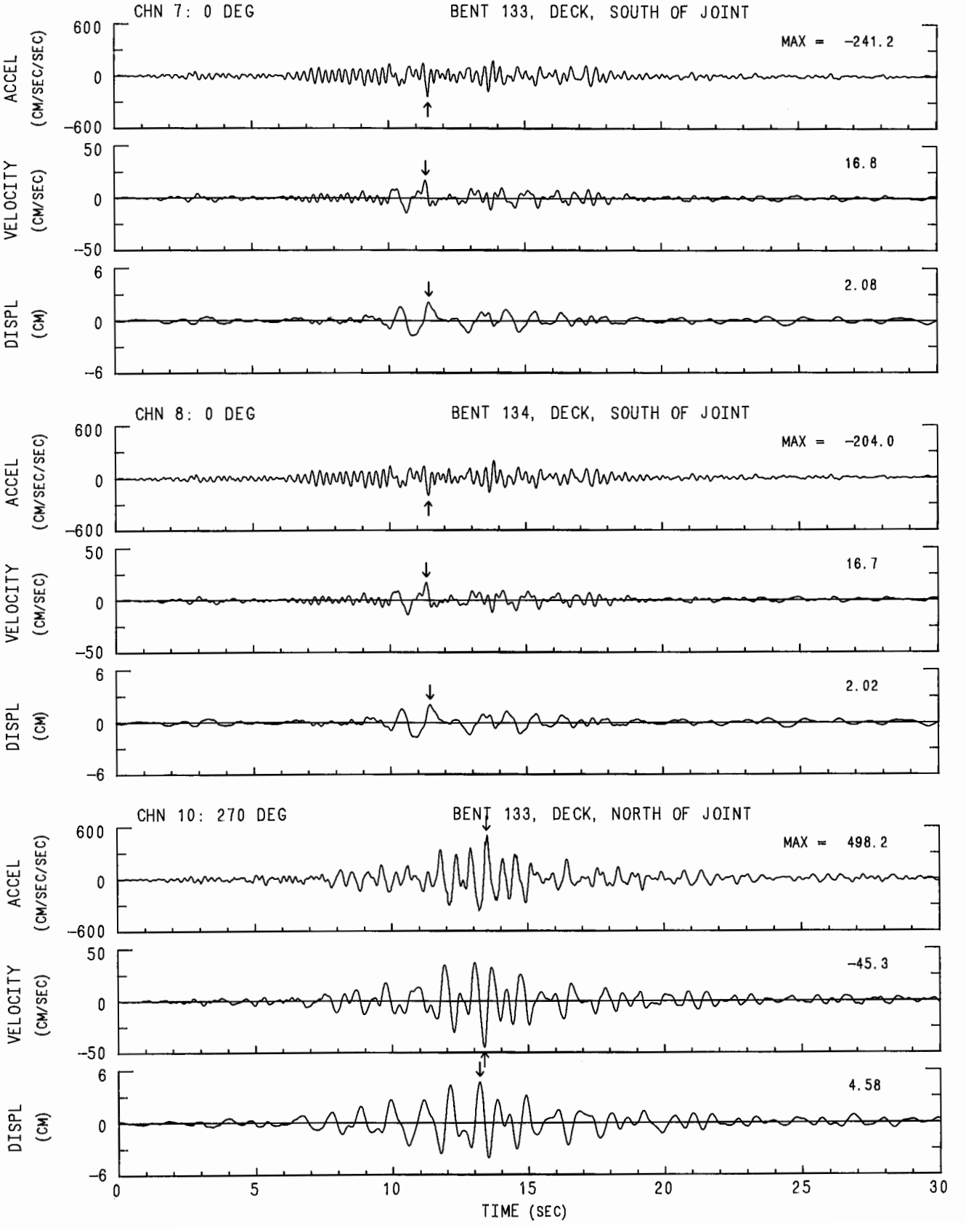
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

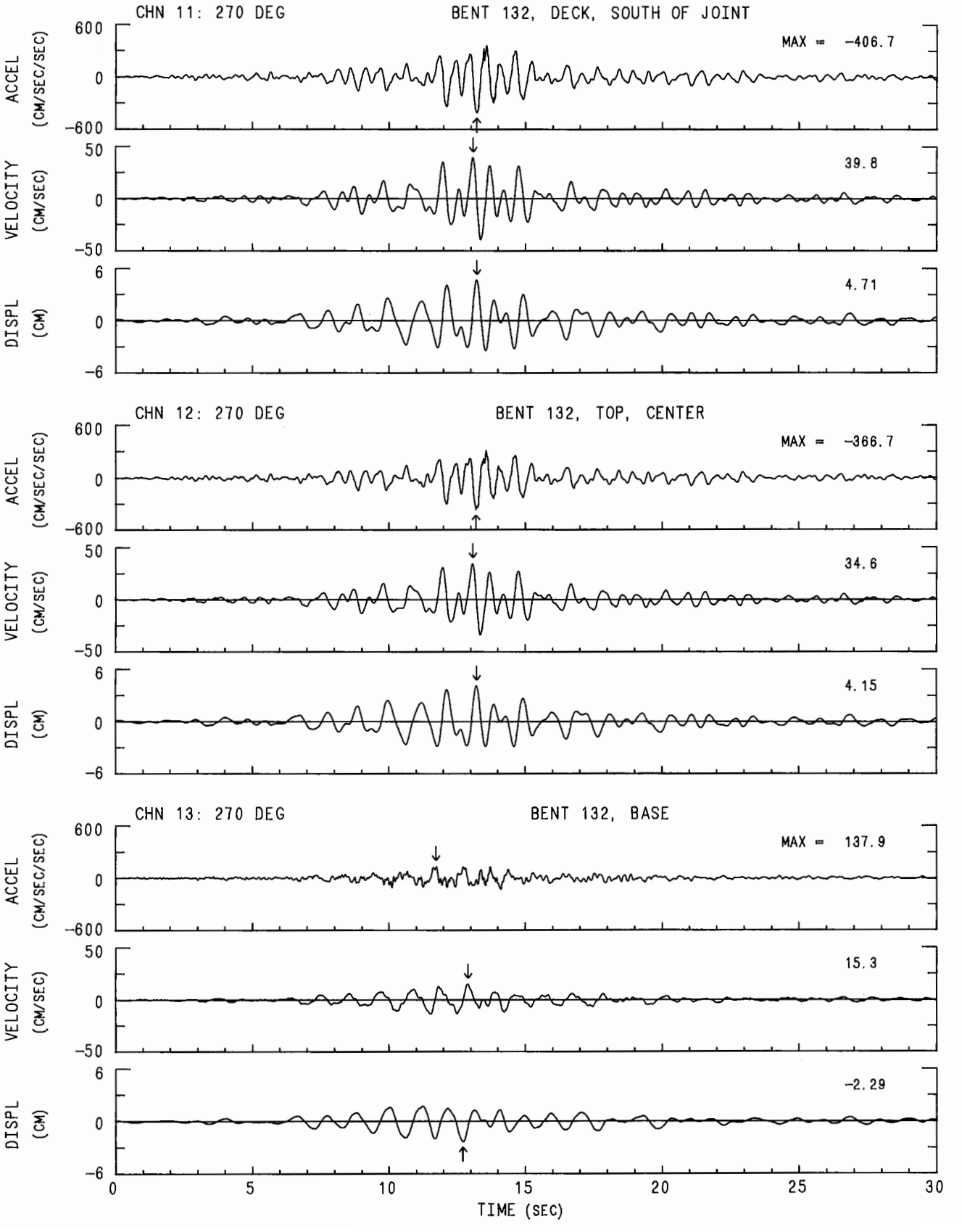
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

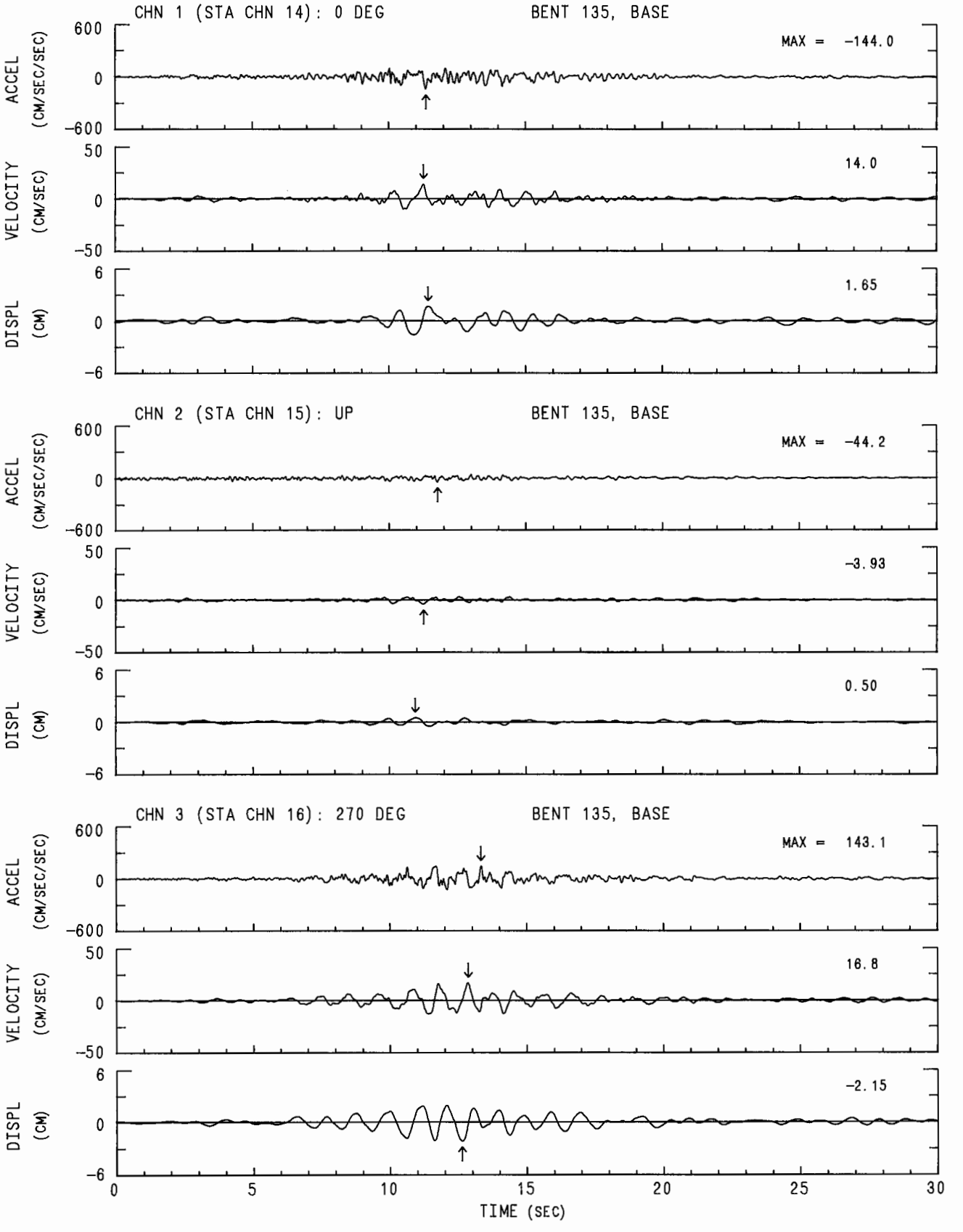
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58501-C0274-89291.02



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58501-S1694-89291.02



HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

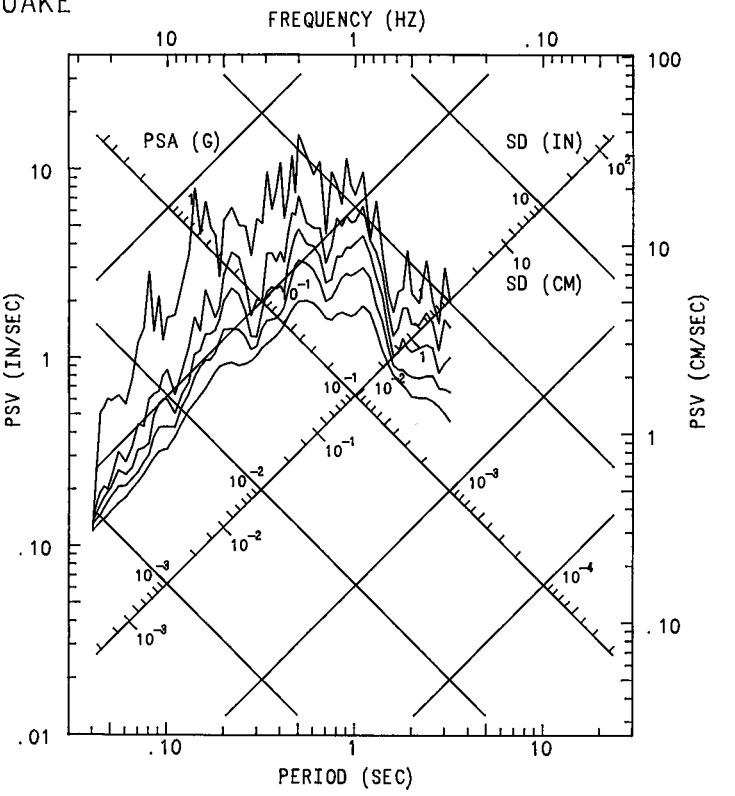
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

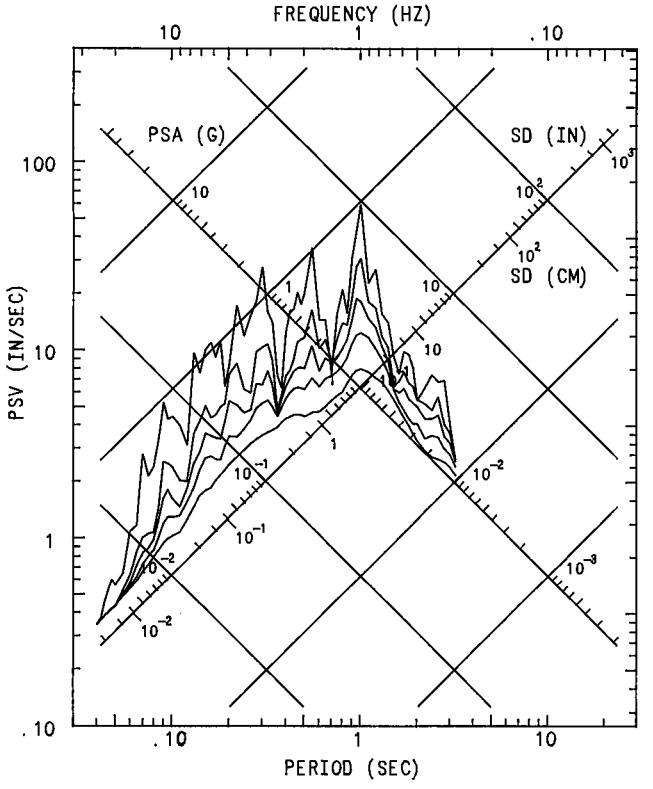
RECORD ID: 58501-C0274-89291.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

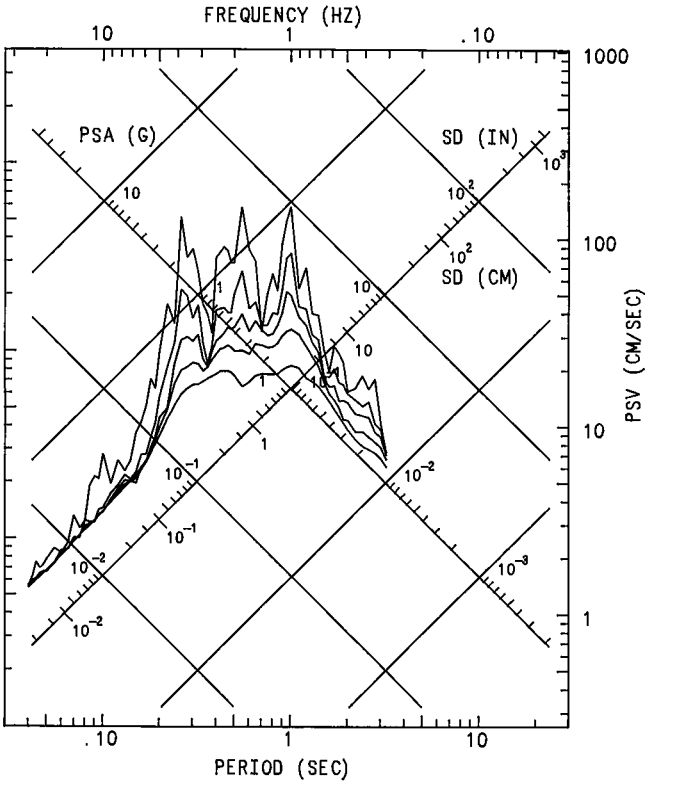
CHN 1: UP
BENT 132, BASE



CHN 2: 0 DEG
BENT 132, BASE



CHN 3: 0 DEG
BENT 132, TOP, CENTER



HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

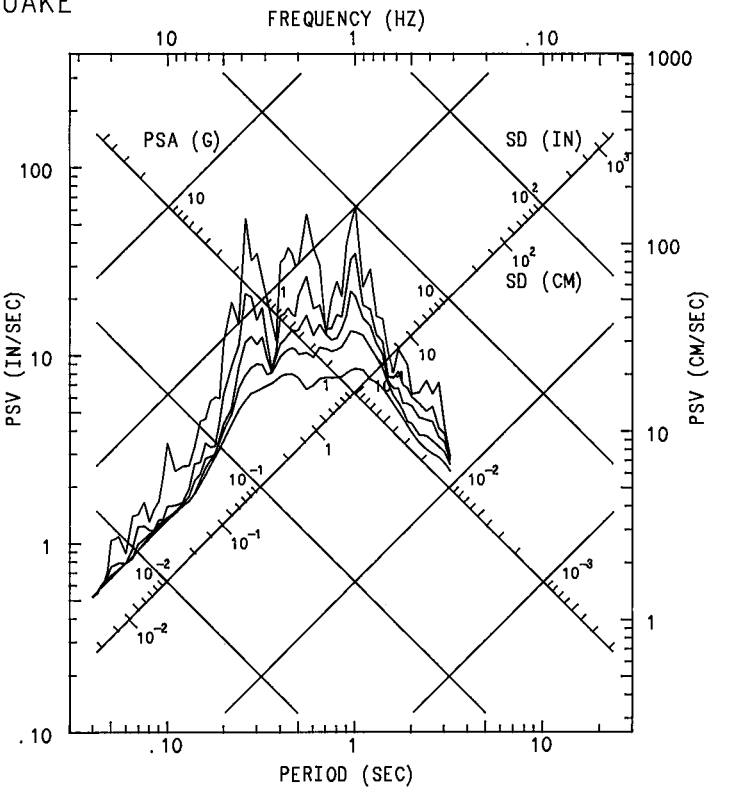
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

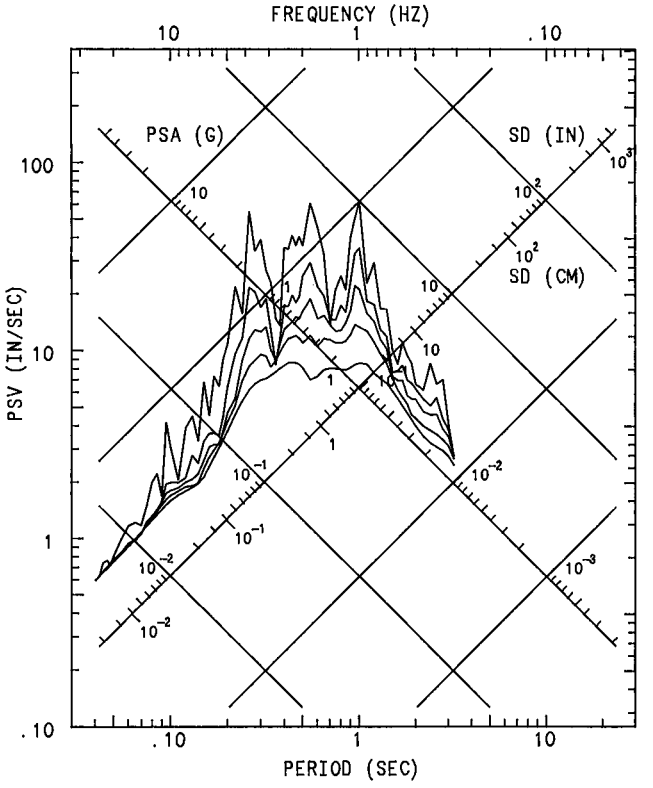
RECORD ID: 58501-C0274-89291.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

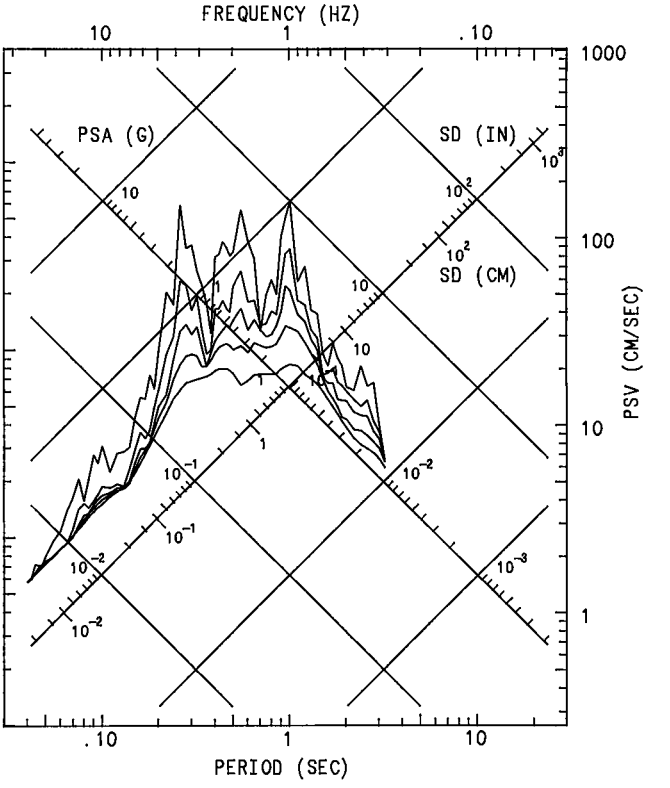
CHN 4: 0 DEG
BENT 132, TOP, EAST END



CHN 5: 0 DEG
BENT 132, DECK, NORTH OF JOINT



CHN 6: 0 DEG
BENT 132, DECK, SOUTH OF JOINT



HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

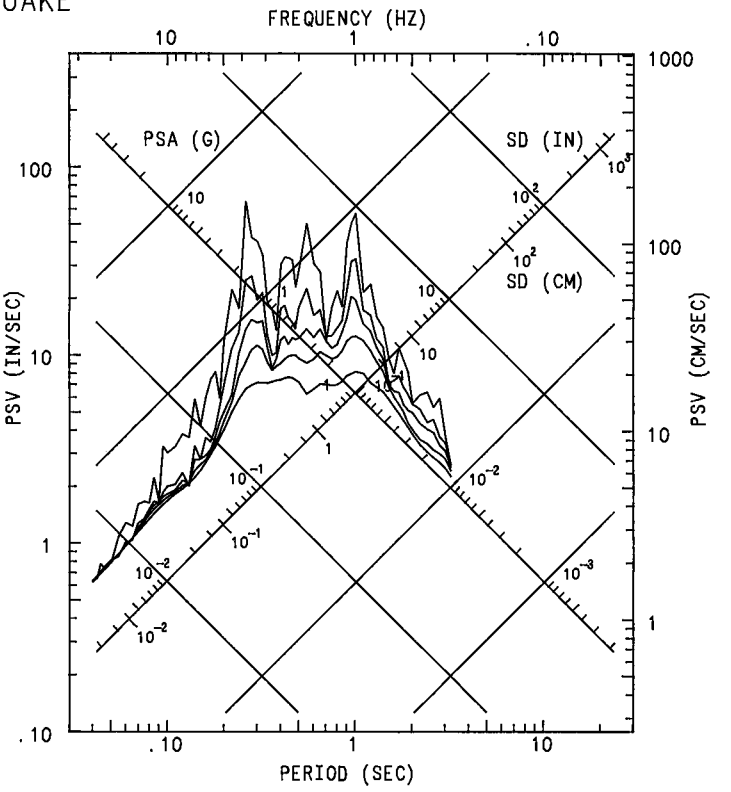
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

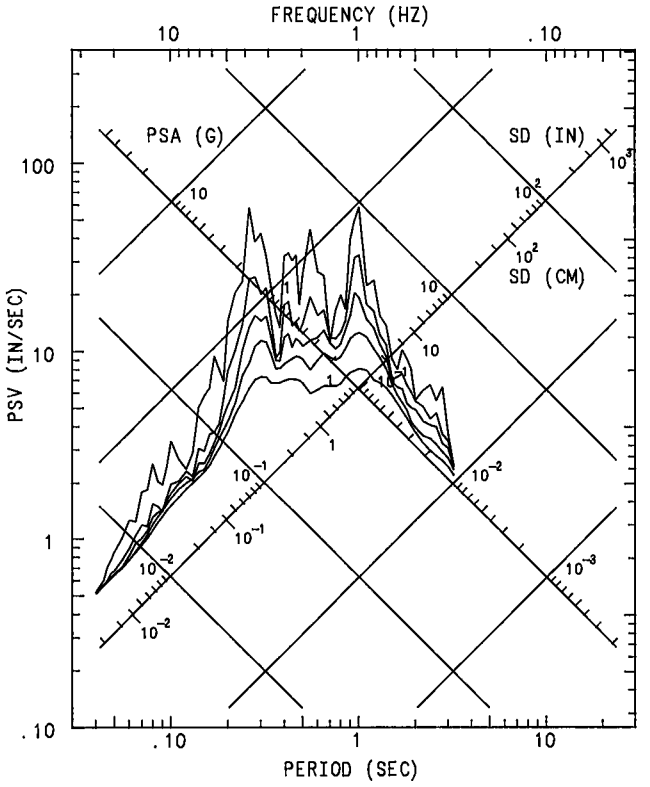
RECORD ID: 58501-C0274-89291.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

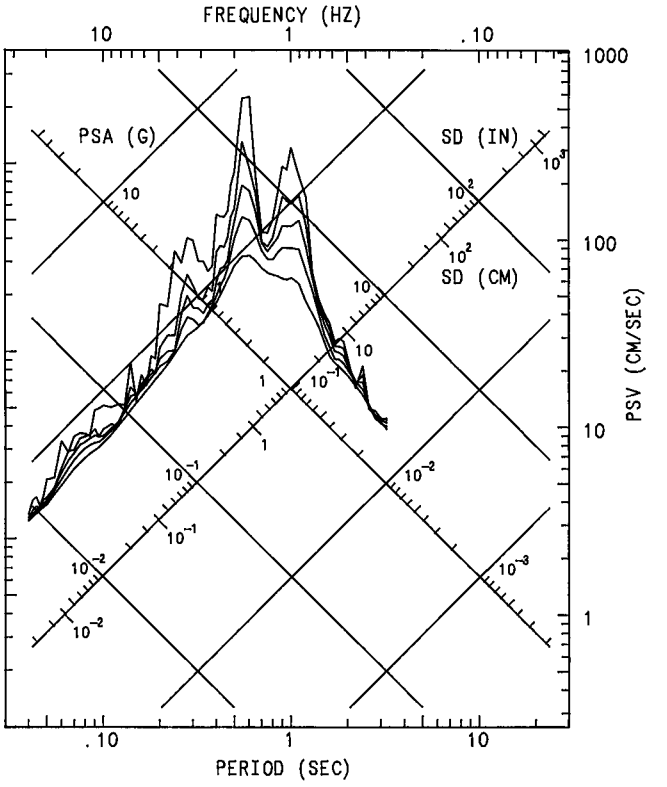
CHN 7: 0 DEG
BENT 133, DECK, SOUTH OF JOINT



CHN 8: 0 DEG
BENT 134, DECK, SOUTH OF JOINT



CHN 10: 270 DEG
BENT 133, DECK, NORTH OF JOINT



HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

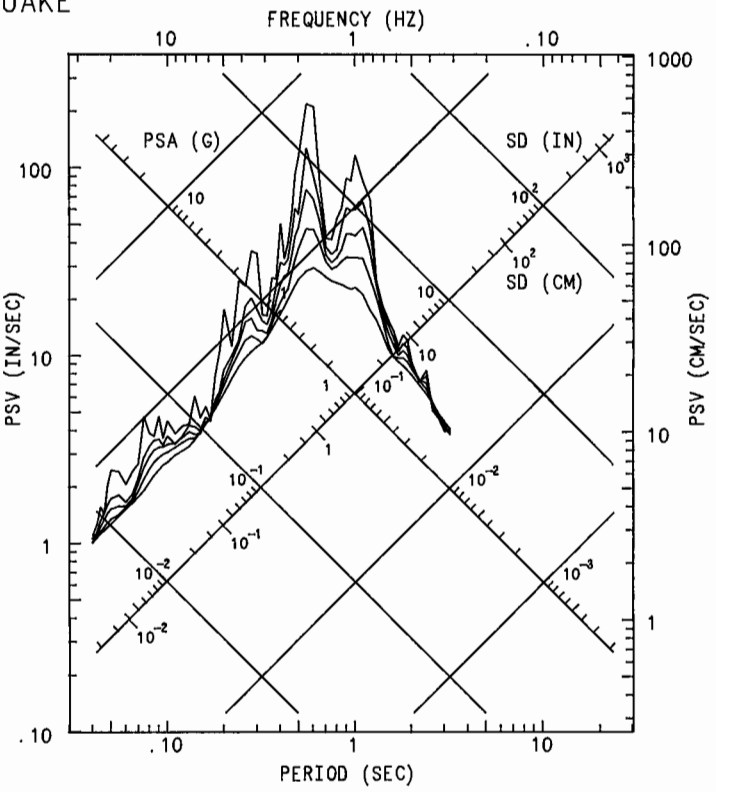
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

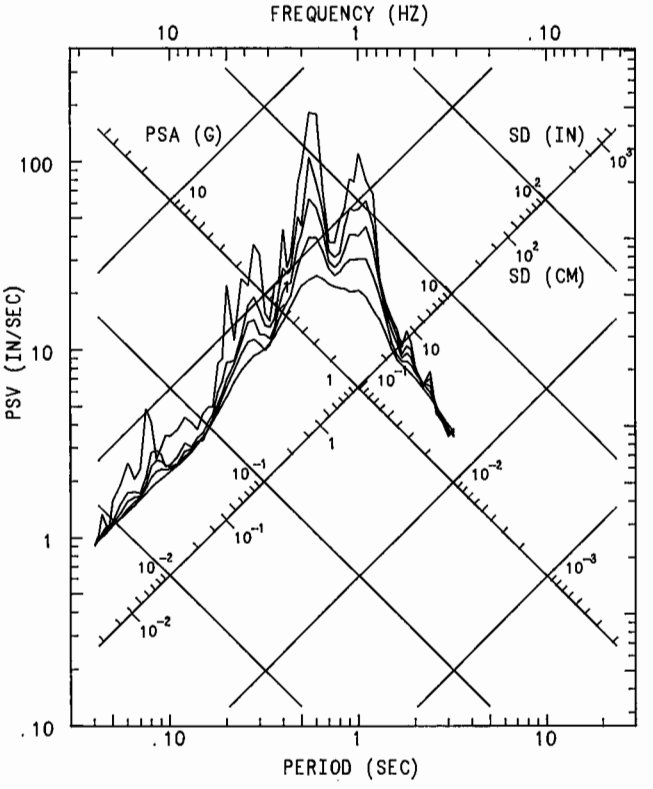
RECORD ID: 58501-C0274-89291.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

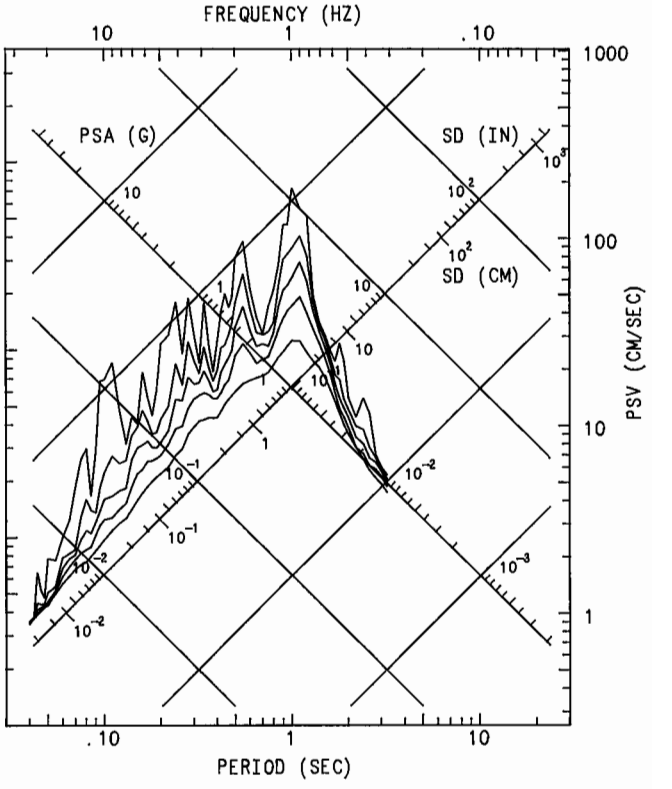
CHN 11: 270 DEG
BENT 132, DECK, SOUTH OF JOINT



CHN 12: 270 DEG
BENT 132, TOP, CENTER



CHN 13: 270 DEG
BENT 132, BASE



HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

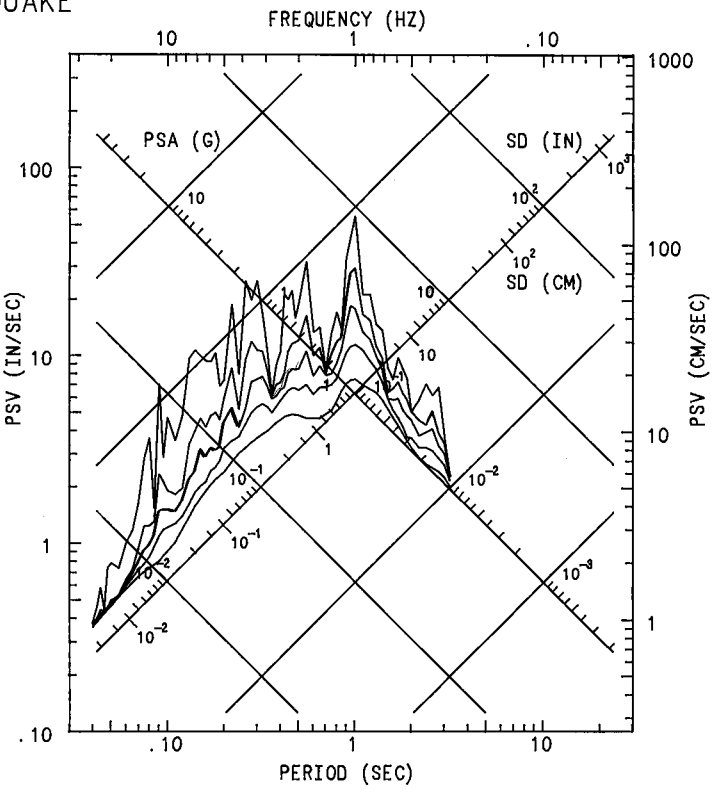
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

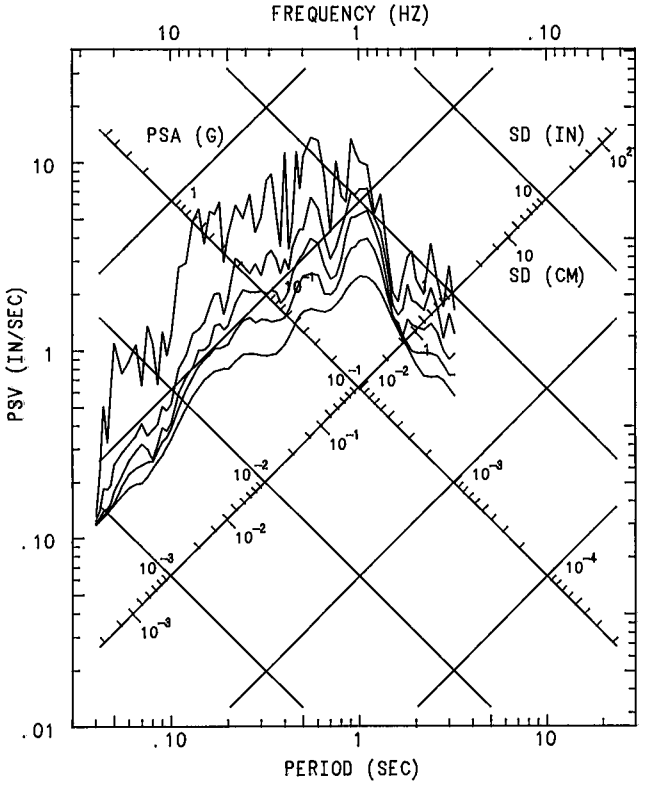
RECORD ID: 58501-S1694-89291.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

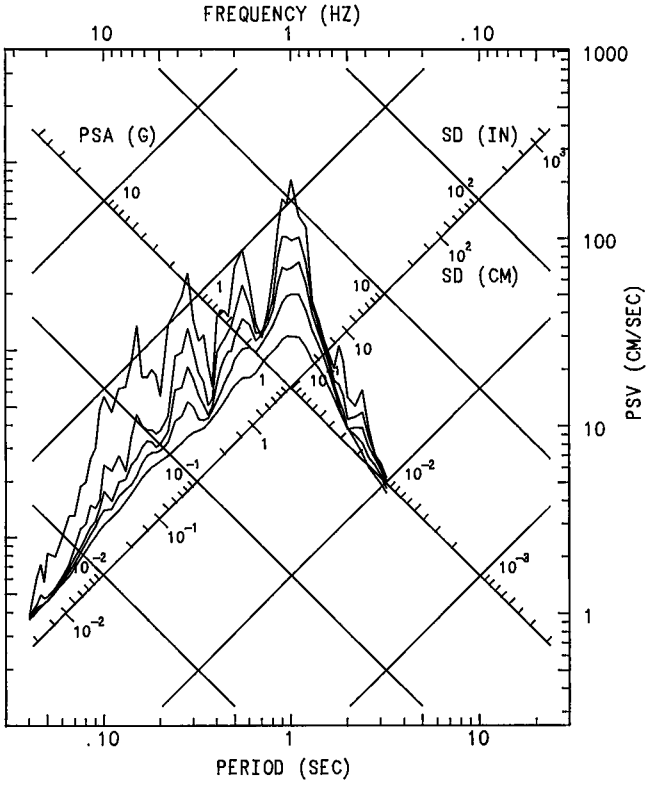
CHN 1 (STA CHN 14): 0 DEG
BENT 135, BASE



CHN 2 (STA CHN 15): UP
BENT 135, BASE

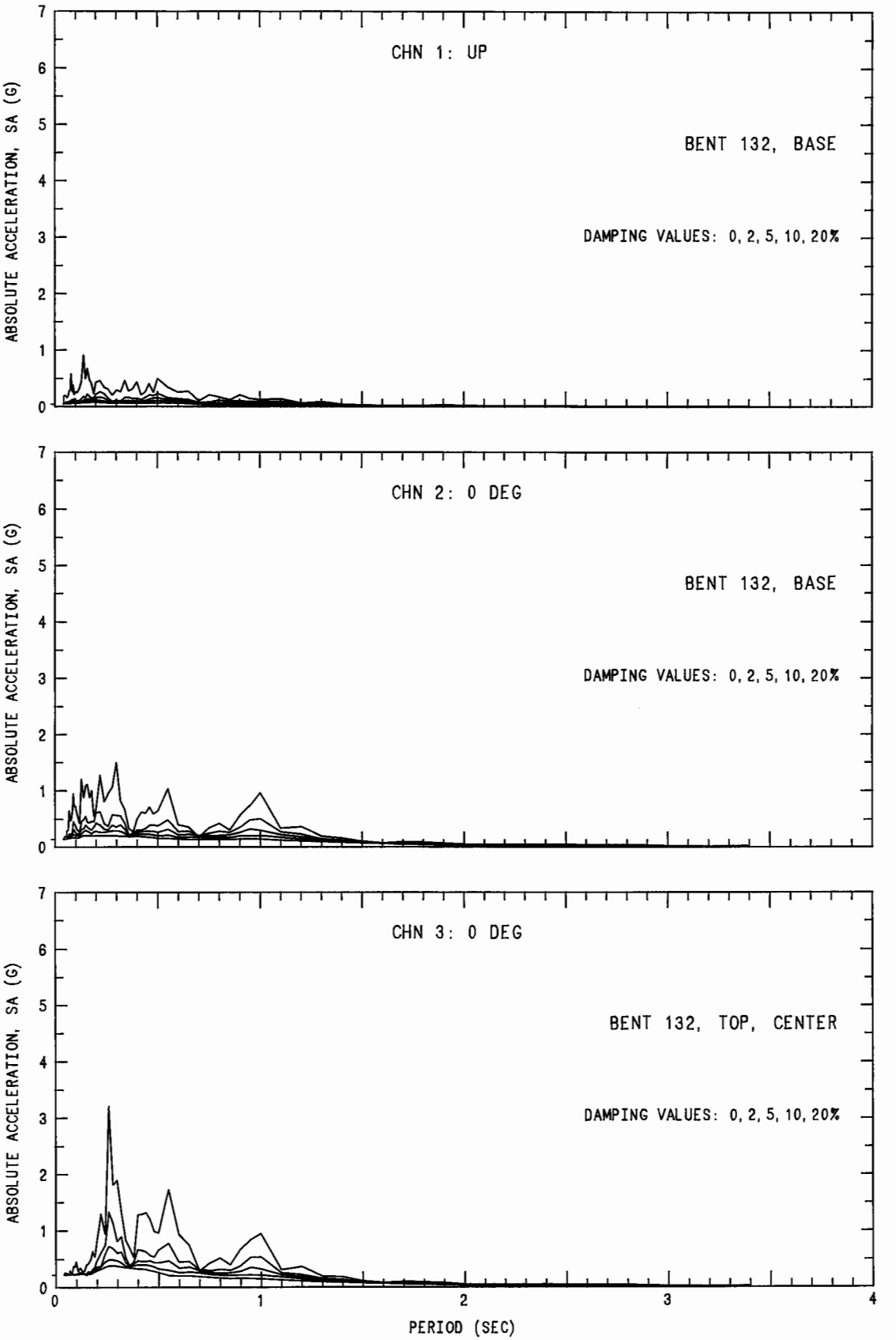


CHN 3 (STA CHN 16): 270 DEG
BENT 135, BASE



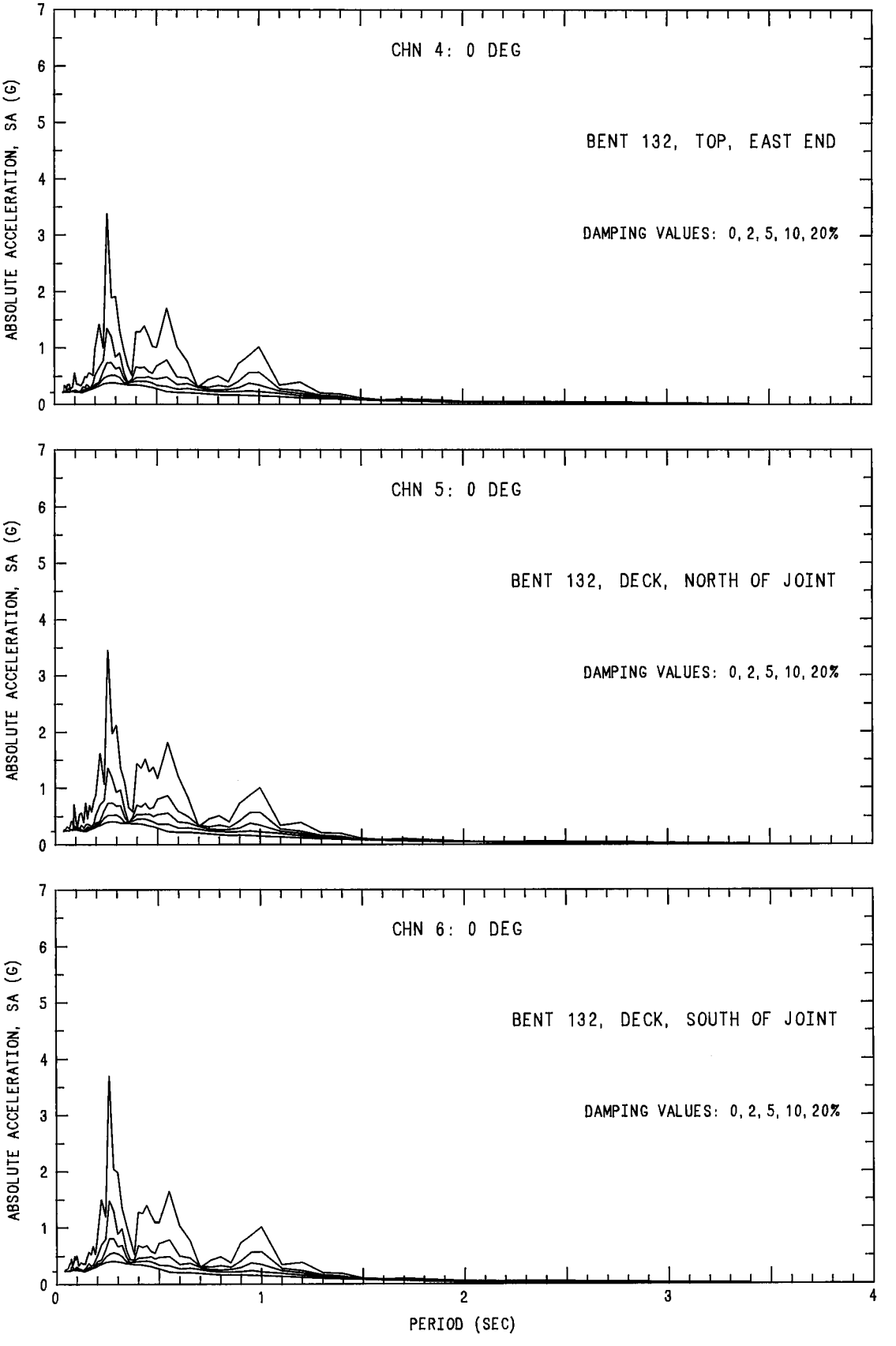
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58501-C0274-89291.02
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



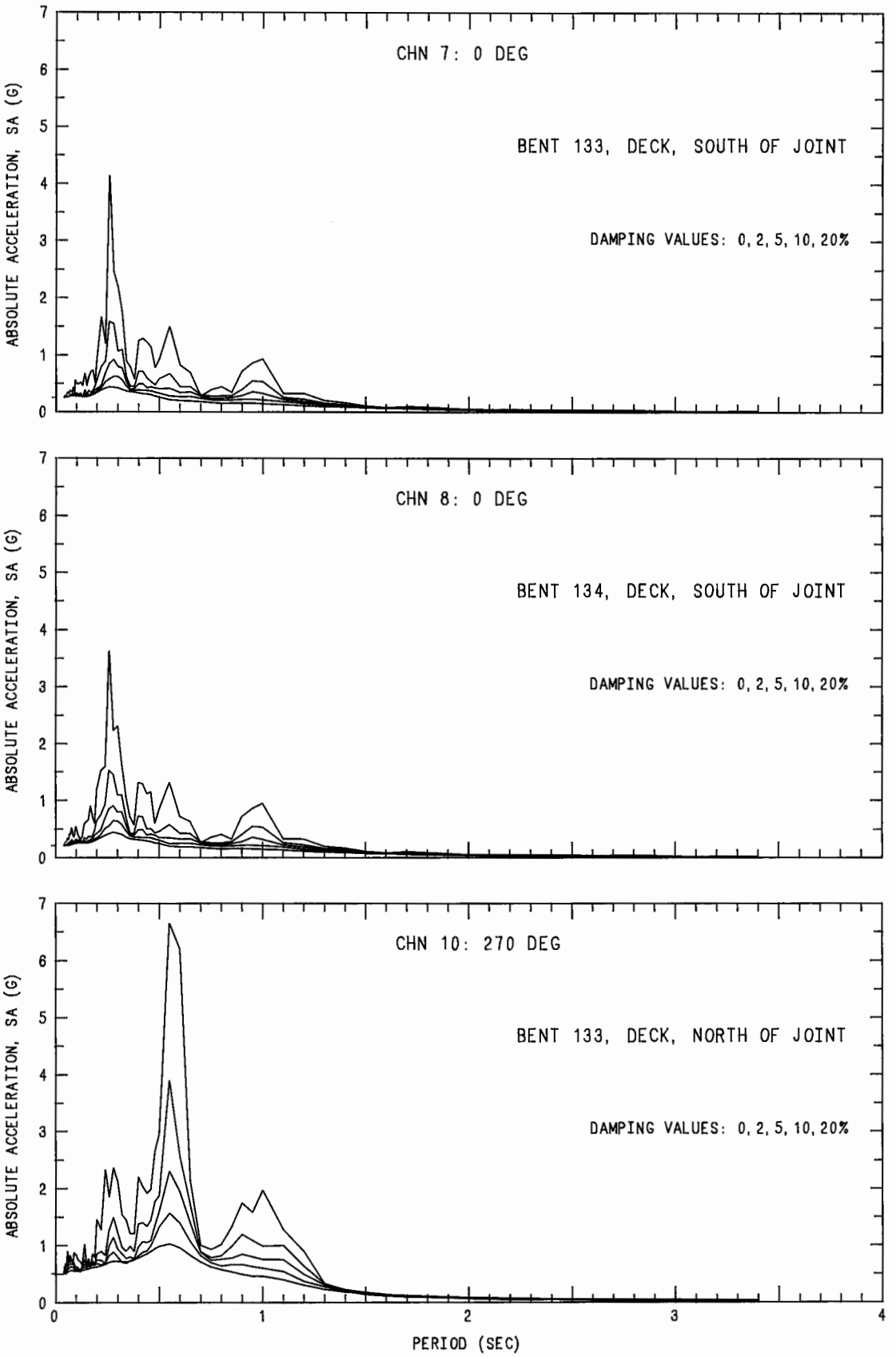
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58501-C0274-89291.02
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



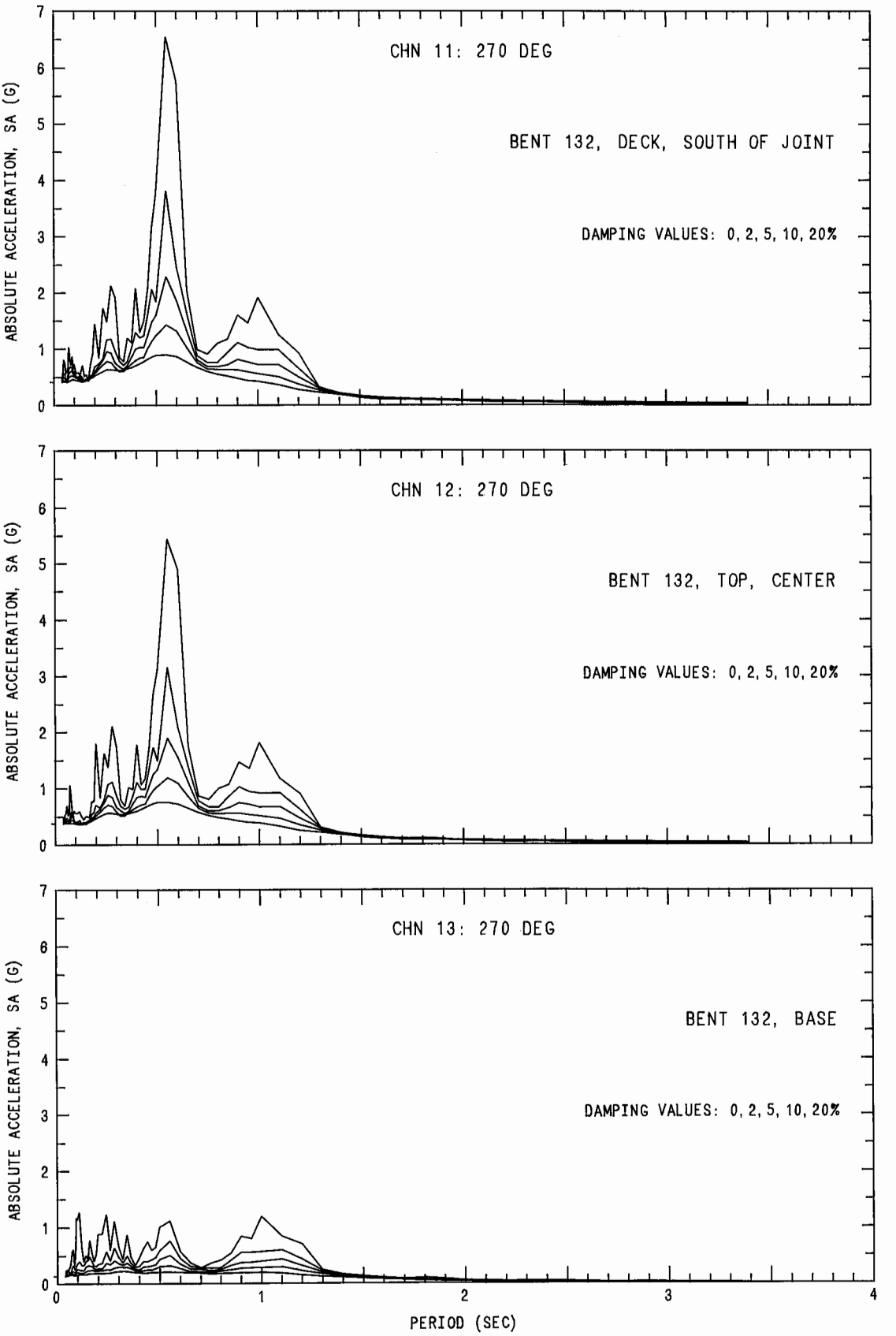
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58501-C0274-89291.02
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



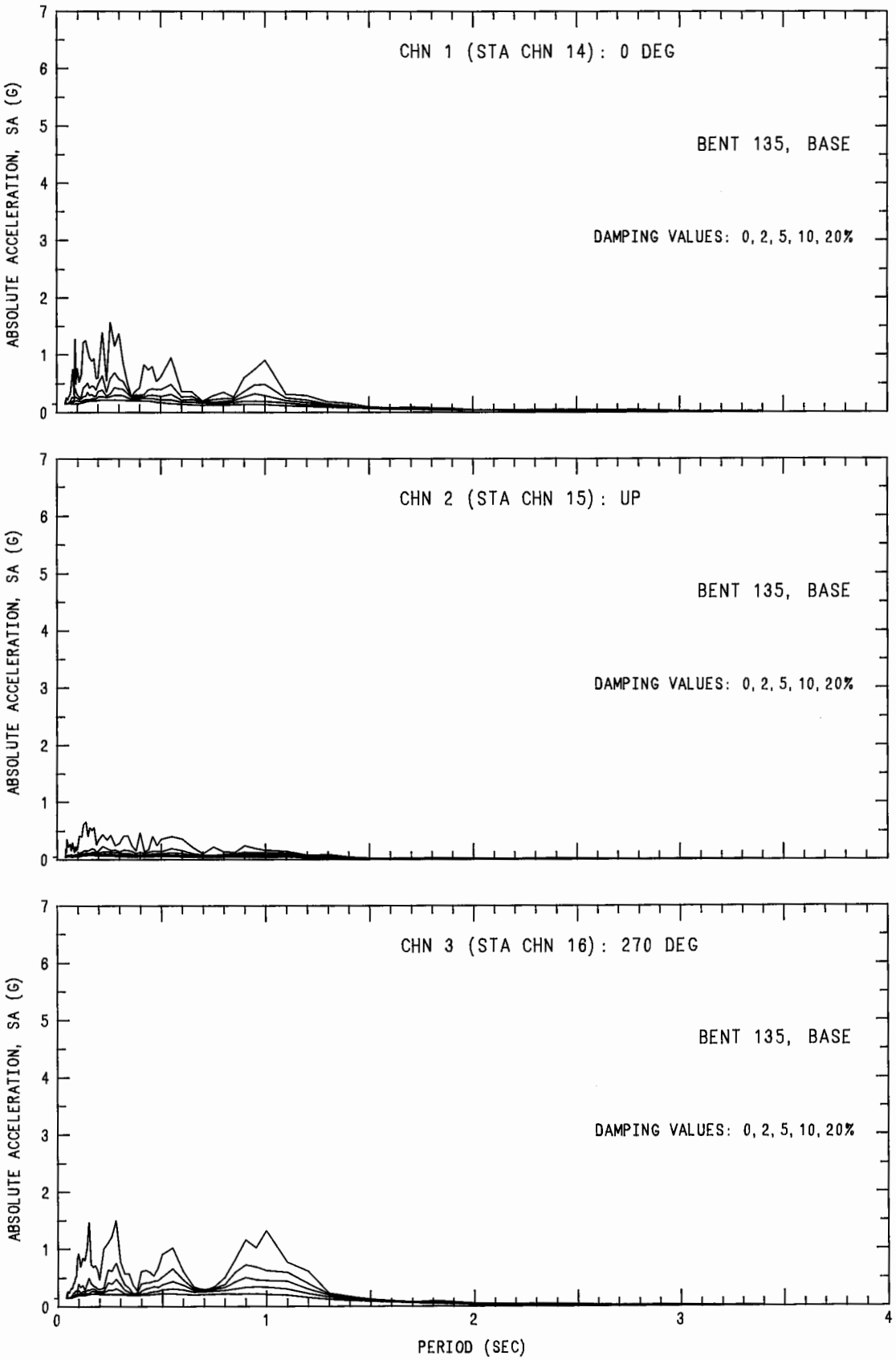
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58501-C0274-89291.02
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART ELEVATED SECTION: CSMIP S/N 501

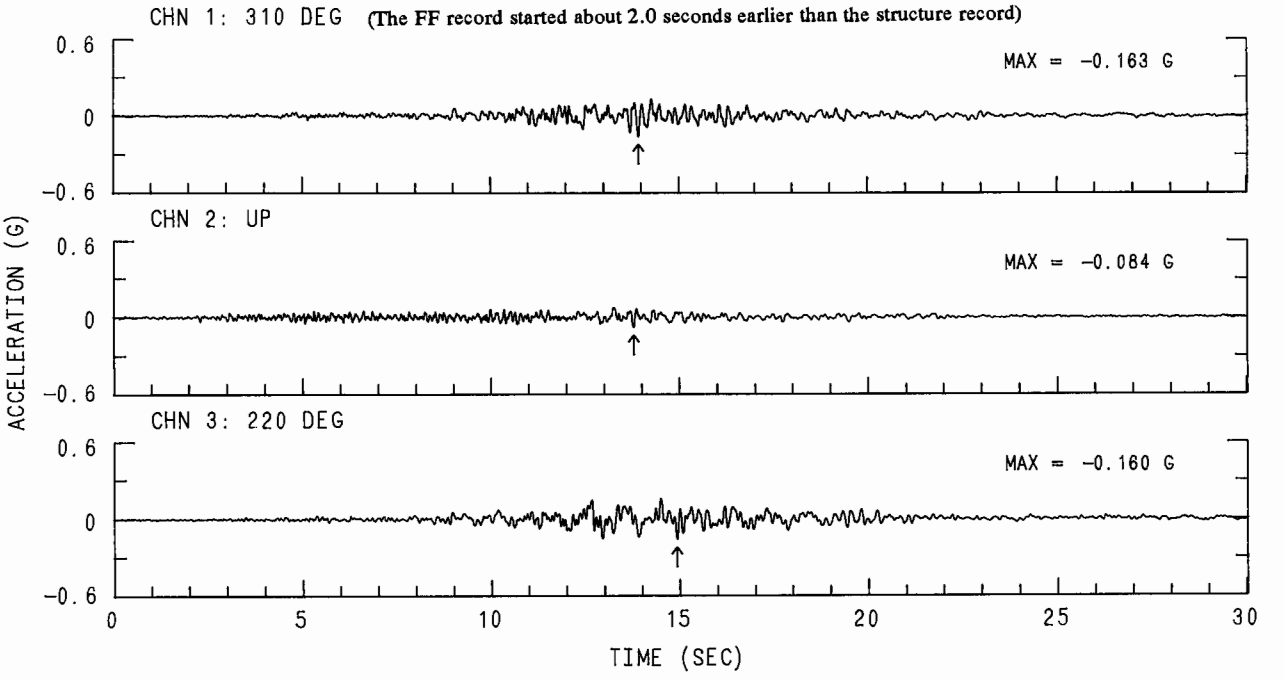
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58501-S1694-89291.02
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

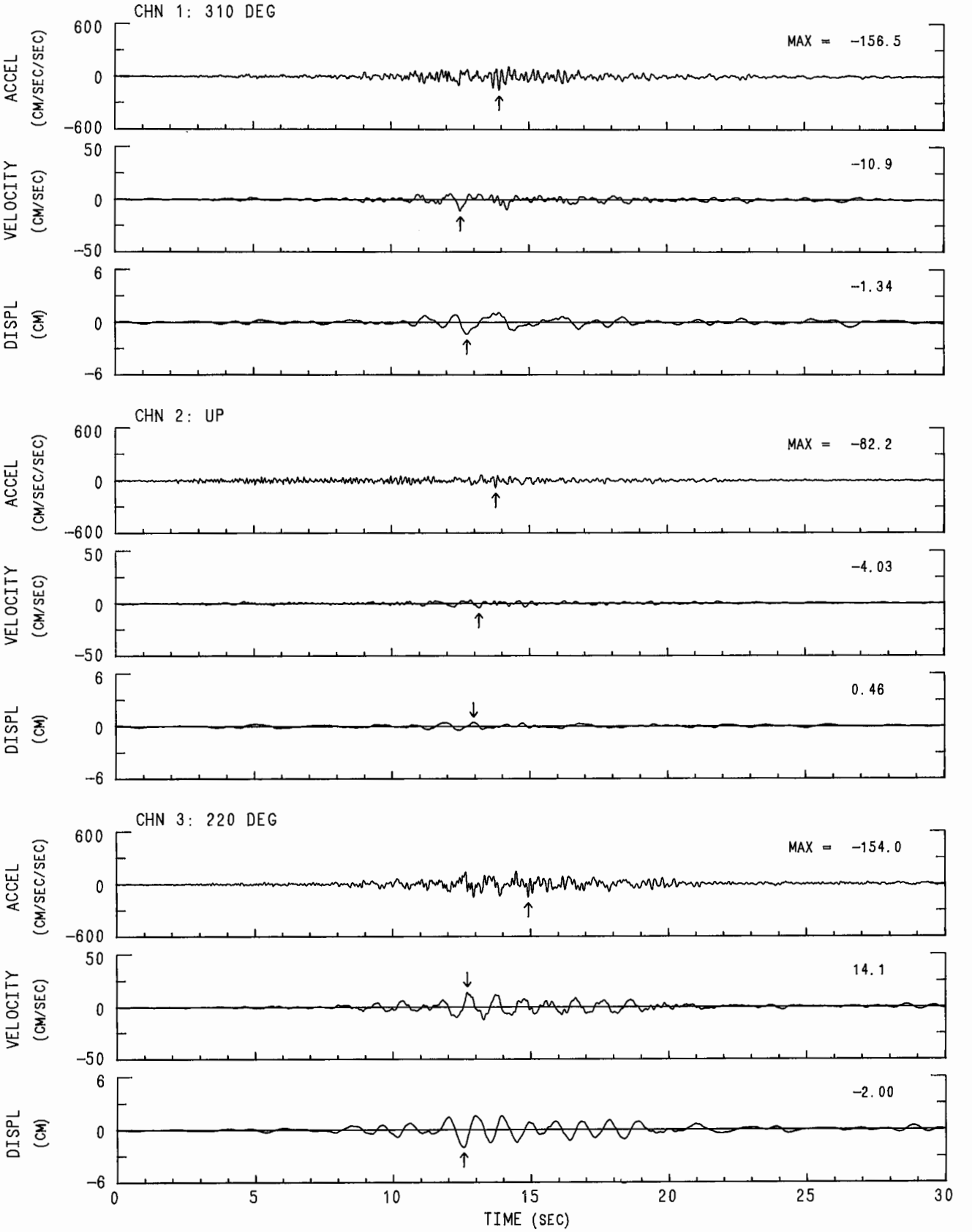
HAYWARD - BART STATION: CSMIP S/N 498

PHASE 1 ACCELERATION. RECORD ID: 58498-S5089-89291.03



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART STATION: CSMIP S/N 498

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 58498-S5089-89291.03



HAYWARD - BART STATION: CSMIP S/N 498

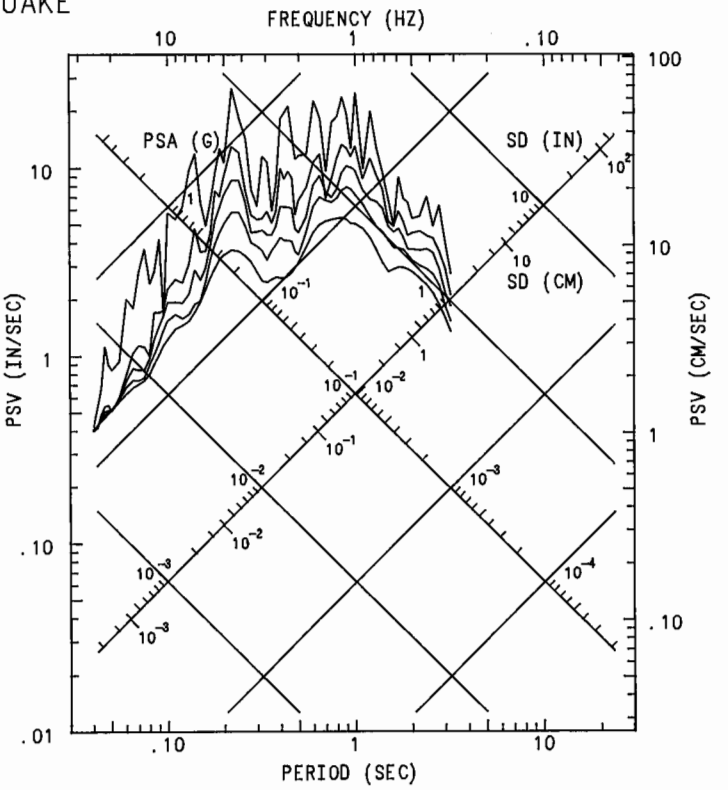
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ
(0.04 TO 2.94 SEC)

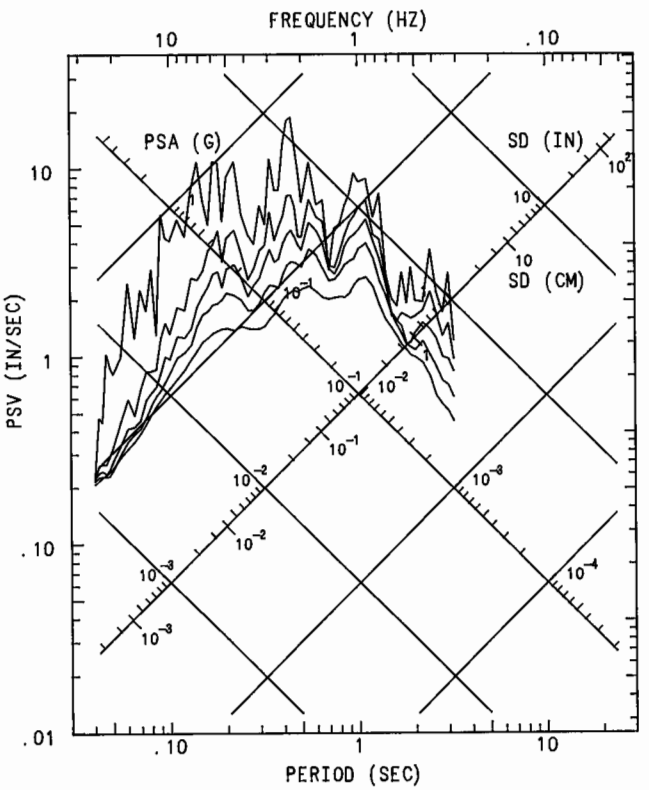
RECORD ID: 58498-S5089-89291.03

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

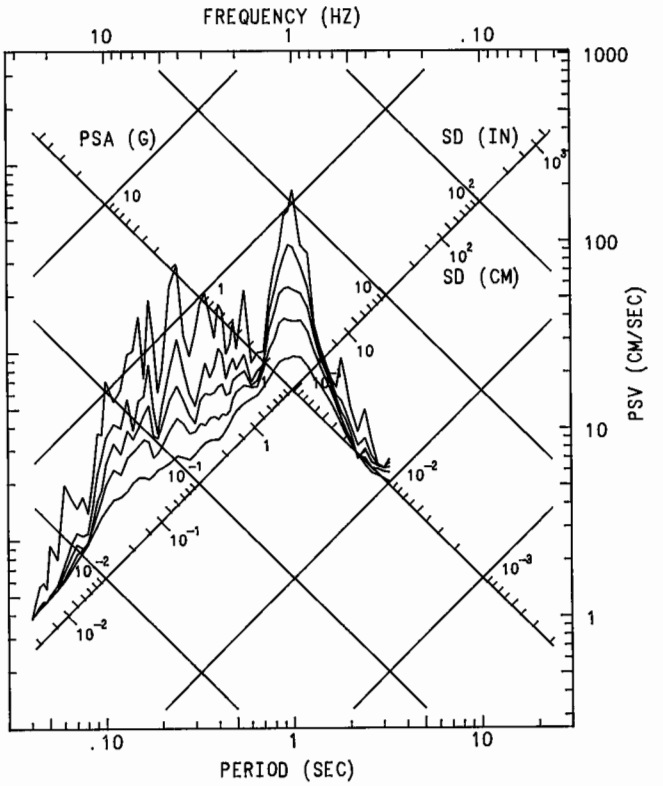
CHN 1: 310 DEG



CHN 2: UP

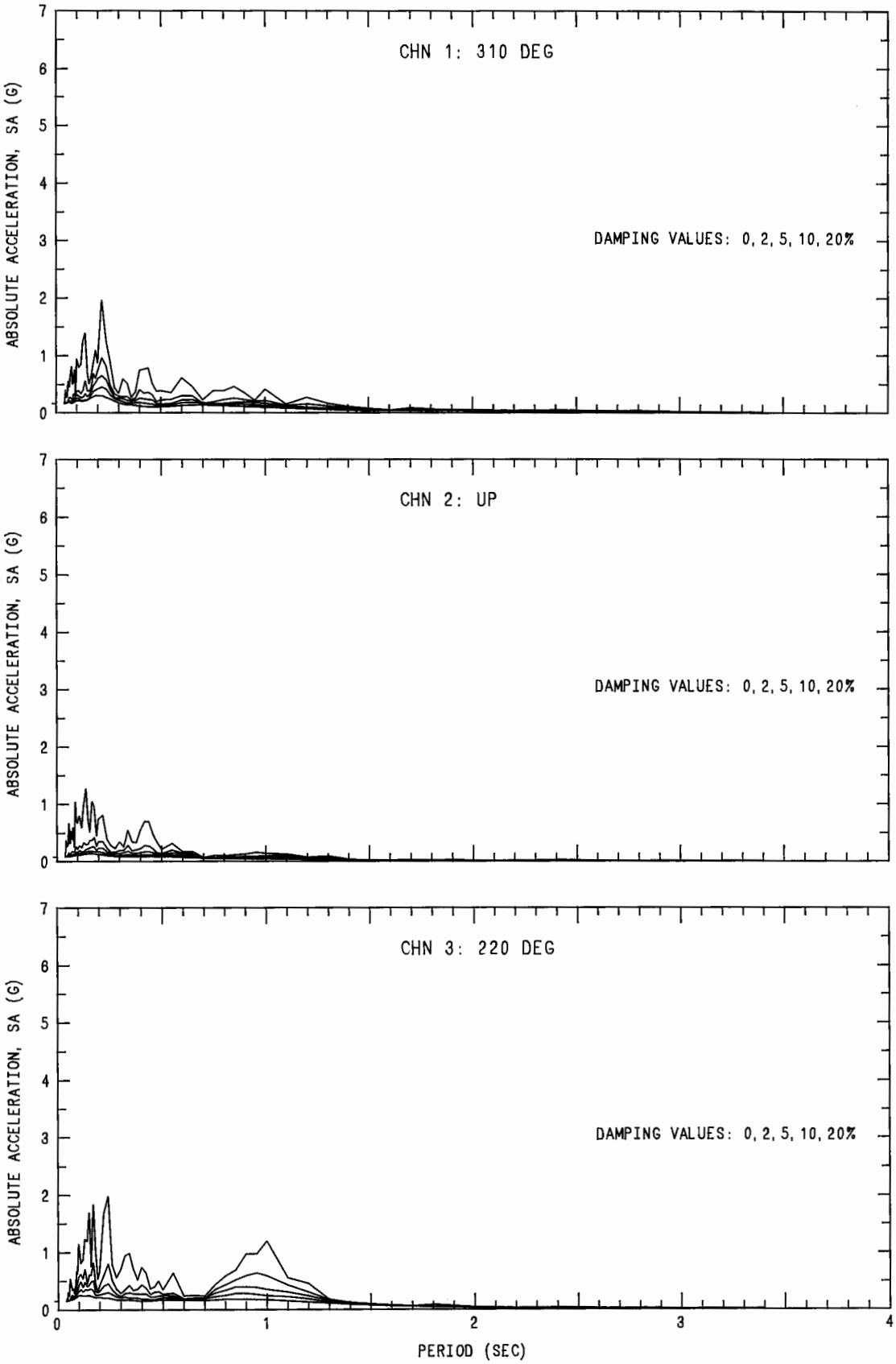


CHN 3: 220 DEG



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
HAYWARD - BART STATION: CSMIP S/N 498

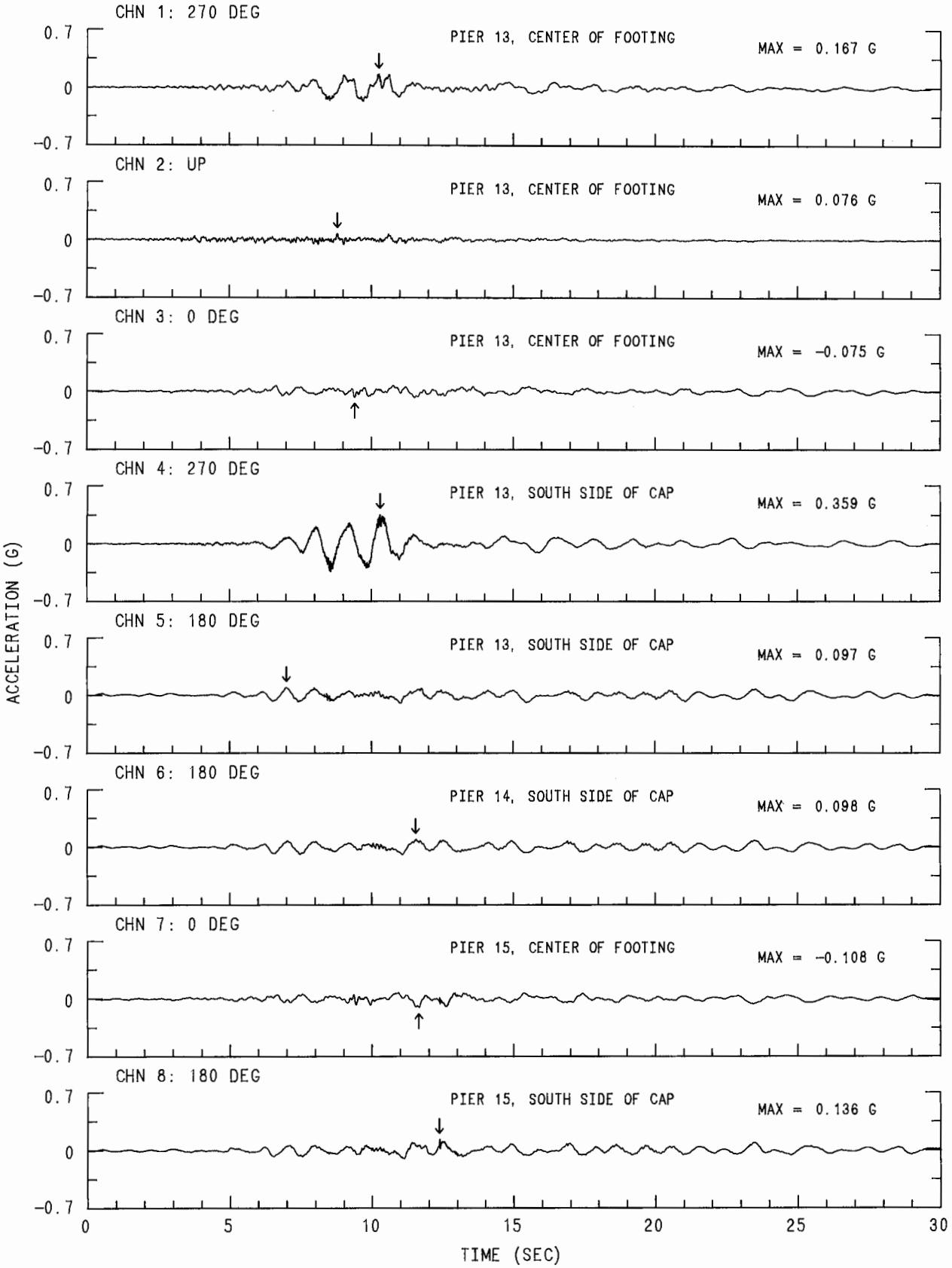
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58498-S5089-89291.03
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

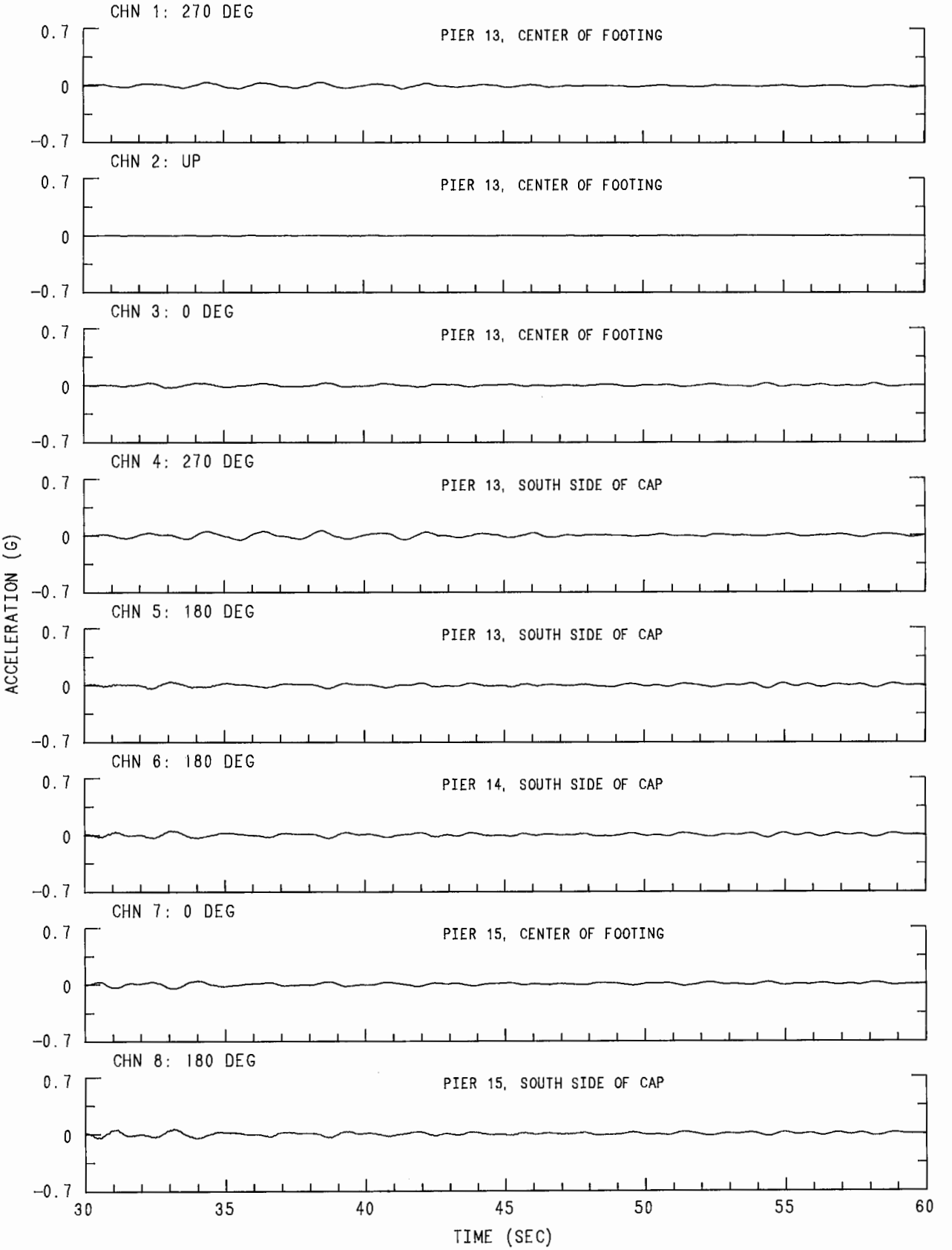
PHASE 1 ACCELERATION. RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

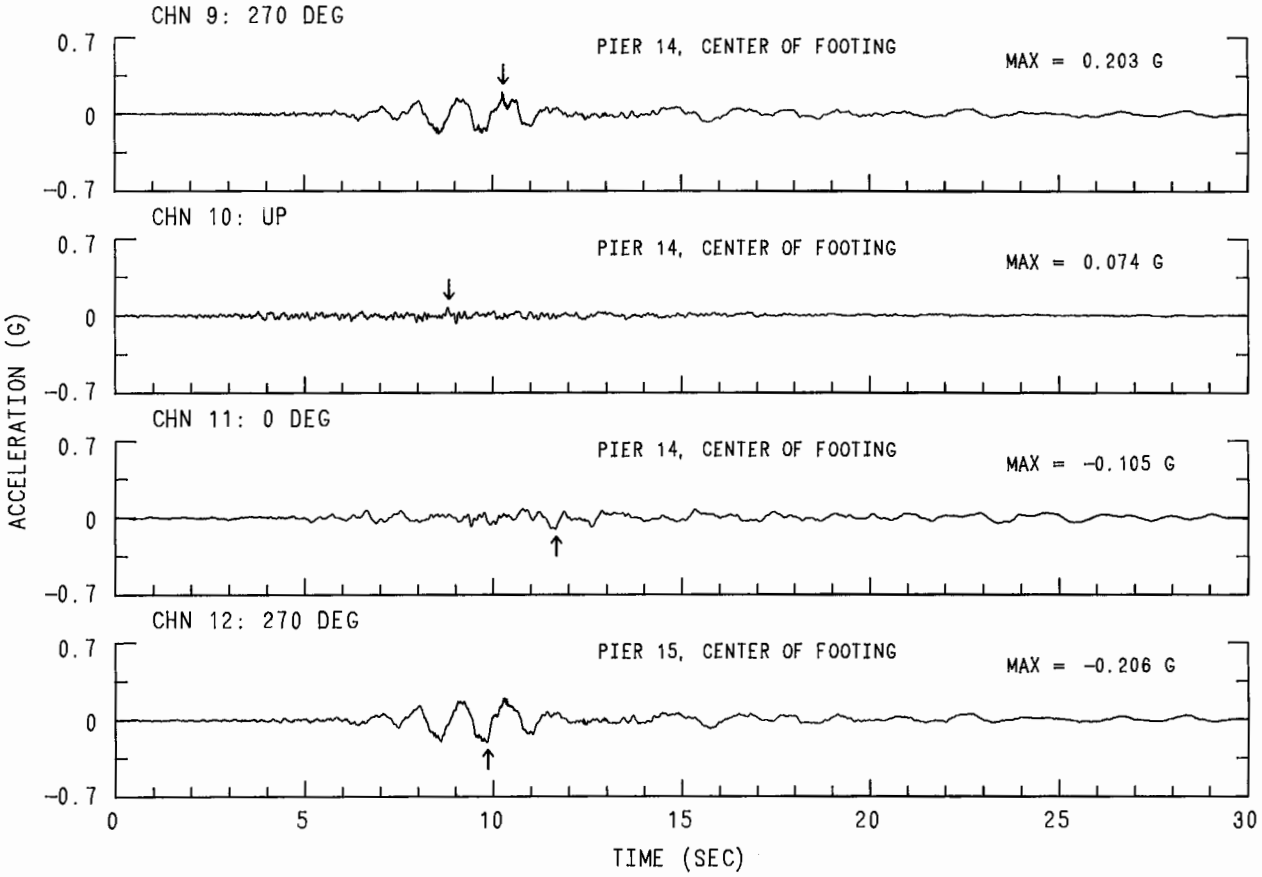
PHASE 1 ACCELERATION. RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

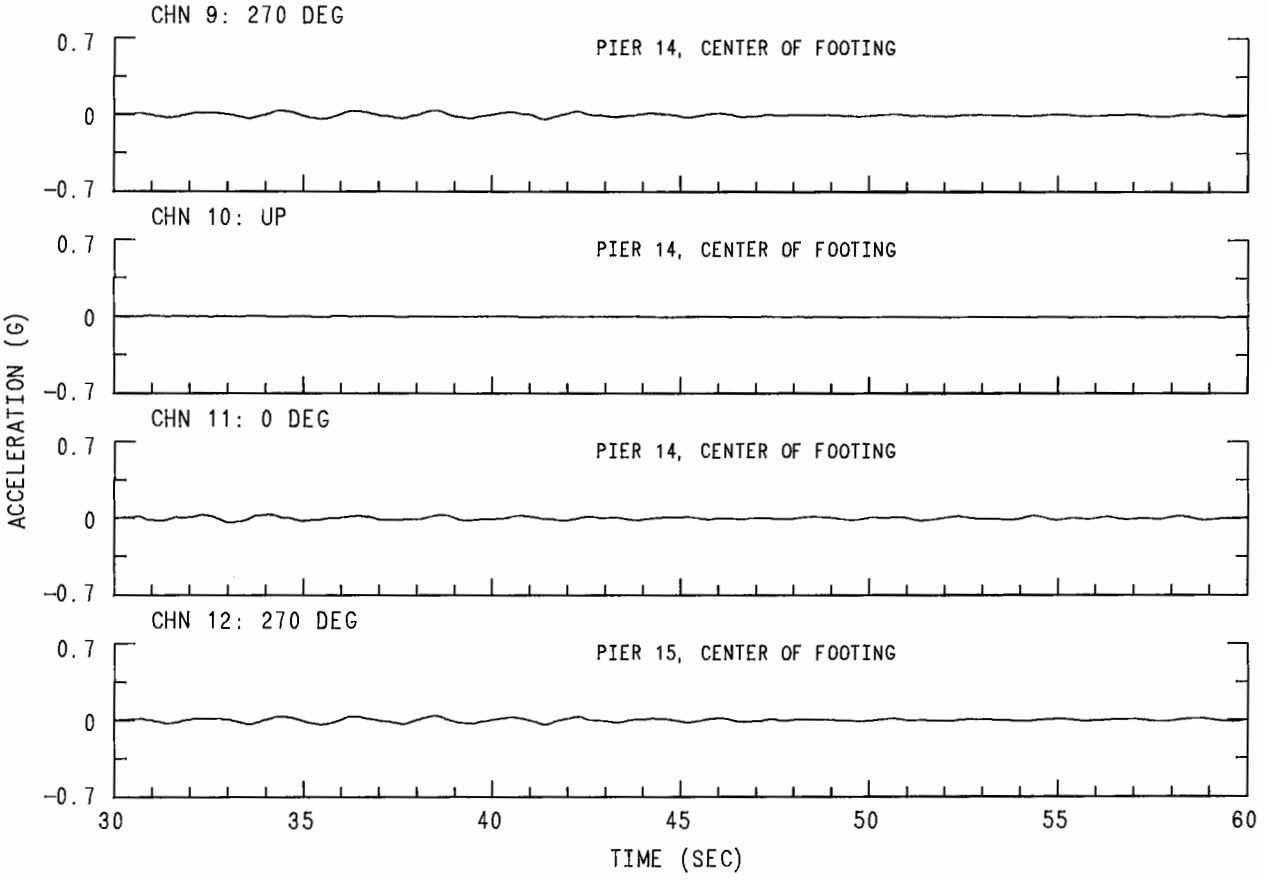
PHASE 1 ACCELERATION. RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

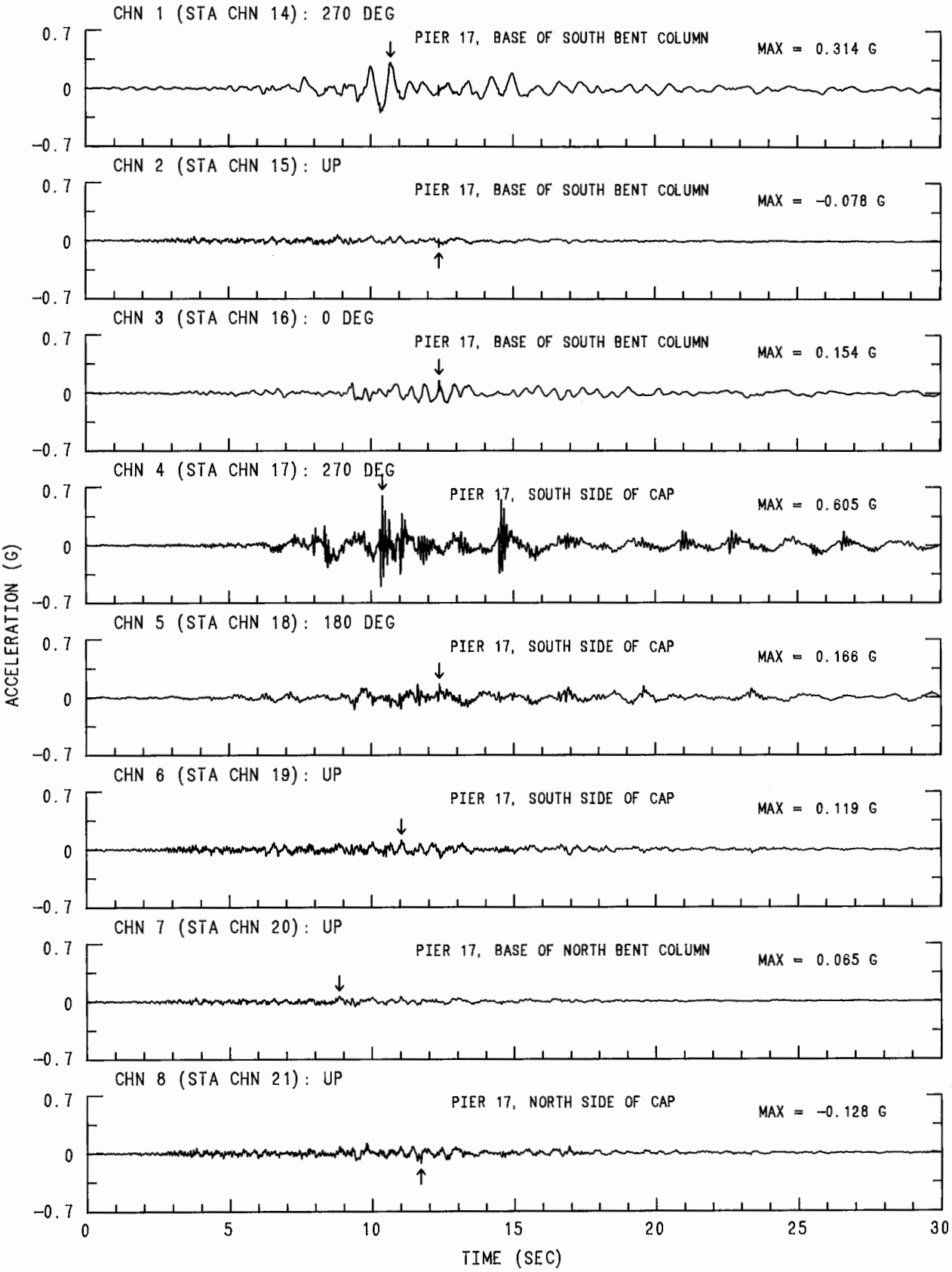
PHASE 1 ACCELERATION. RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

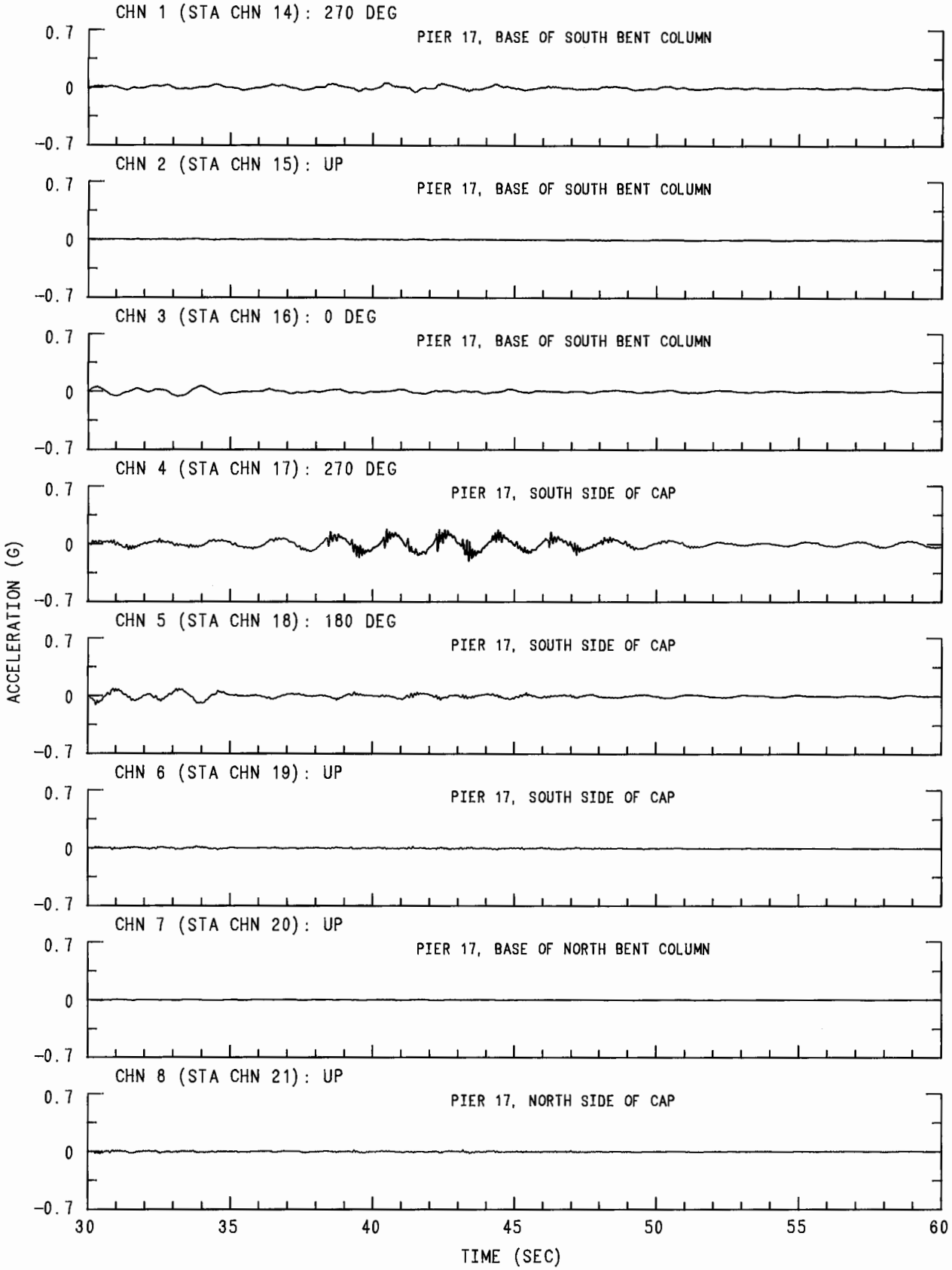
PHASE 1 ACCELERATION. RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

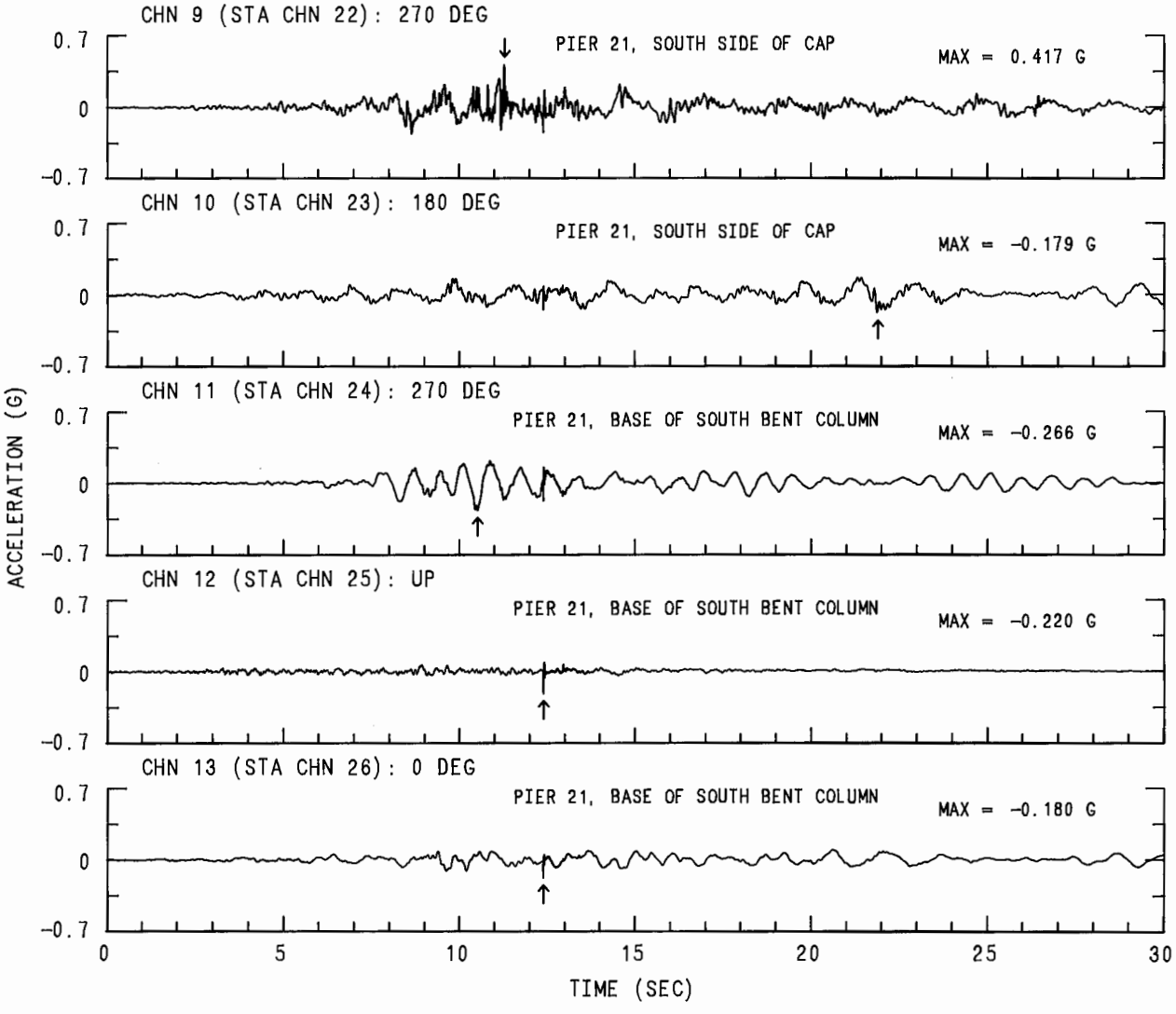
PHASE 1 ACCELERATION. RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

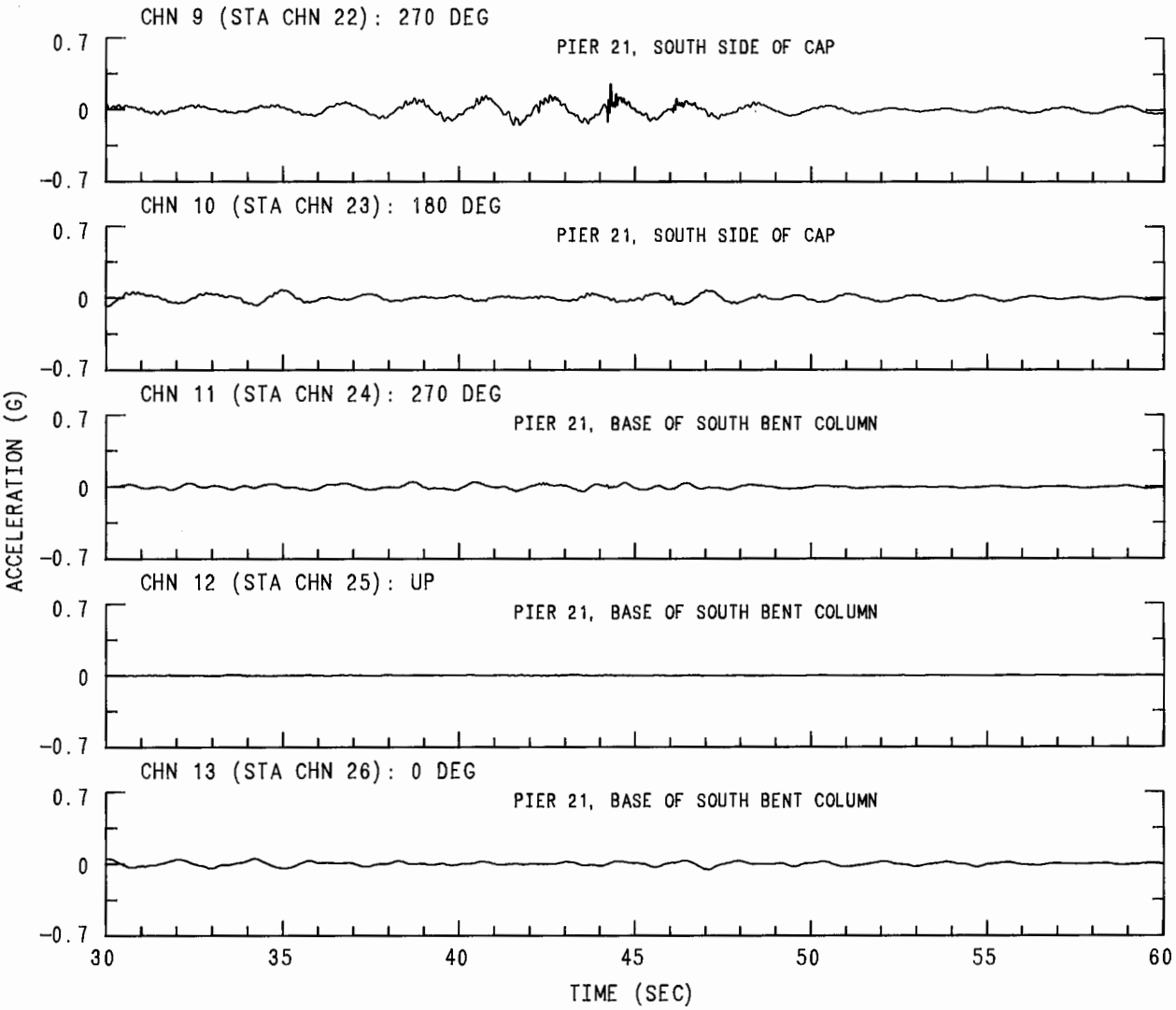
PHASE 1 ACCELERATION. RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

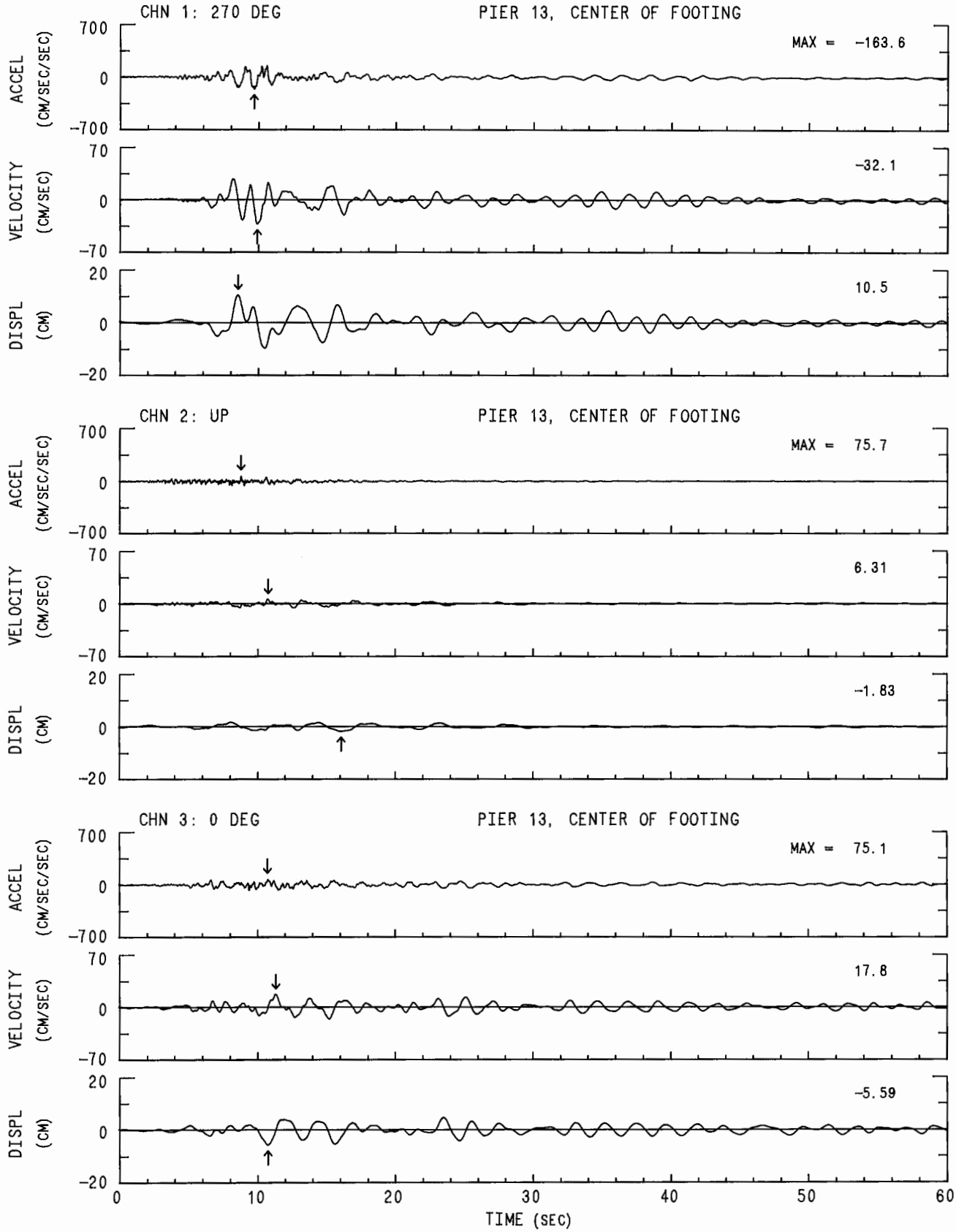
PHASE 1 ACCELERATION. RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

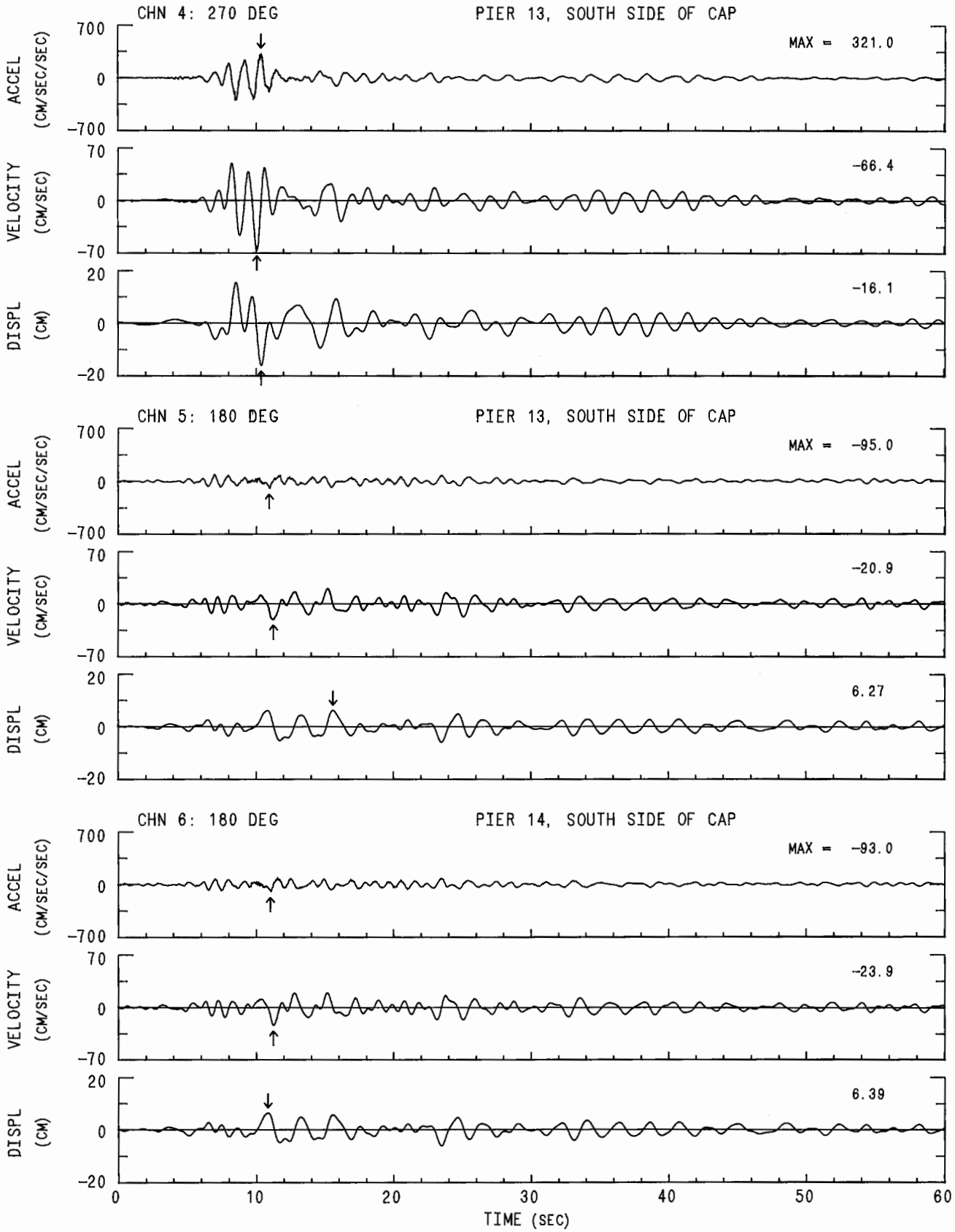
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

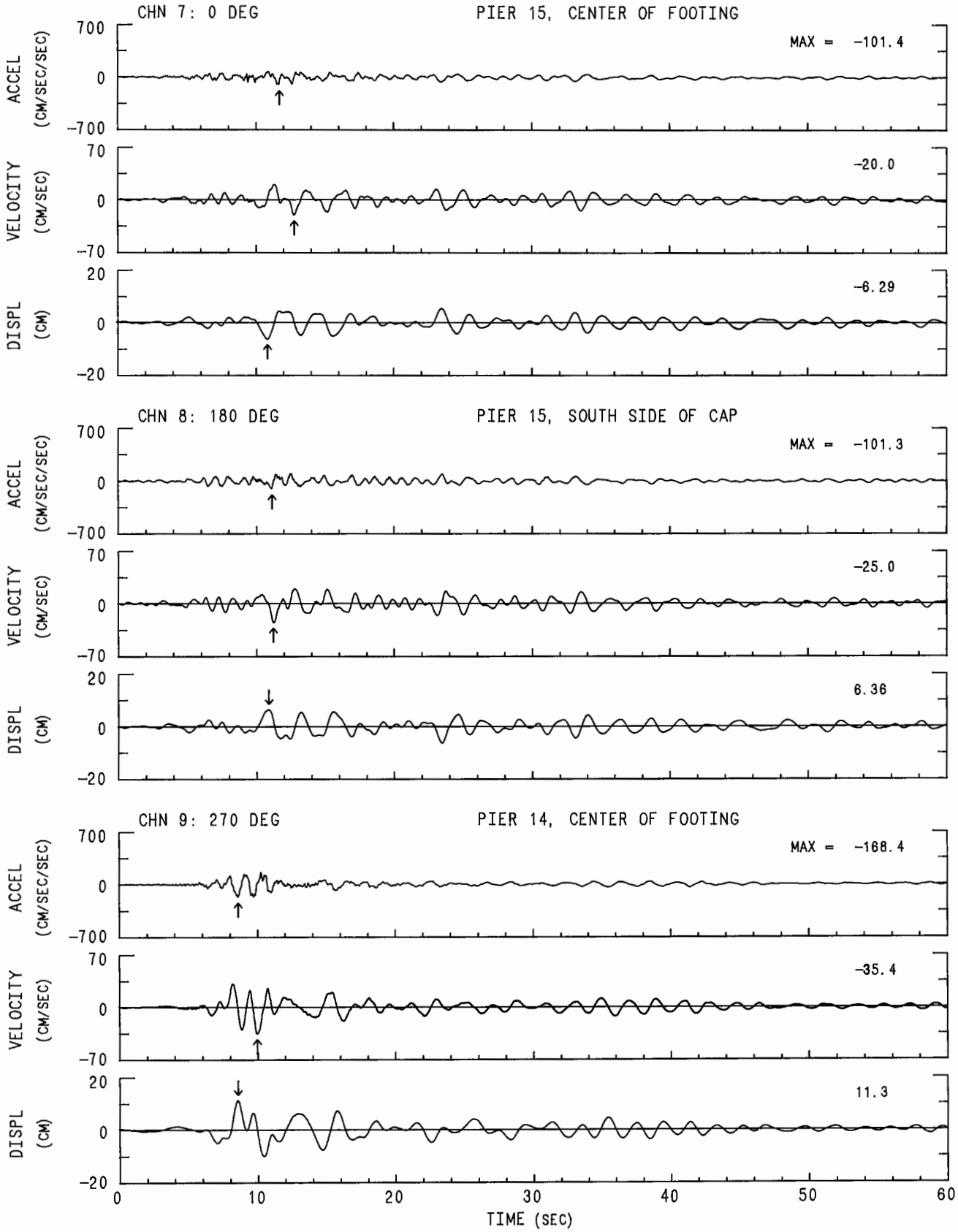
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

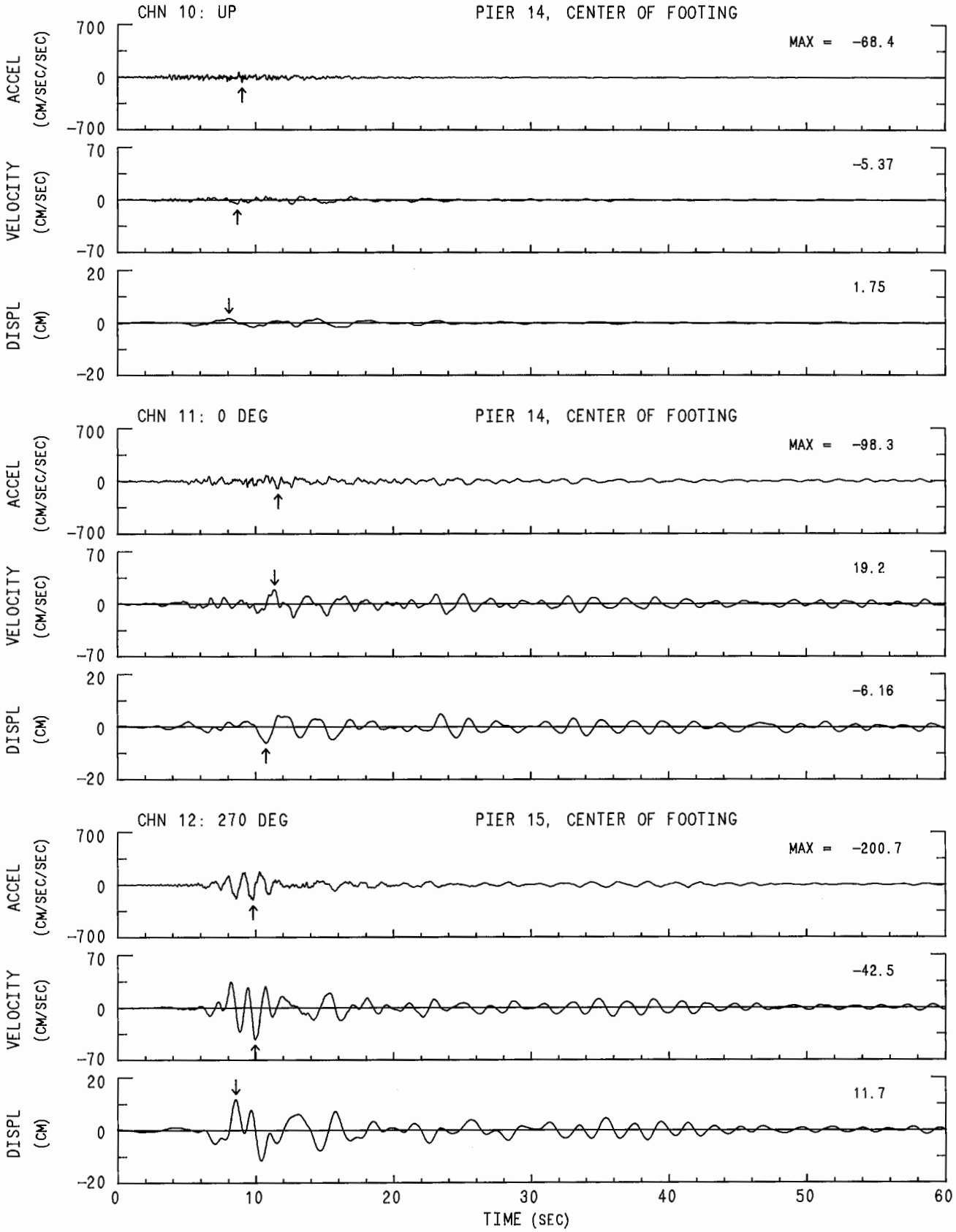
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

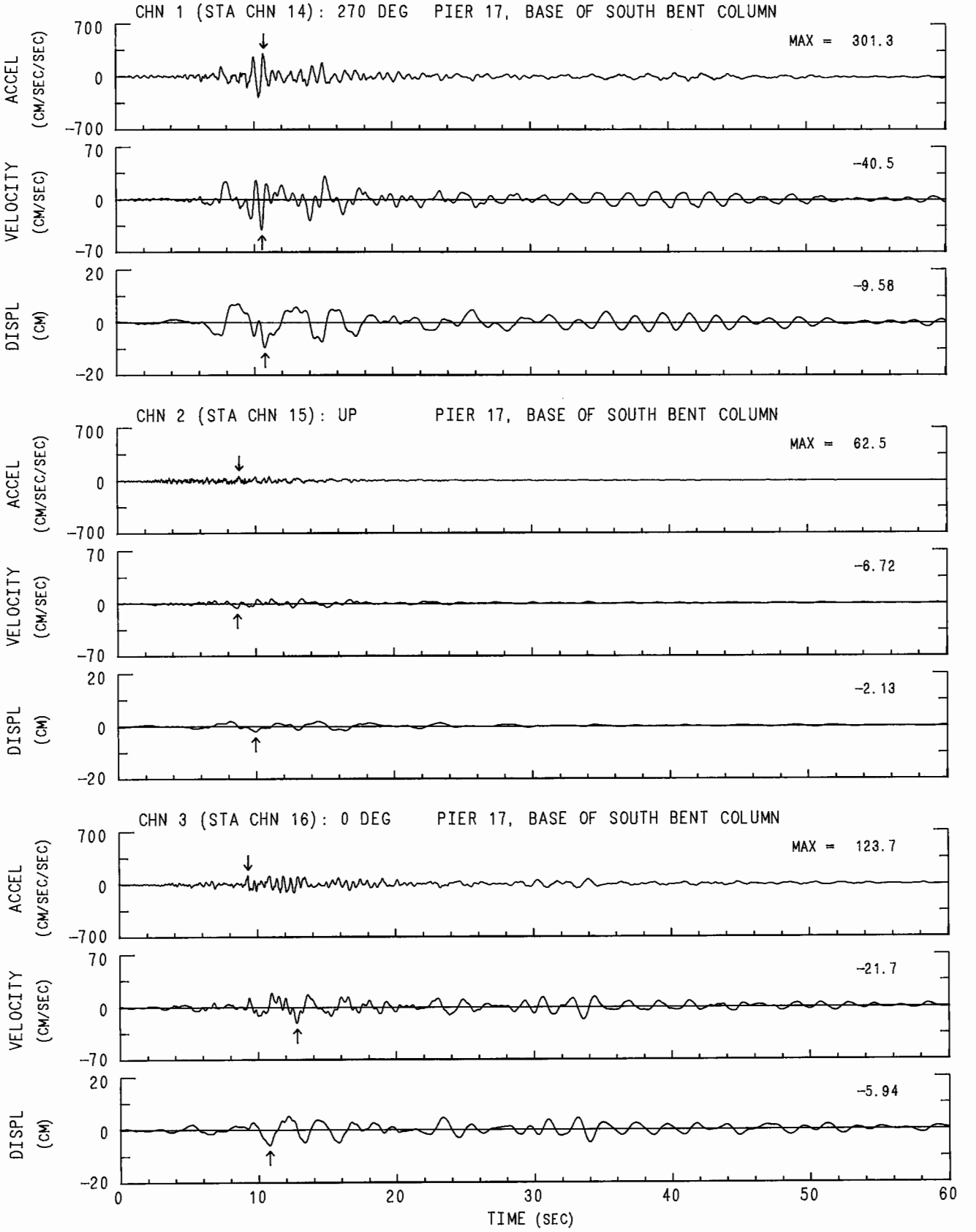
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0288-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

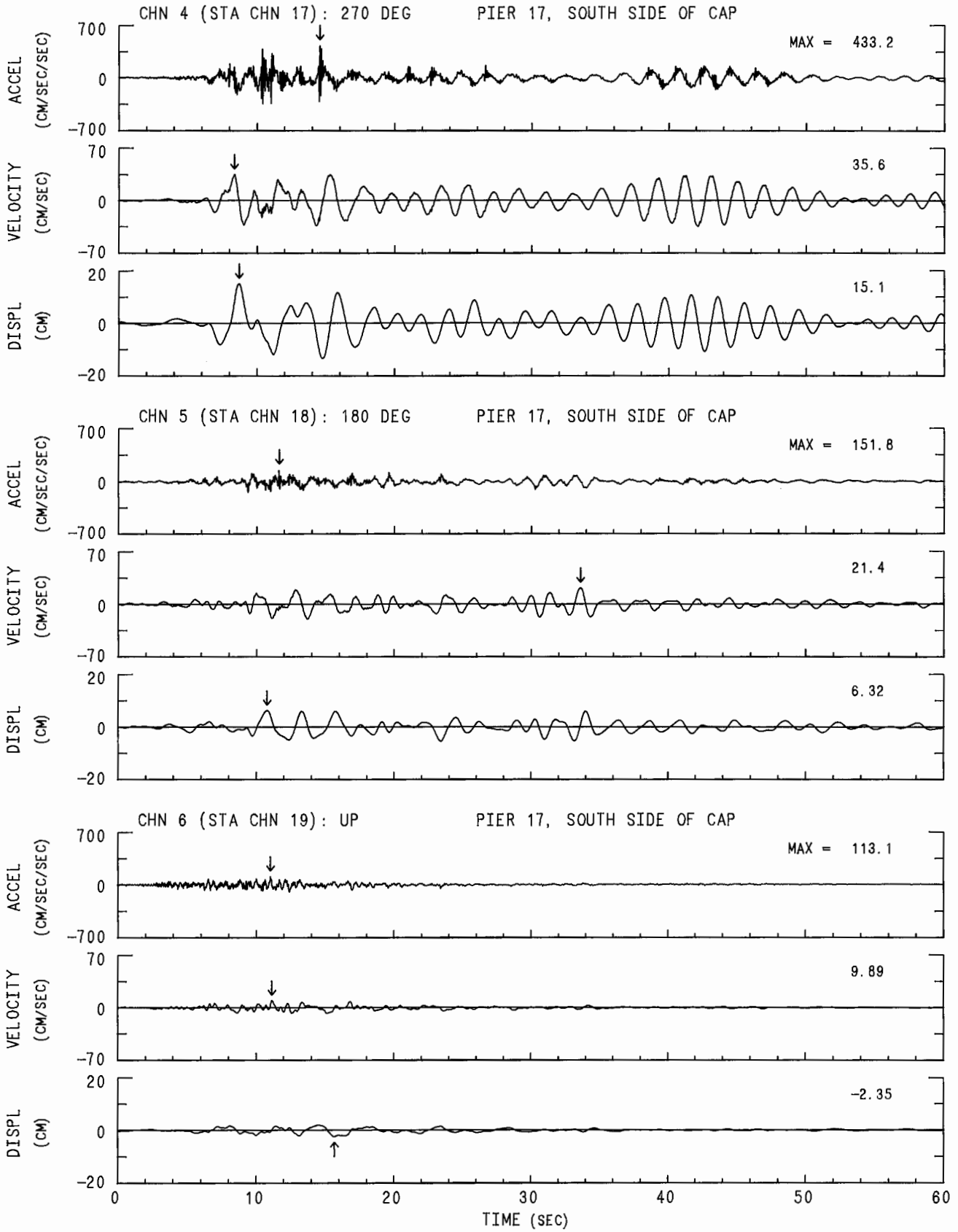
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0289-90208.13



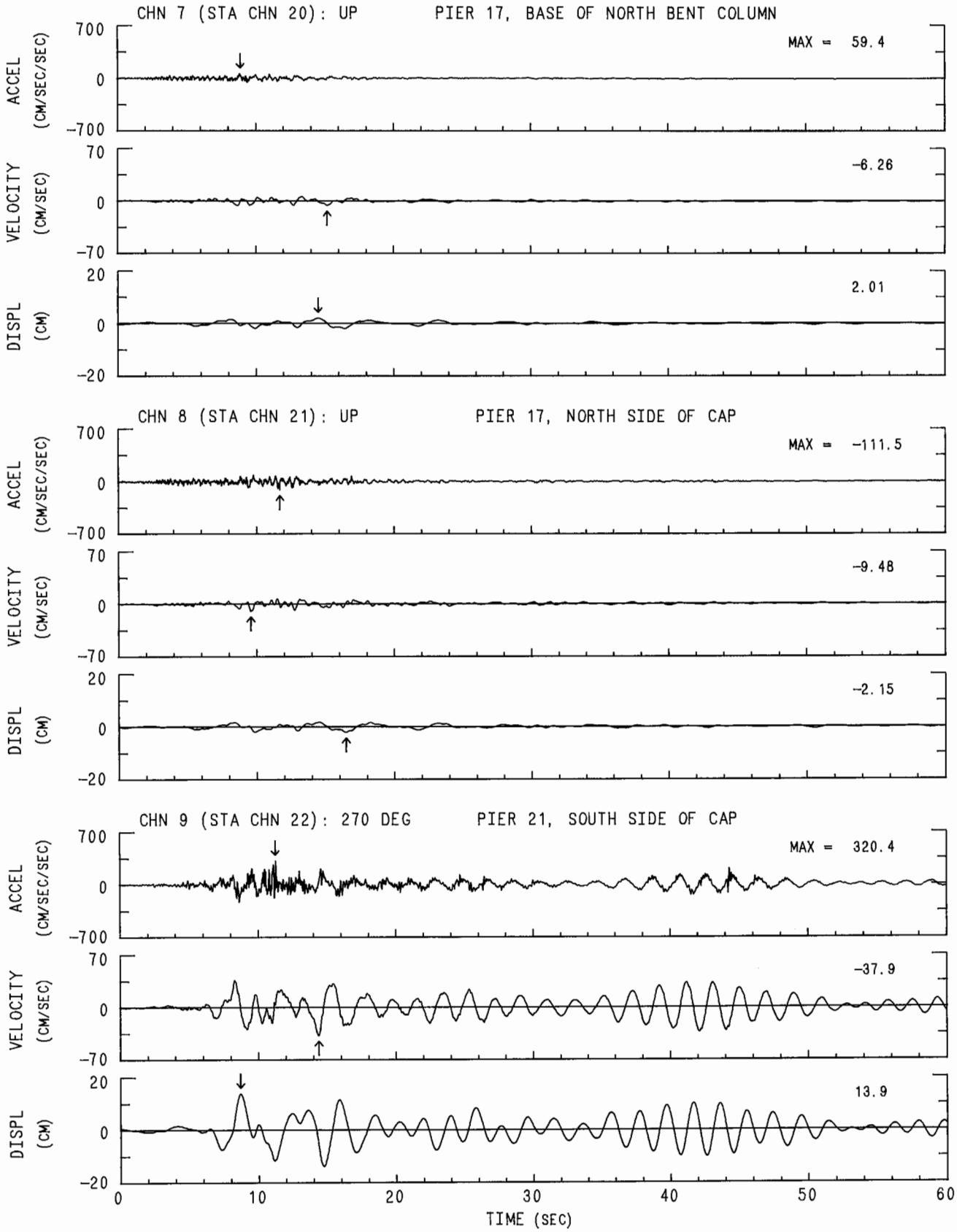
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0289-90208.13



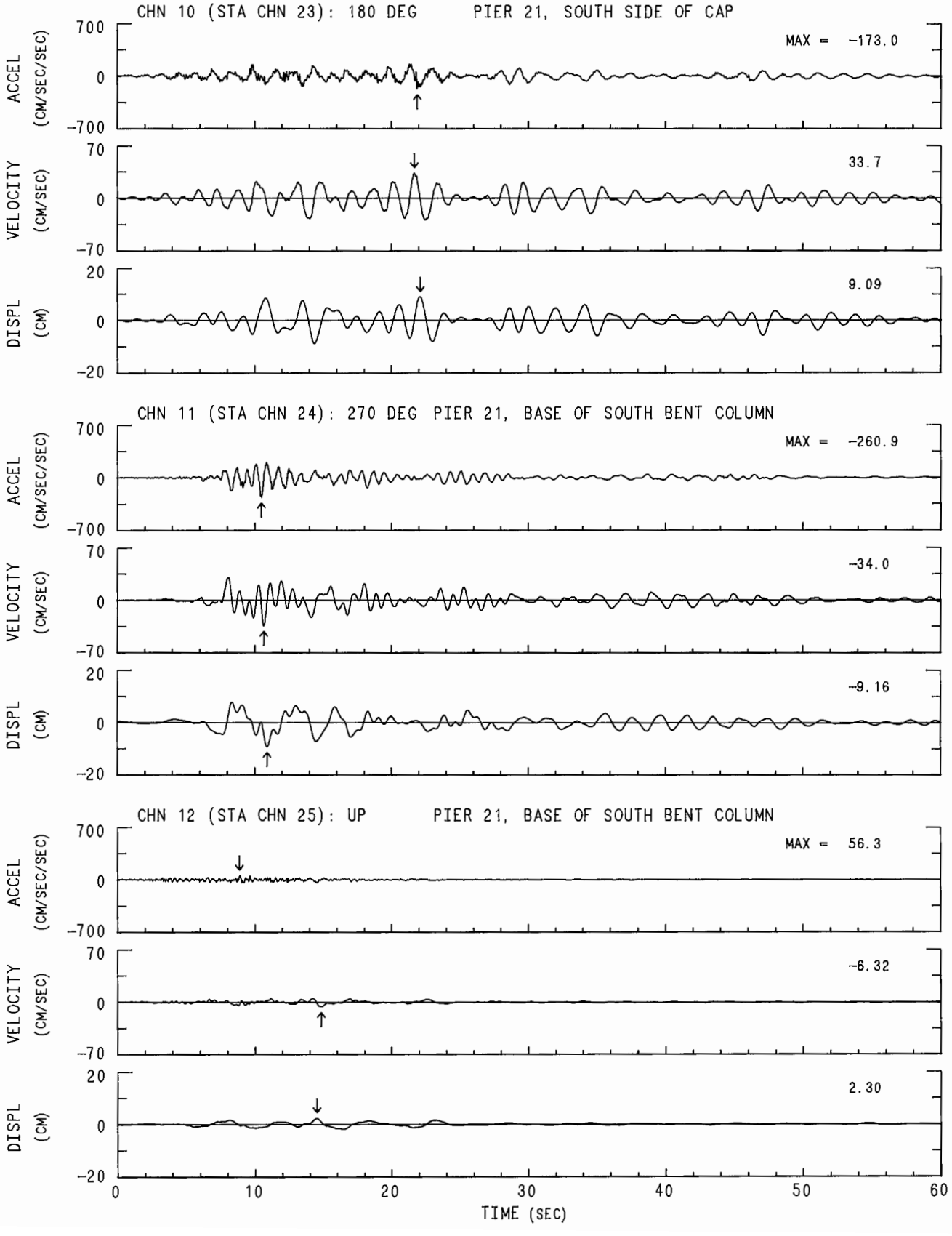
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

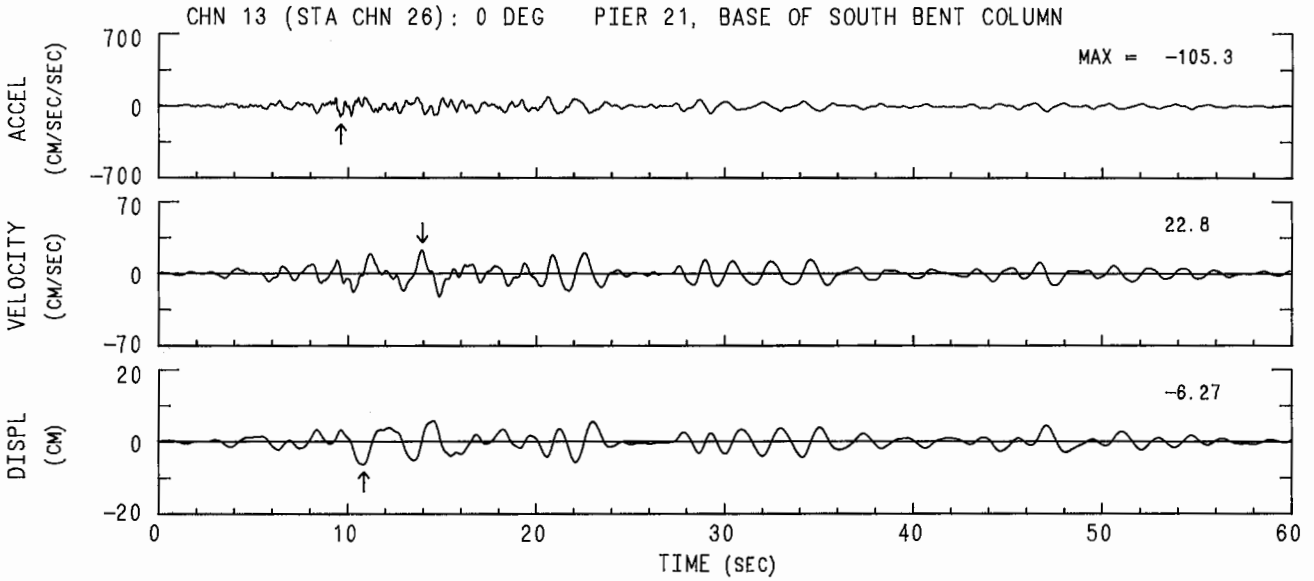
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0289-90208.13



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-C0289-90208.13



SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

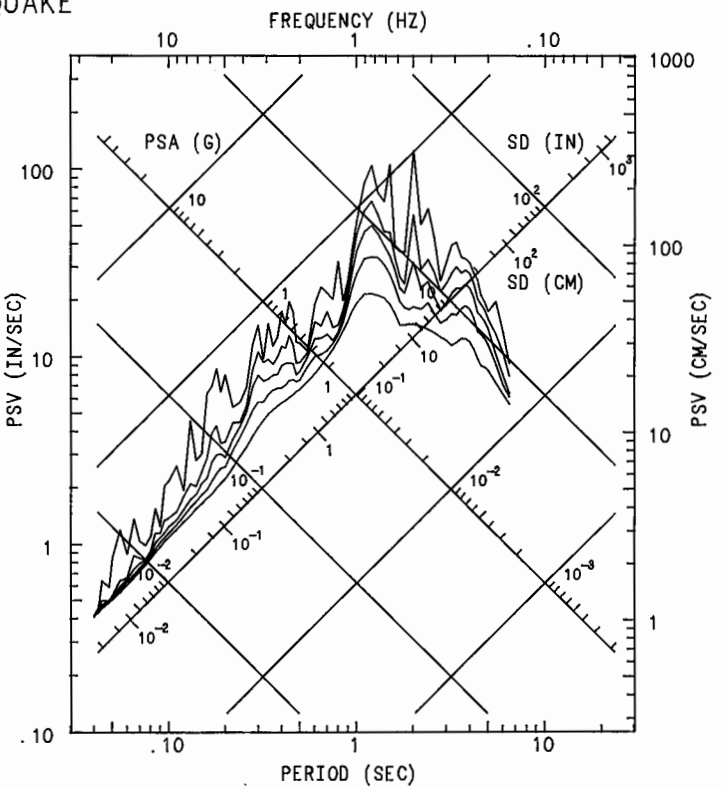
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

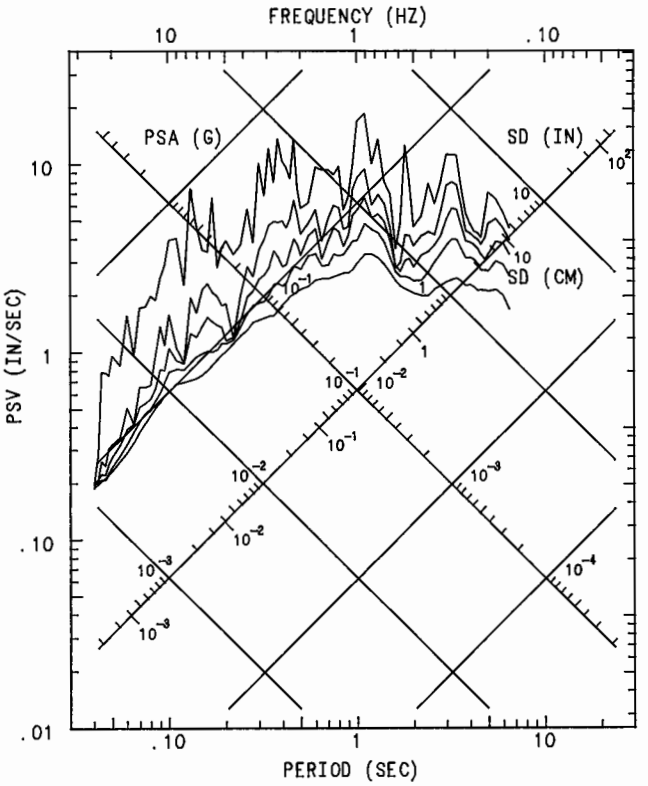
RECORD ID: 58596-C0288-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

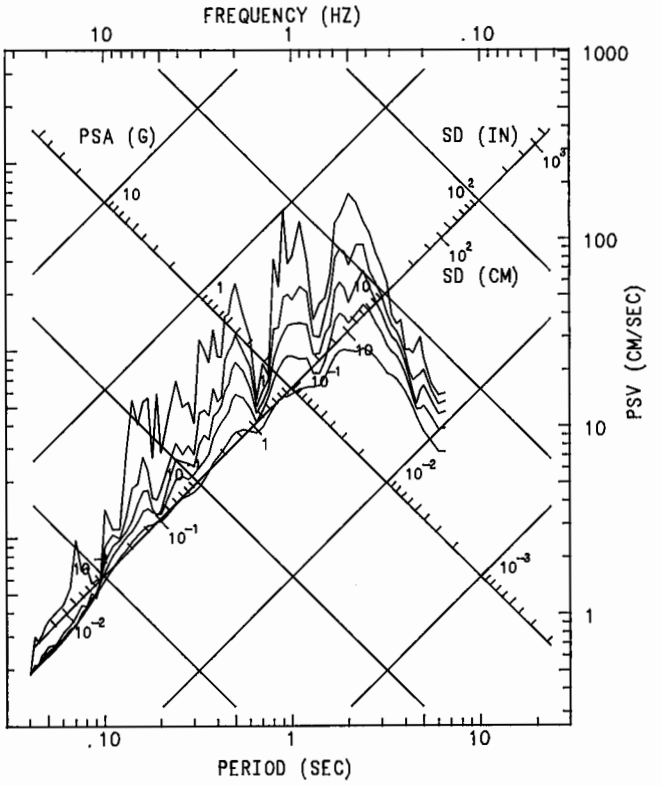
CHN 1: 270 DEG
PIER 13, CENTER OF FOOTING



CHN 2: UP
PIER 13, CENTER OF FOOTING



CHN 3: 0 DEG
PIER 13, CENTER OF FOOTING



SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

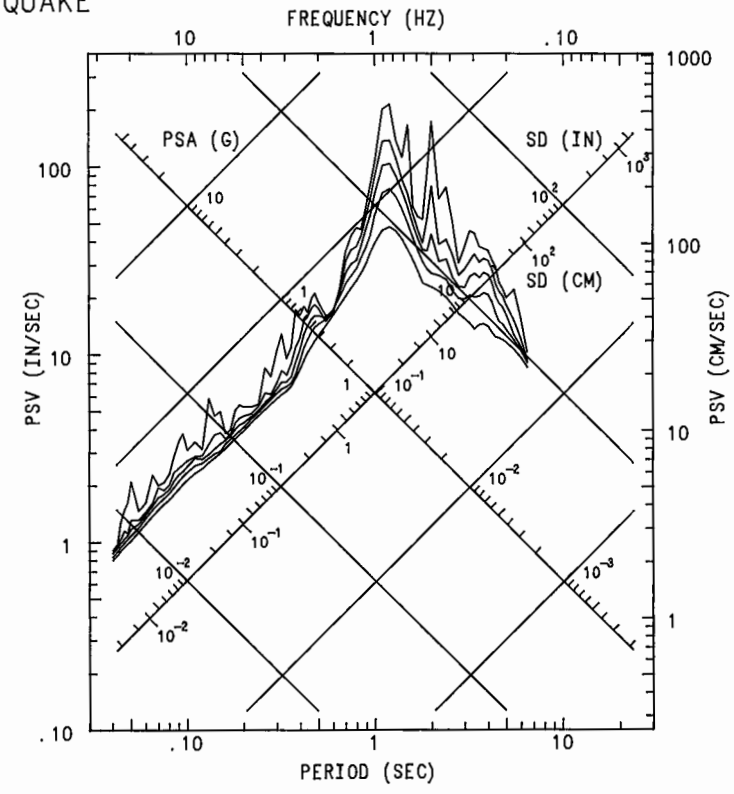
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

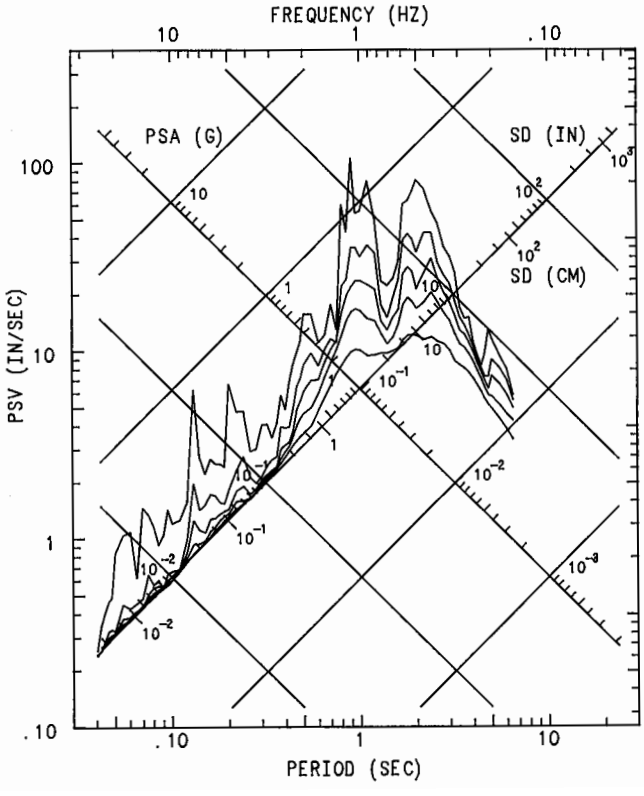
RECORD ID: 58596-C0288-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

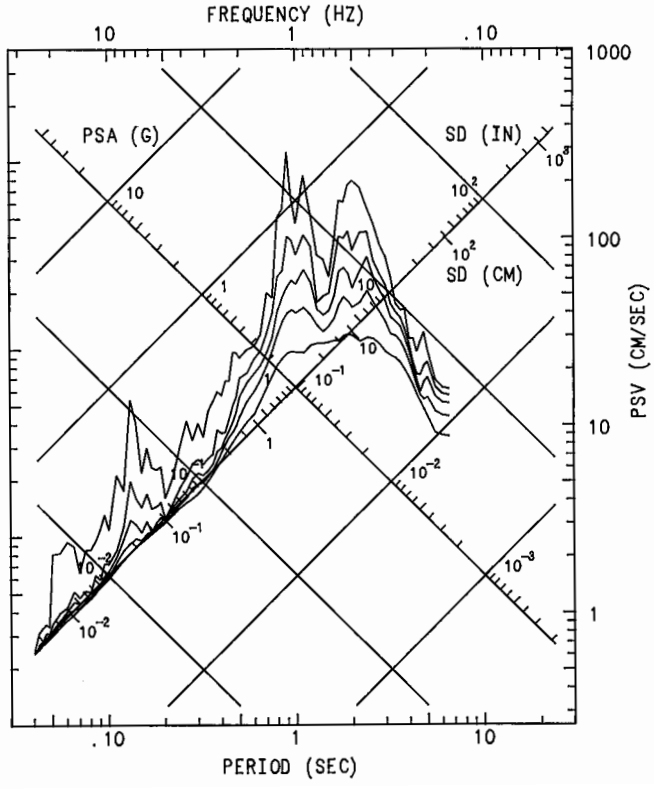
CHN 4: 270 DEG
PIER 13, SOUTH SIDE OF CAP



CHN 5: 180 DEG
PIER 13, SOUTH SIDE OF CAP



CHN 6: 180 DEG
PIER 14, SOUTH SIDE OF CAP



SAN FRANCISCO BAY – DUMBARTON BRIDGE: CSMIP S/N 596

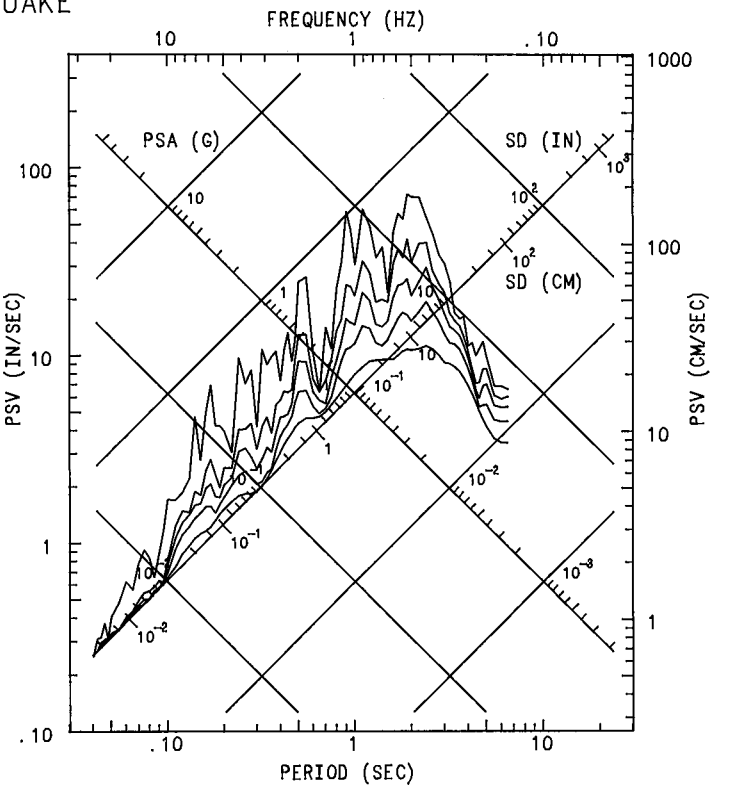
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

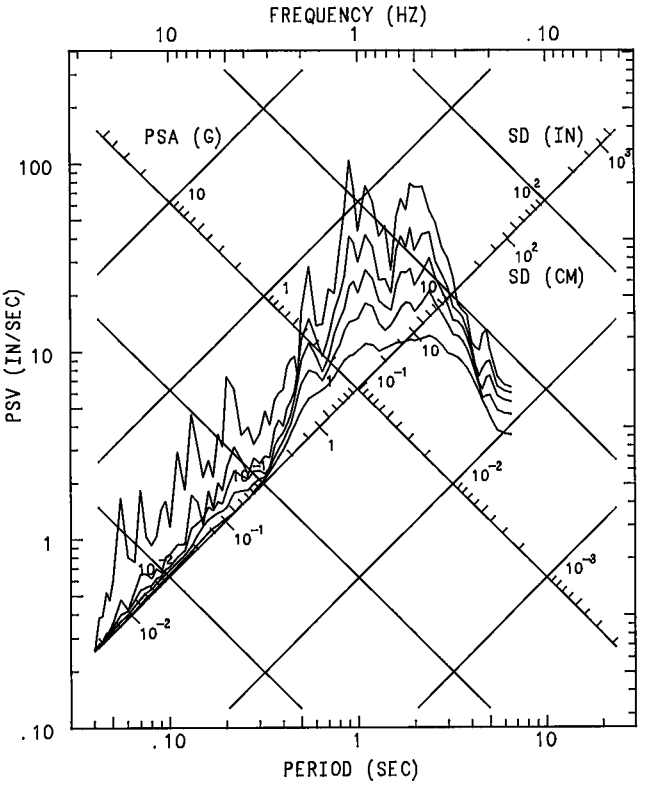
RECORD ID: 58596-C0288-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

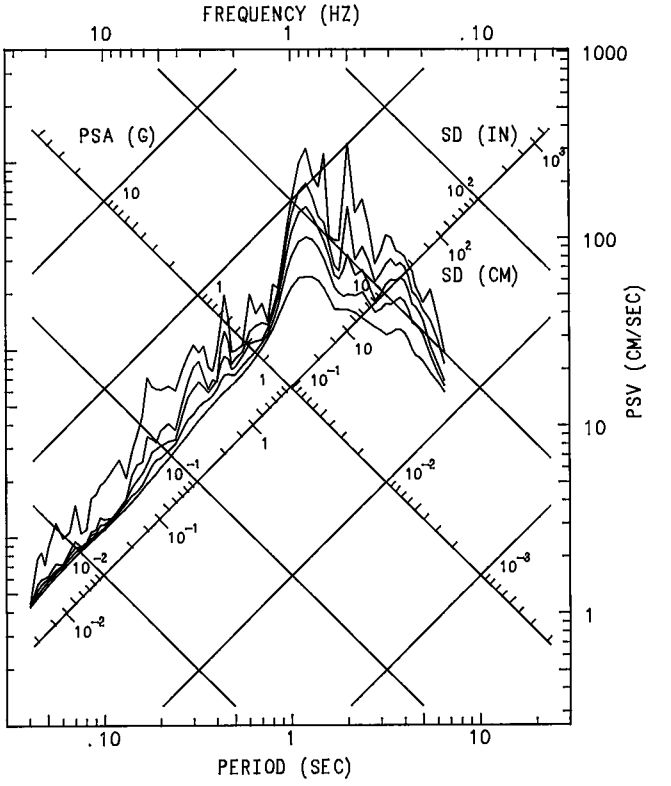
CHN 7: 0 DEG
PIER 15, CENTER OF FOOTING



CHN 8: 180 DEG
PIER 15, SOUTH SIDE OF CAP



CHN 9: 270 DEG
PIER 14, CENTER OF FOOTING



SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

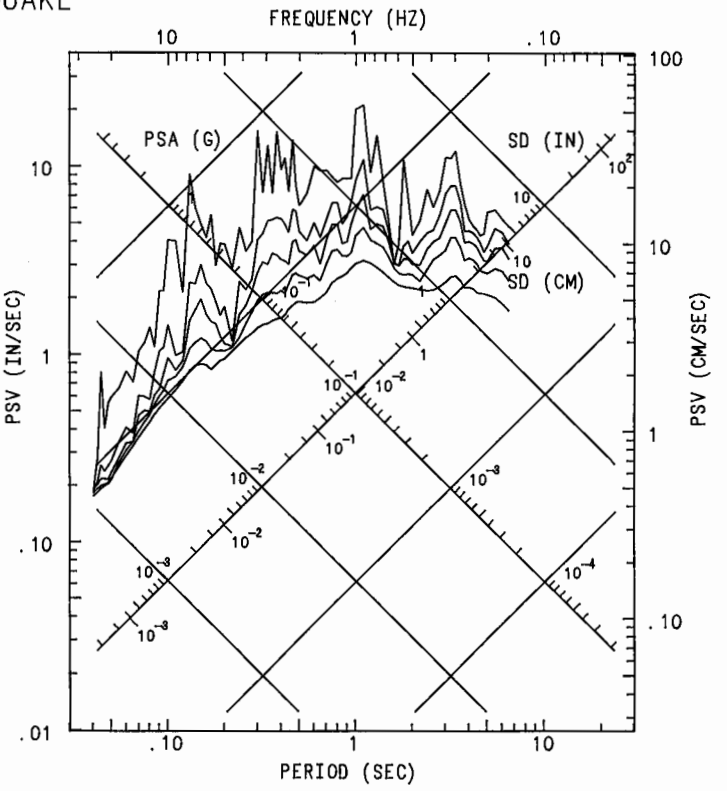
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

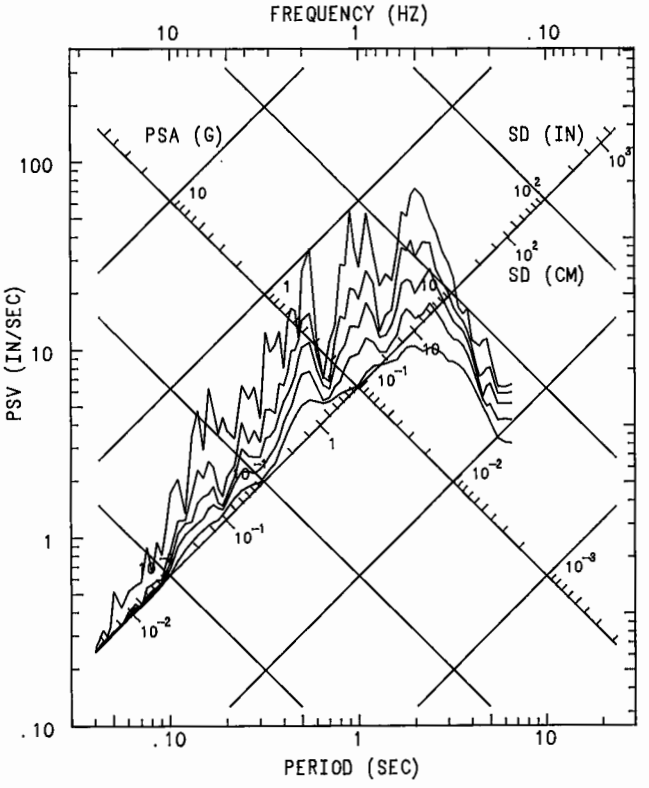
RECORD ID: 58596-C0288-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

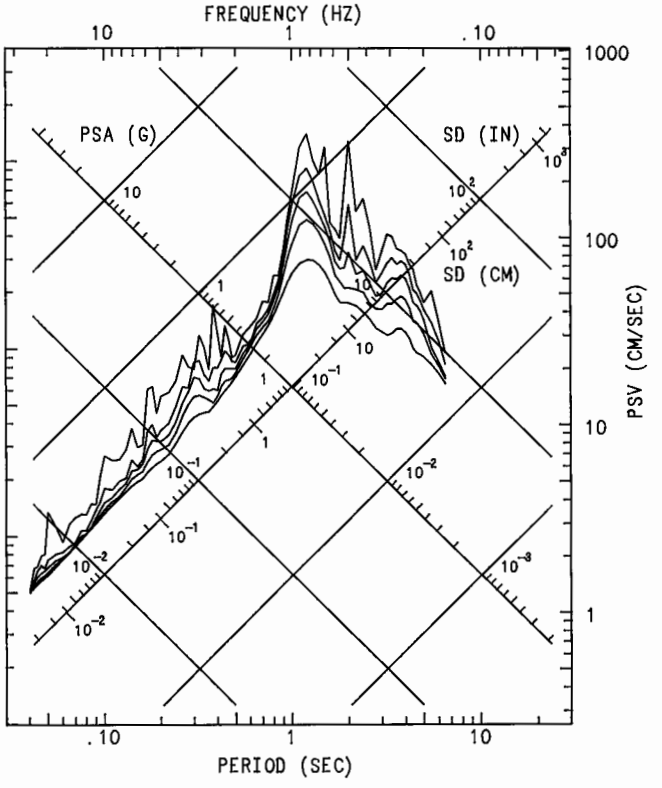
CHN 10: UP
PIER 14, CENTER OF FOOTING



CHN 11: 0 DEG
PIER 14, CENTER OF FOOTING



CHN 12: 270 DEG
PIER 15, CENTER OF FOOTING



SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

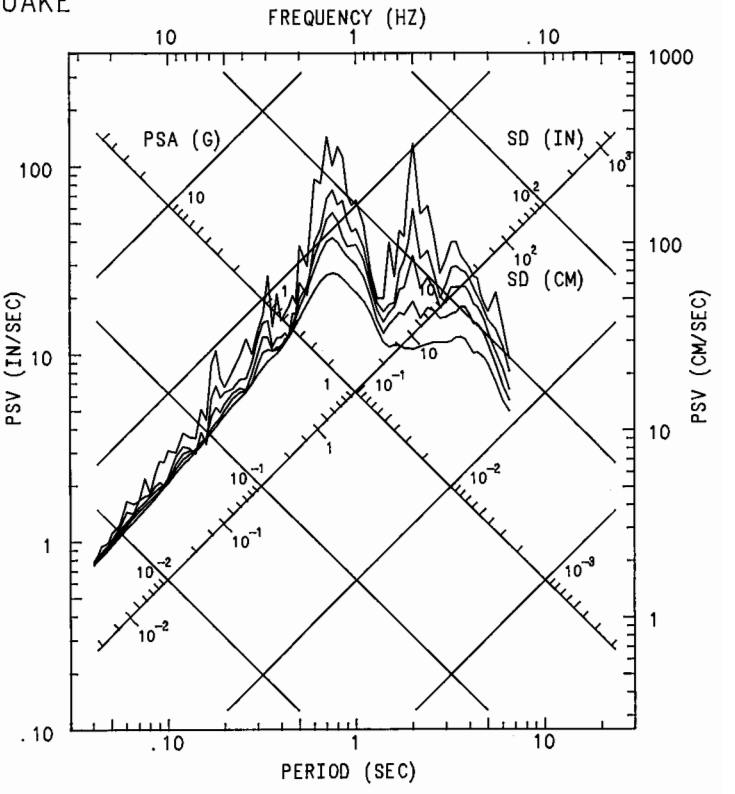
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

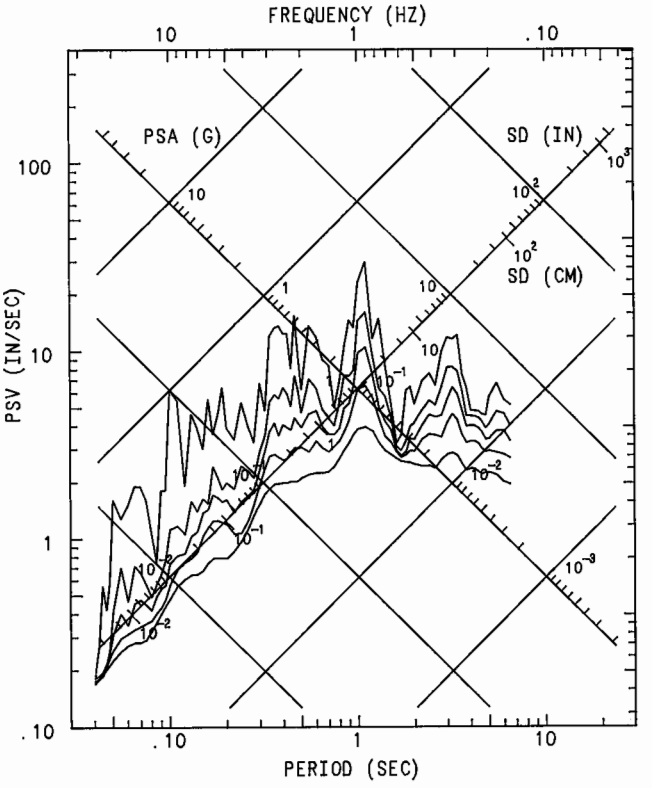
RECORD ID: 58596-C0289-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

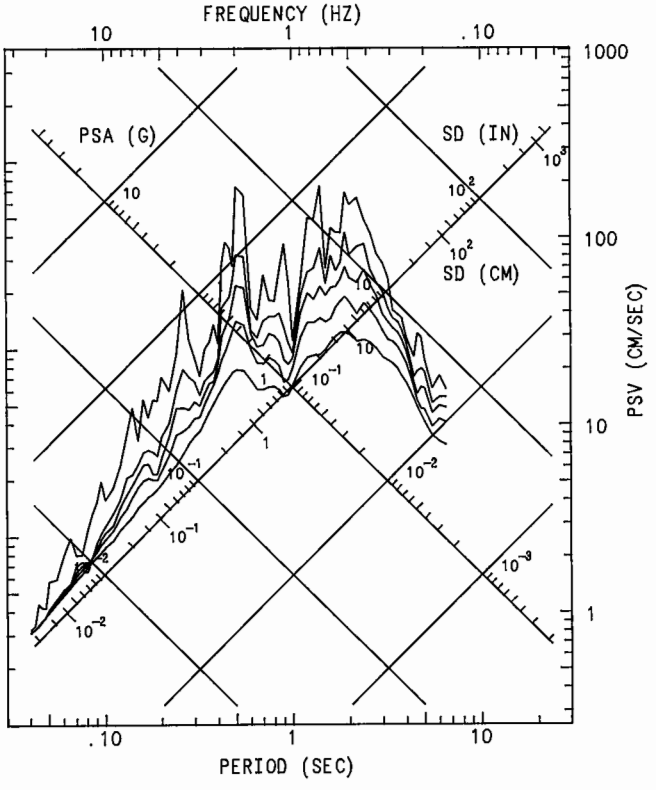
CHN 1 (STA CHN 14): 270 DEG
PIER 17, BASE OF SOUTH BENT COLUMN



CHN 2 (STA CHN 15): UP
PIER 17, BASE OF SOUTH BENT COLUMN



CHN 3 (STA CHN 16): 0 DEG
PIER 17, BASE OF SOUTH BENT COLUMN



SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

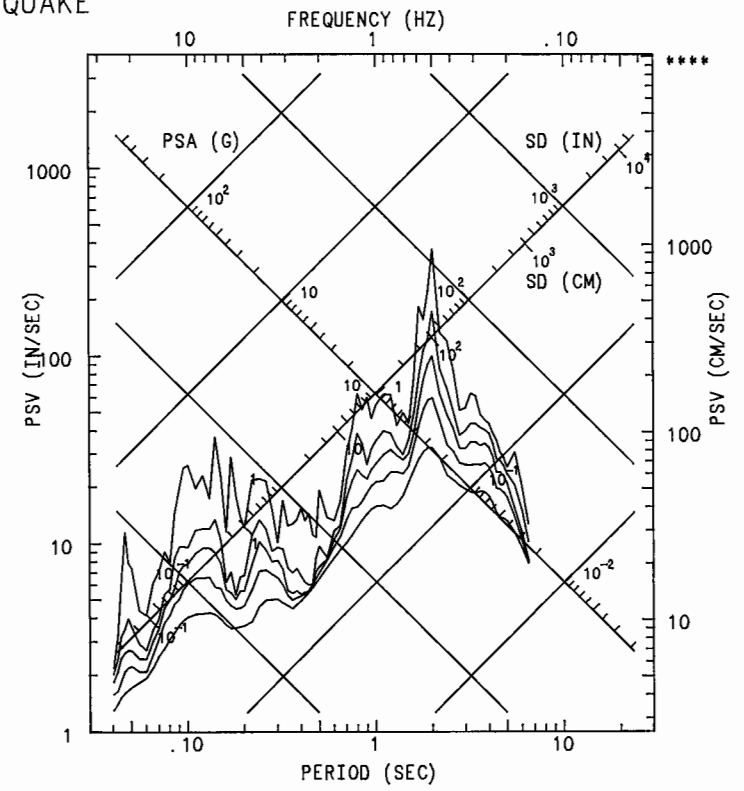
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

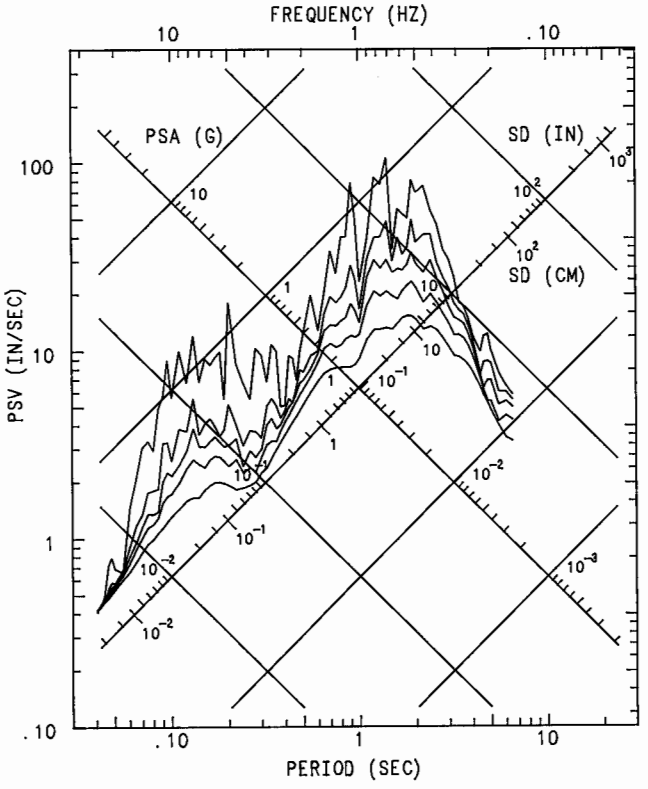
RECORD ID: 58596-C0289-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

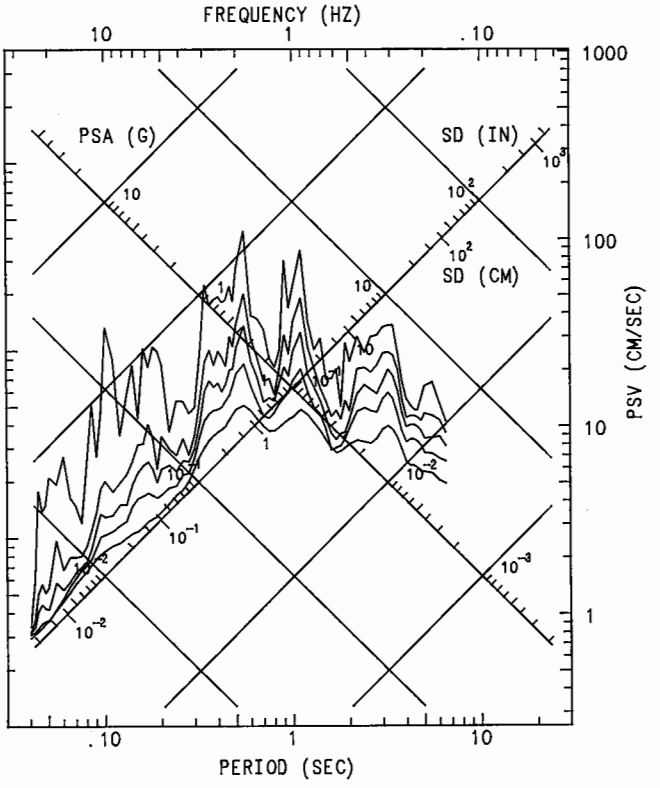
CHN 4 (STA CHN 17): 270 DEG
PIER 17, SOUTH SIDE OF CAP



CHN 5 (STA CHN 18): 180 DEG
PIER 17, SOUTH SIDE OF CAP



CHN 6 (STA CHN 19): UP
PIER 17, SOUTH SIDE OF CAP



SAN FRANCISCO BAY – DUMBARTON BRIDGE: CSMIP S/N 596

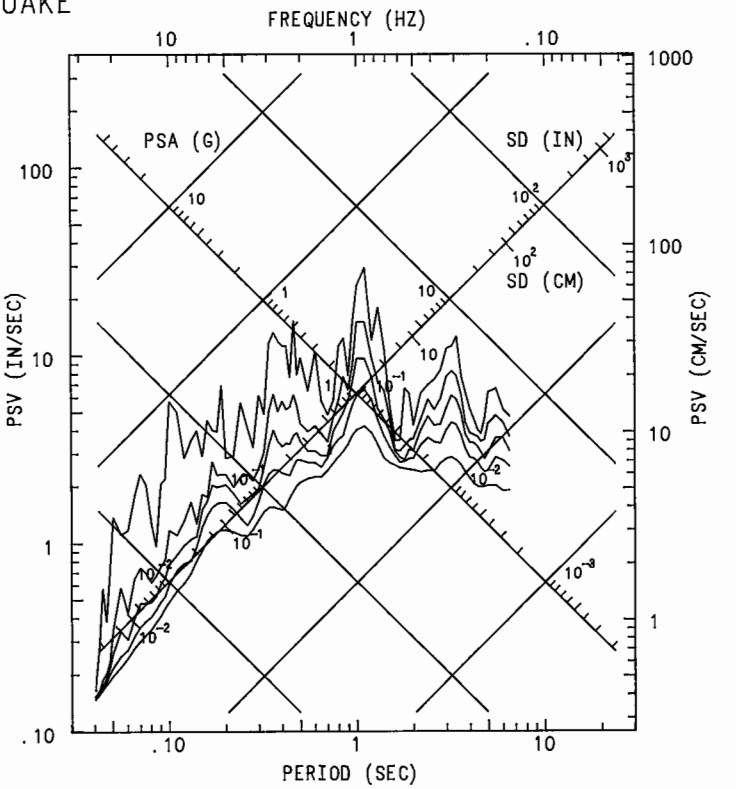
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

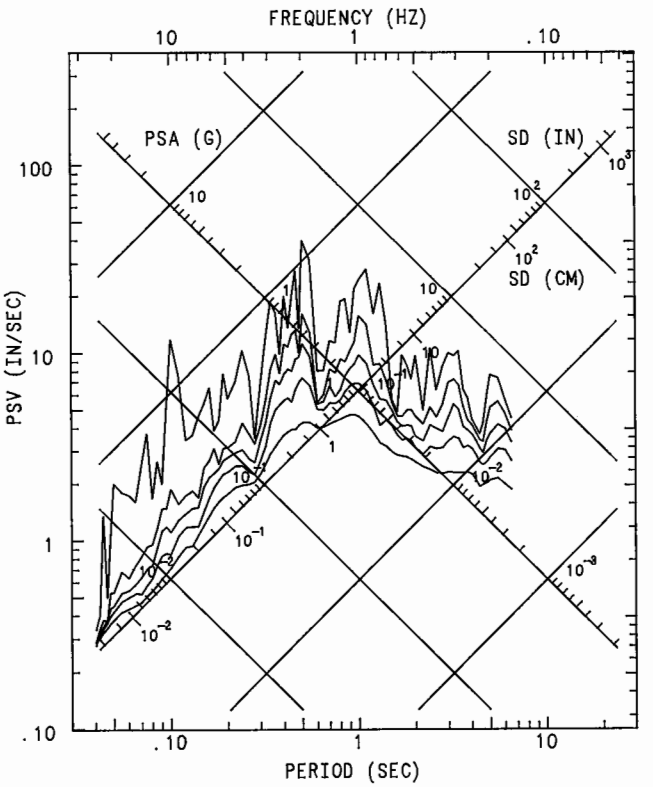
RECORD ID: 58596-C0289-90208.13

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

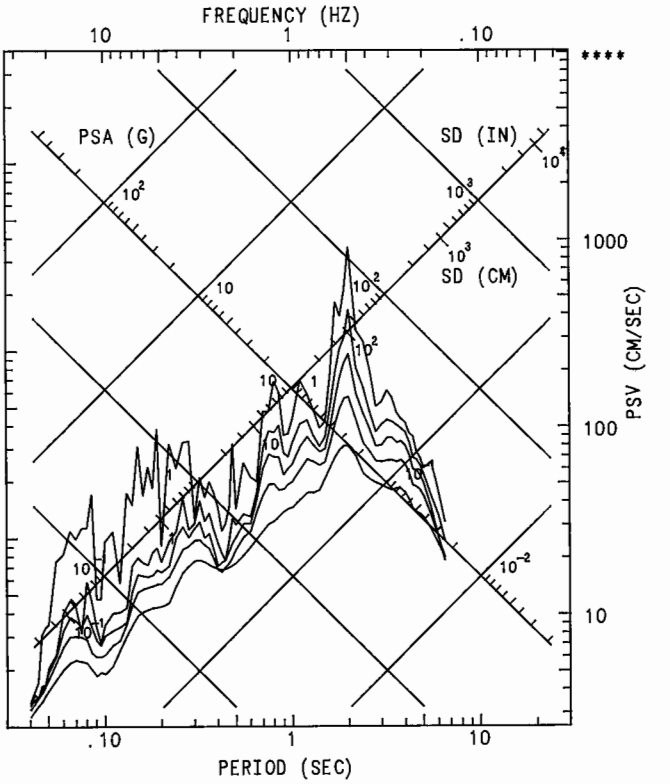
CHN 7 (STA CHN 20): UP
PIER 17, BASE OF NORTH BENT COLUMN



CHN 8 (STA CHN 21): UP
PIER 17, NORTH SIDE OF CAP



CHN 9 (STA CHN 22): 270 DEG
PIER 21, SOUTH SIDE OF CAP



SAN FRANCISCO BAY – DUMBARTON BRIDGE: CSMIP S/N 596

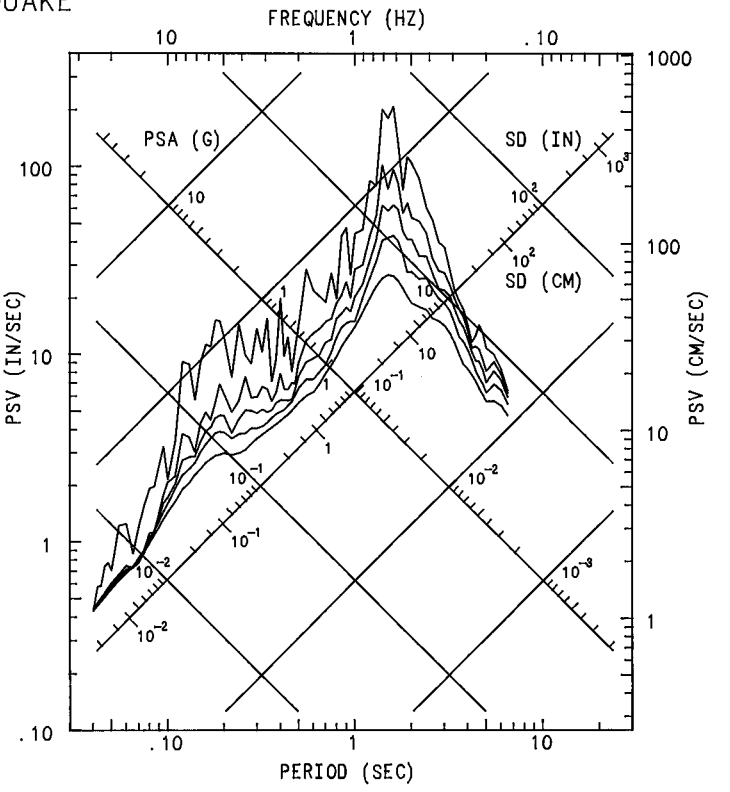
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

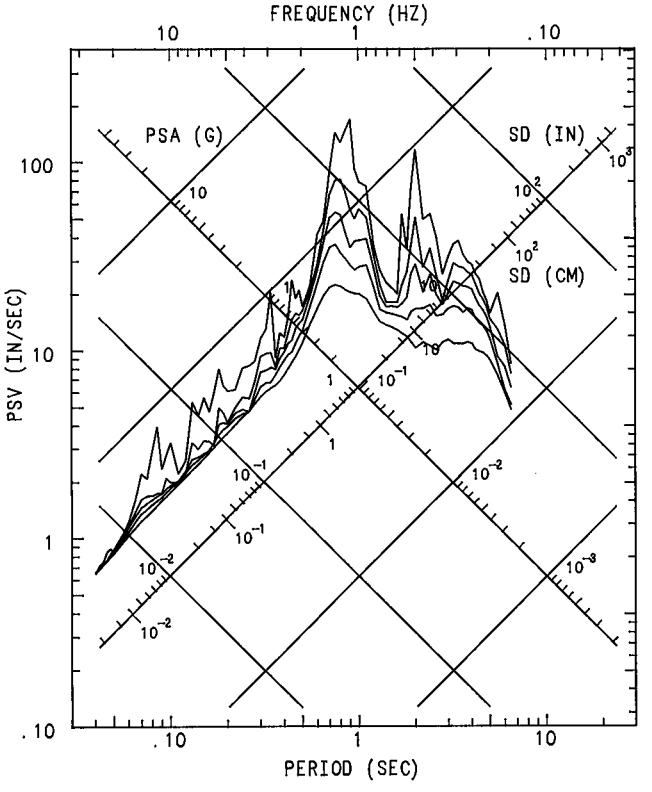
RECORD ID: 58596-C0289-90208.13

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

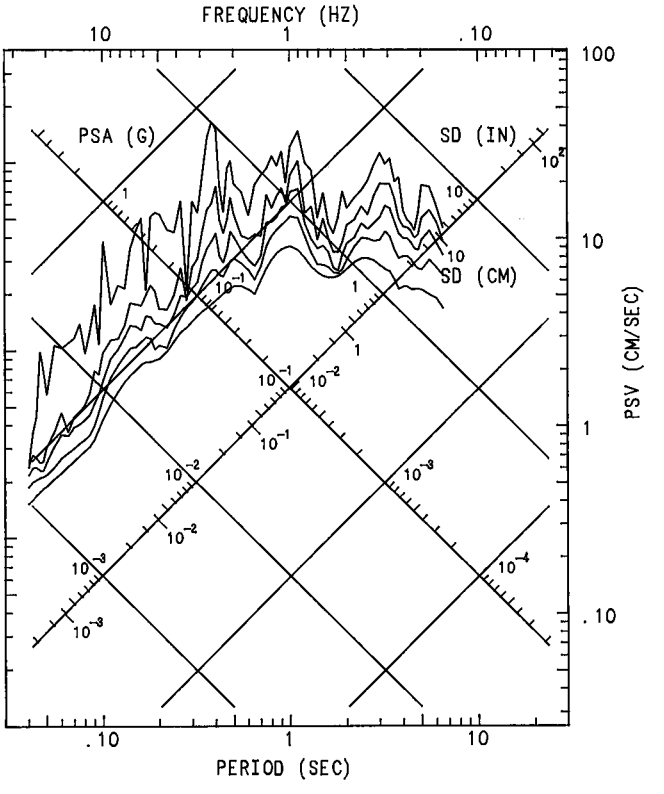
CHN 10 (STA CHN 23): 180 DEG
PIER 21, SOUTH SIDE OF CAP



CHN 11 (STA CHN 24): 270 DEG
PIER 21, BASE OF SOUTH BENT COLUMN



CHN 12 (STA CHN 25): UP
PIER 21, BASE OF SOUTH BENT COLUMN



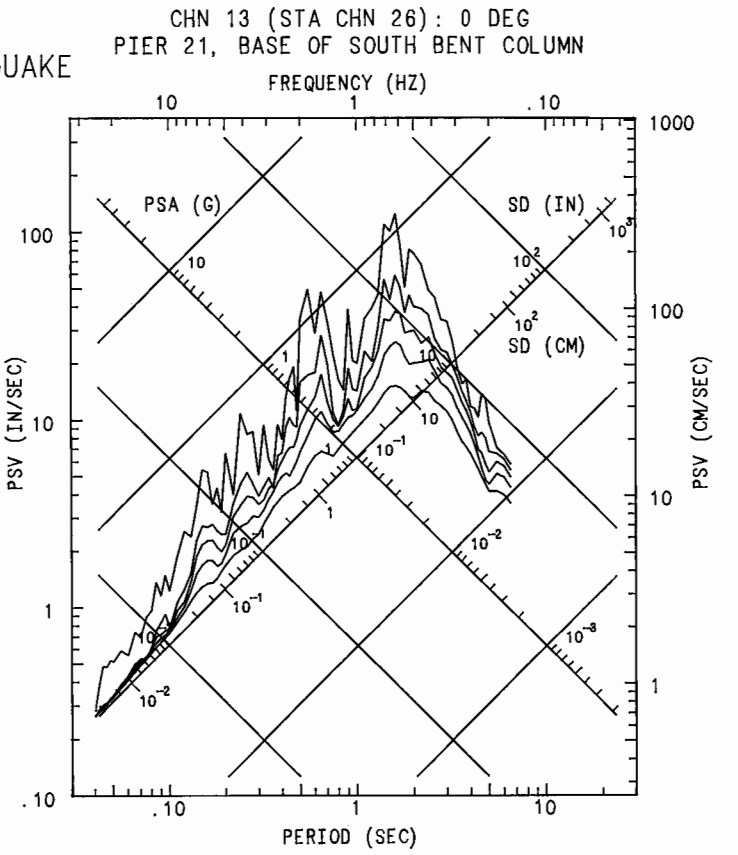
SAN FRANCISCO BAY – DUMBARTON BRIDGE: CSMIP S/N 596

SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

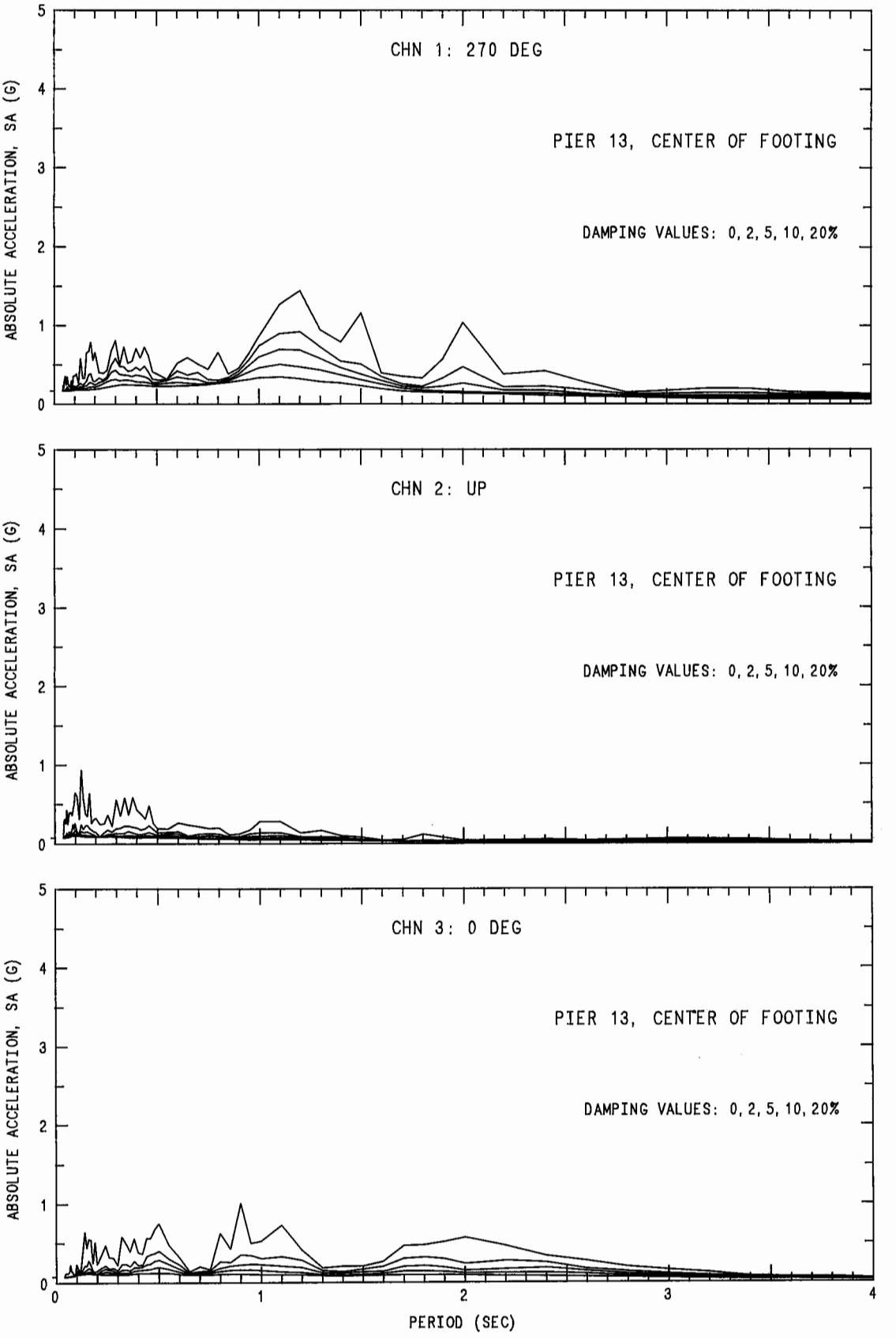
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

RECORD ID: 58596-C0289-90208.13

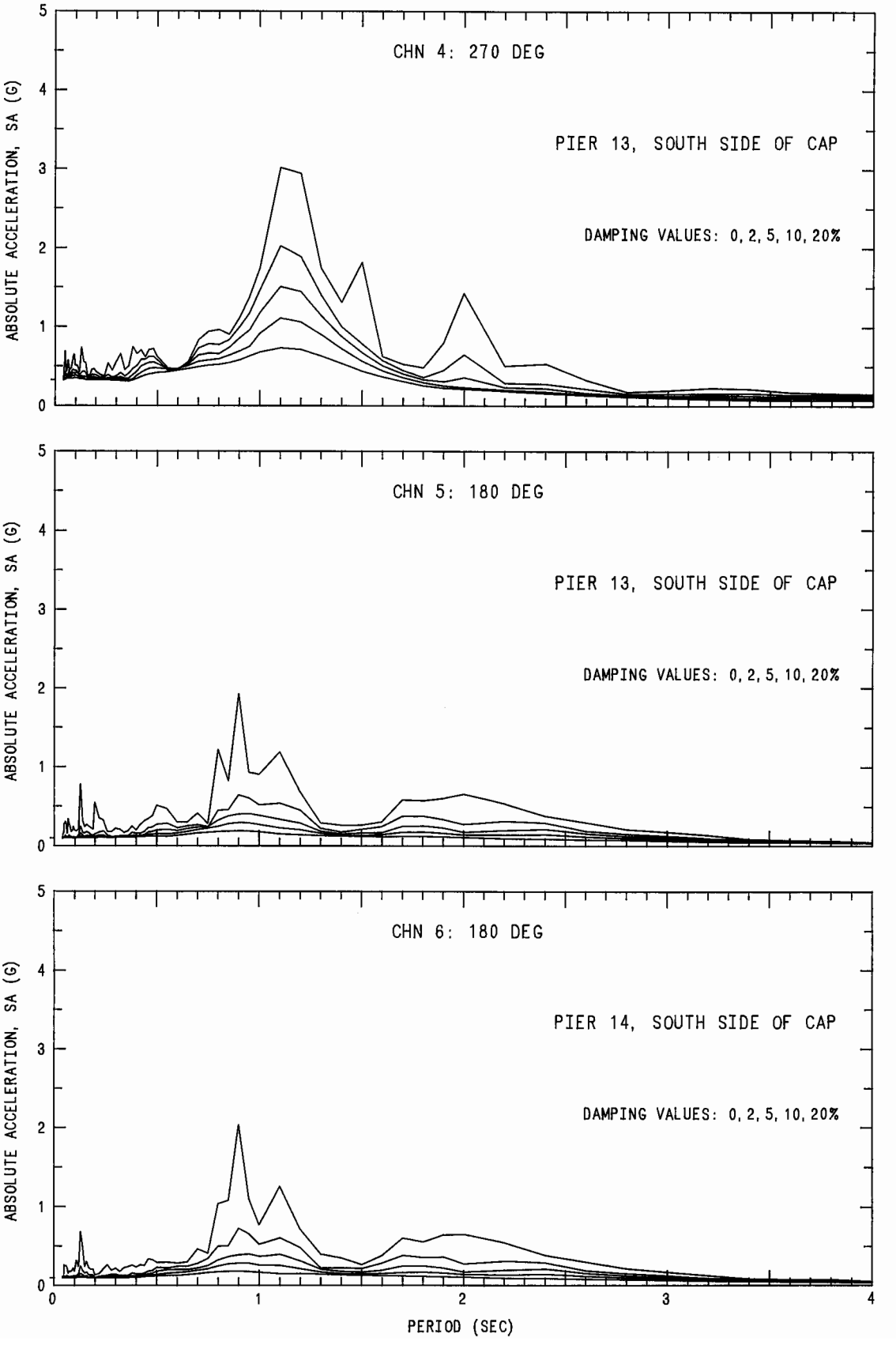
—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0288-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)

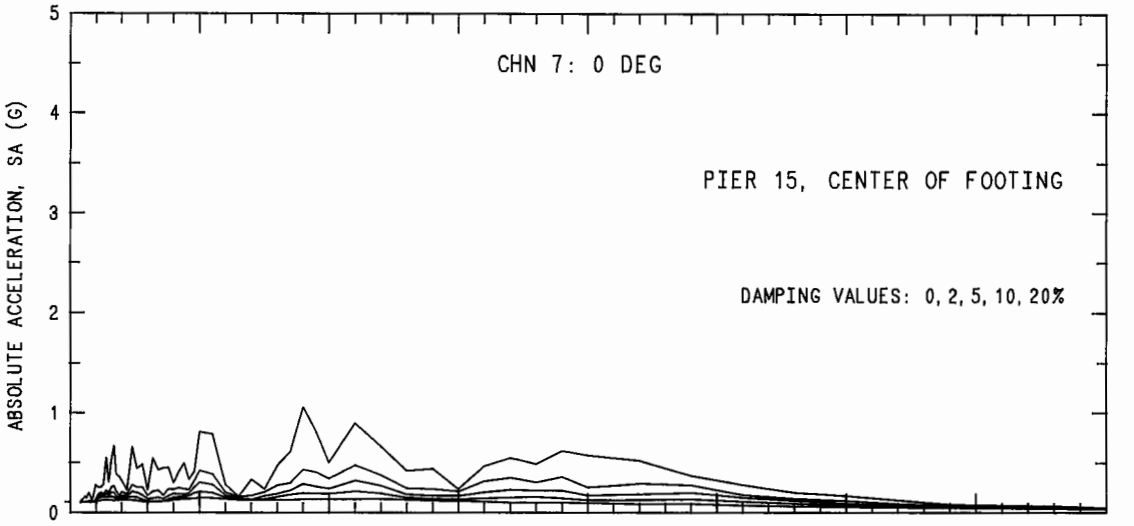


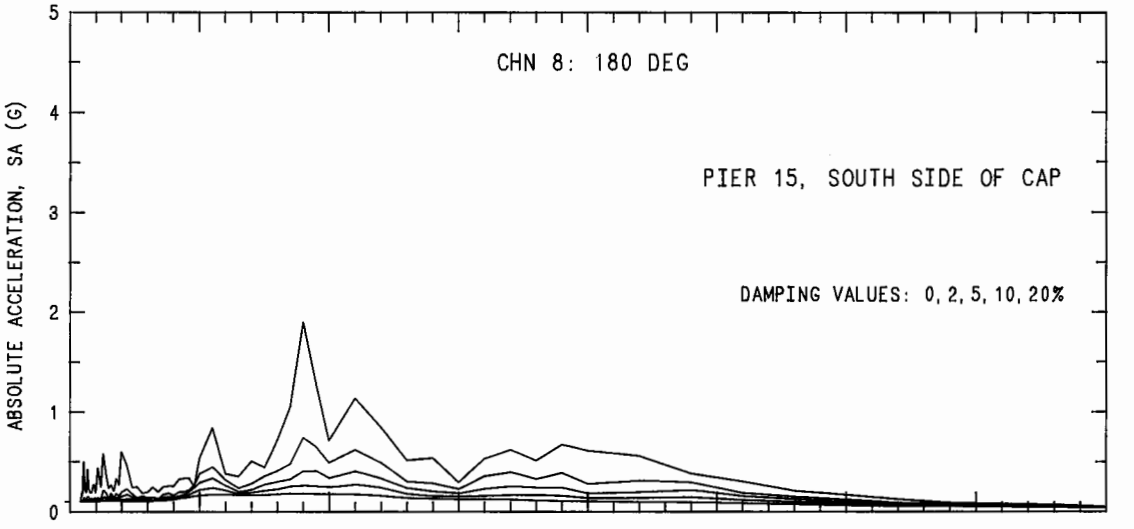
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0288-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)

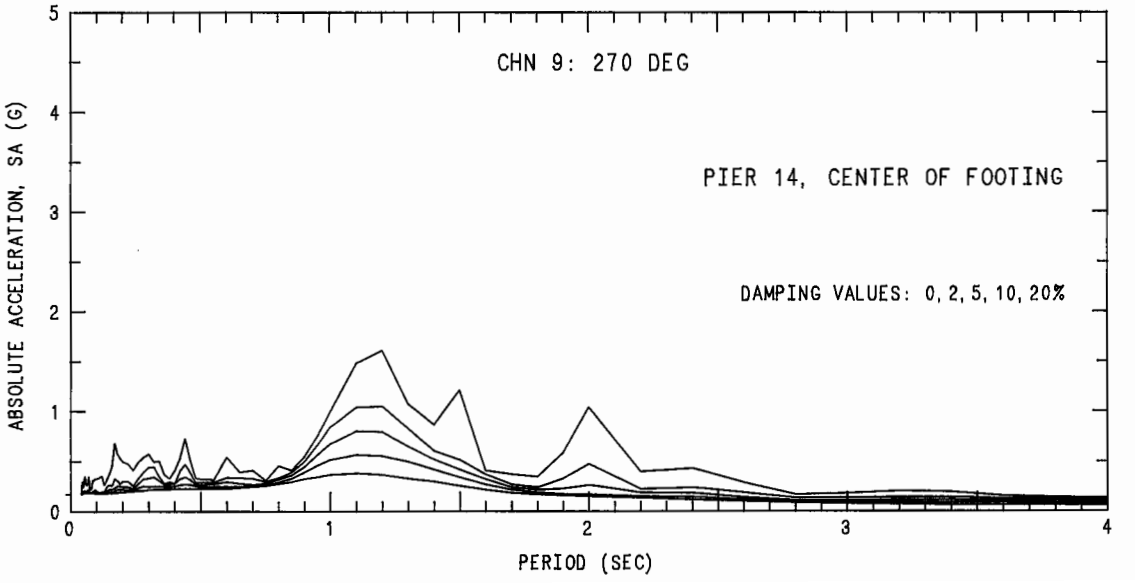


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

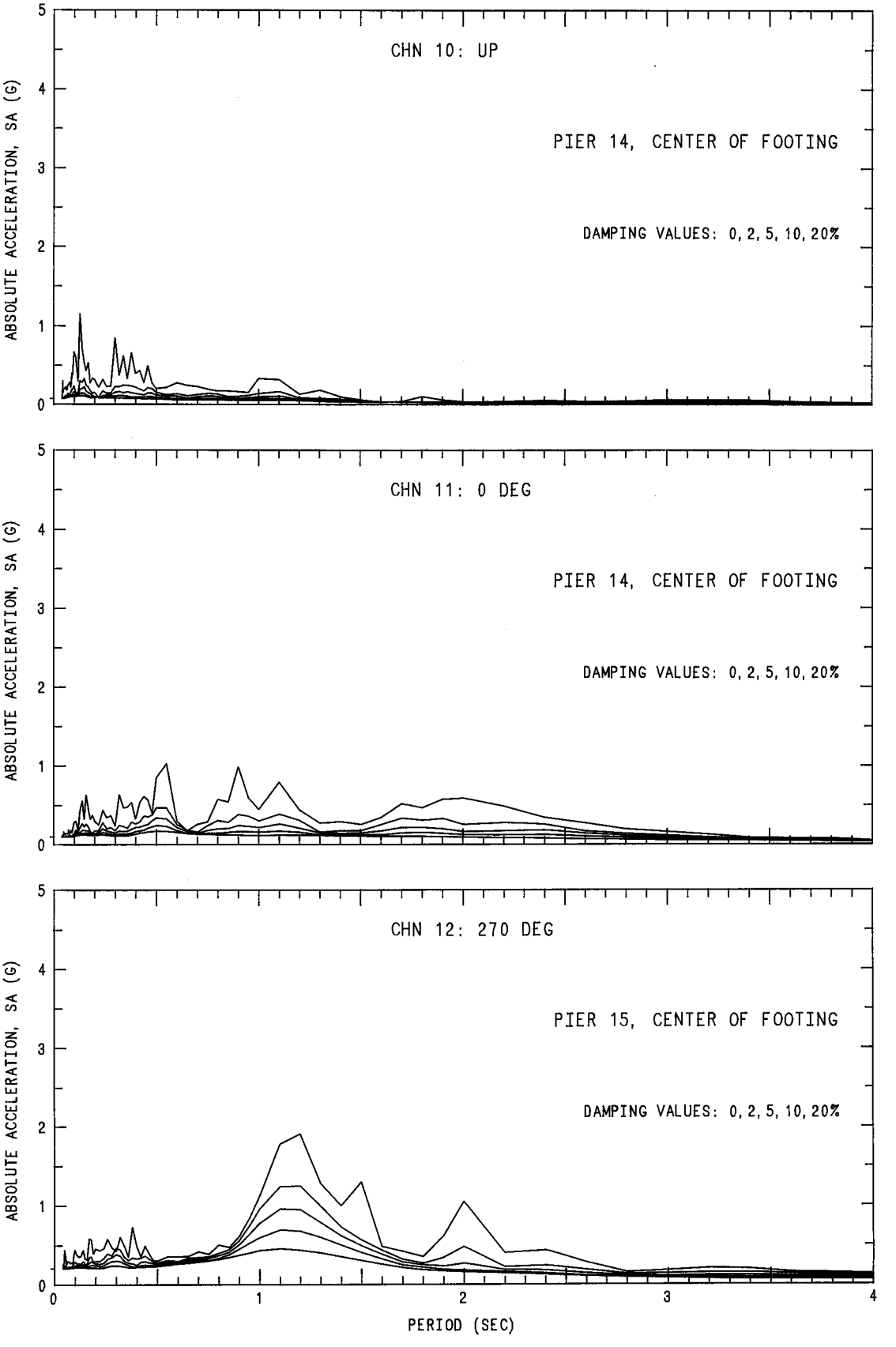
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0288-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)





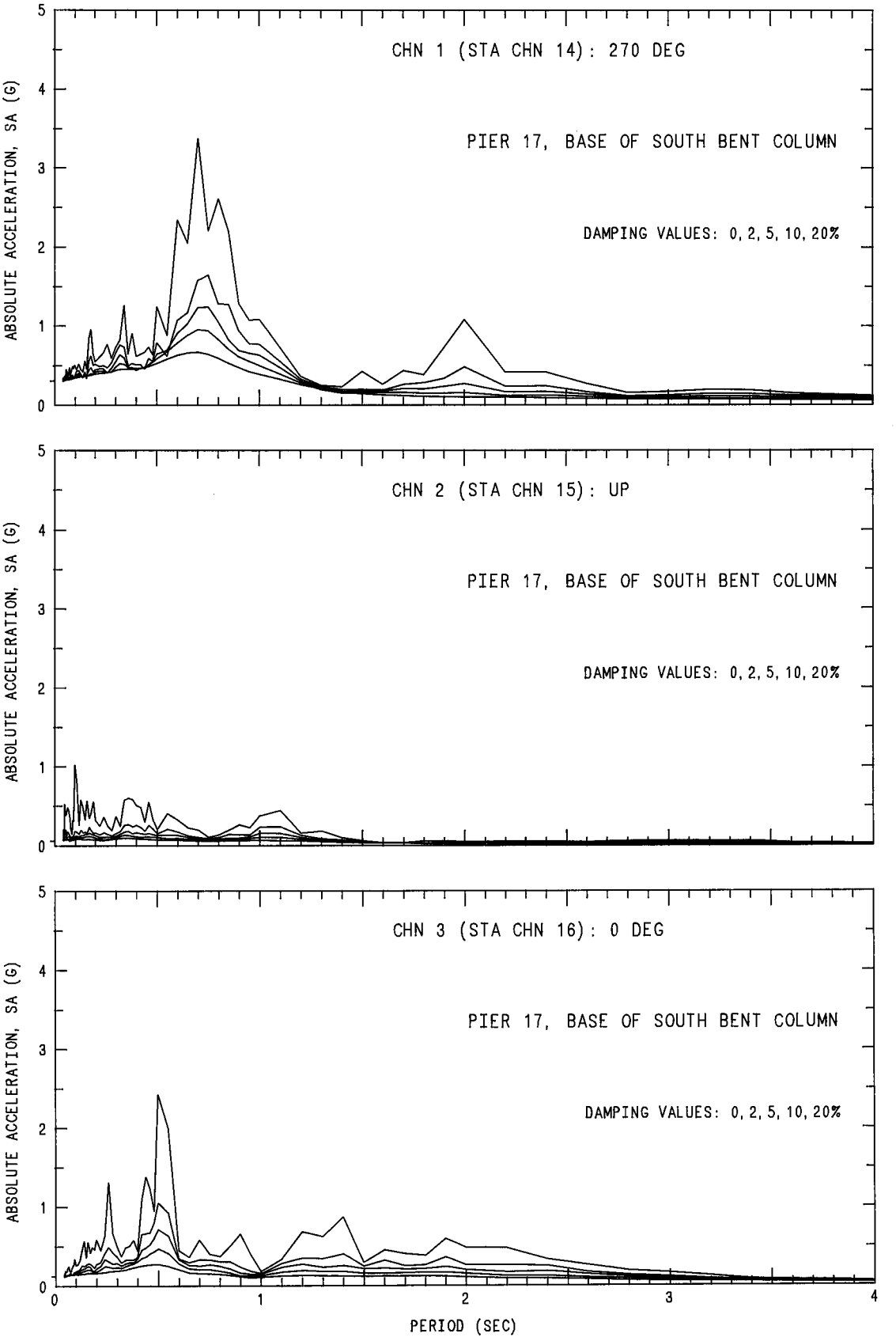


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0288-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)

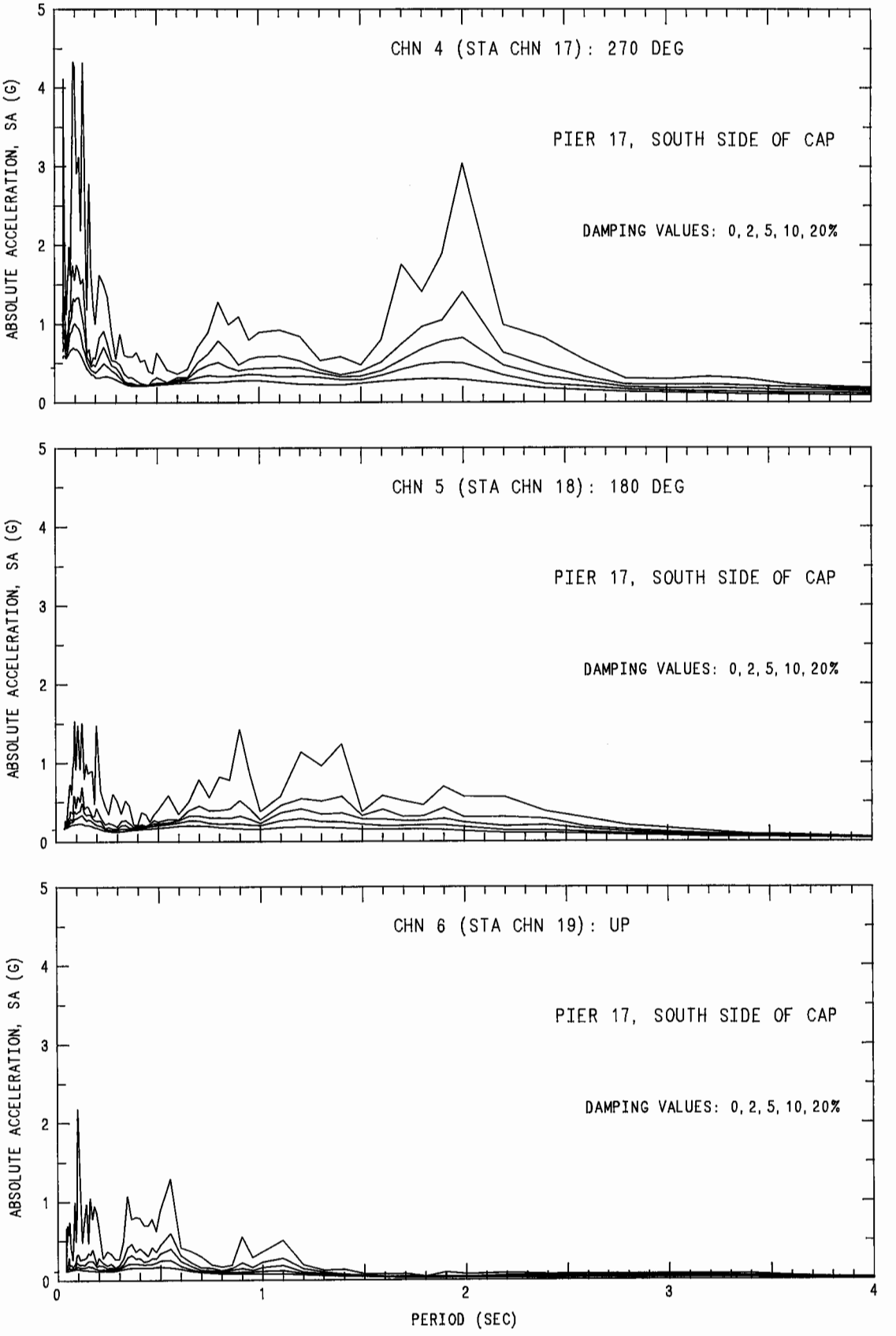


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

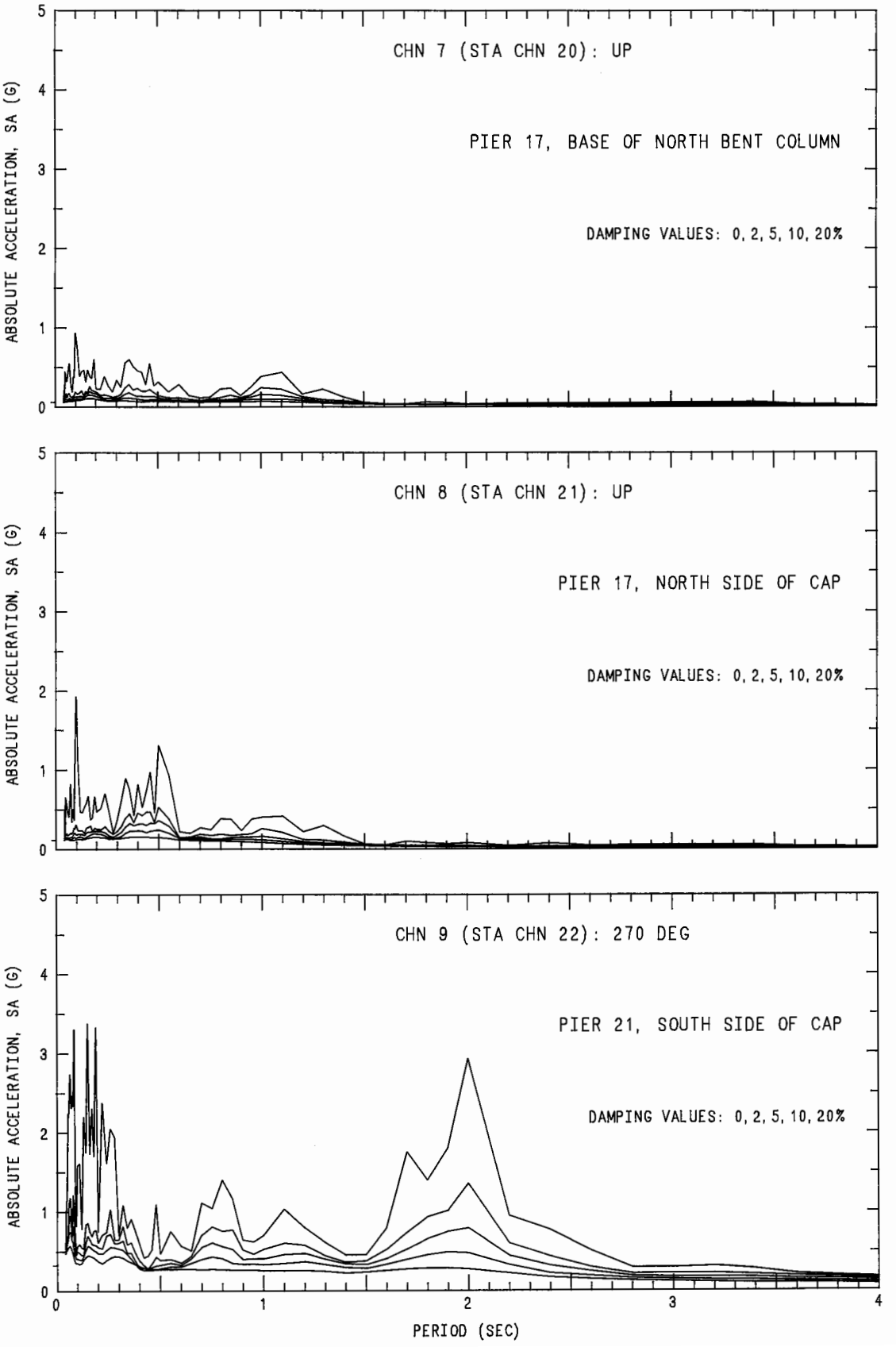
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0289-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0289-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)

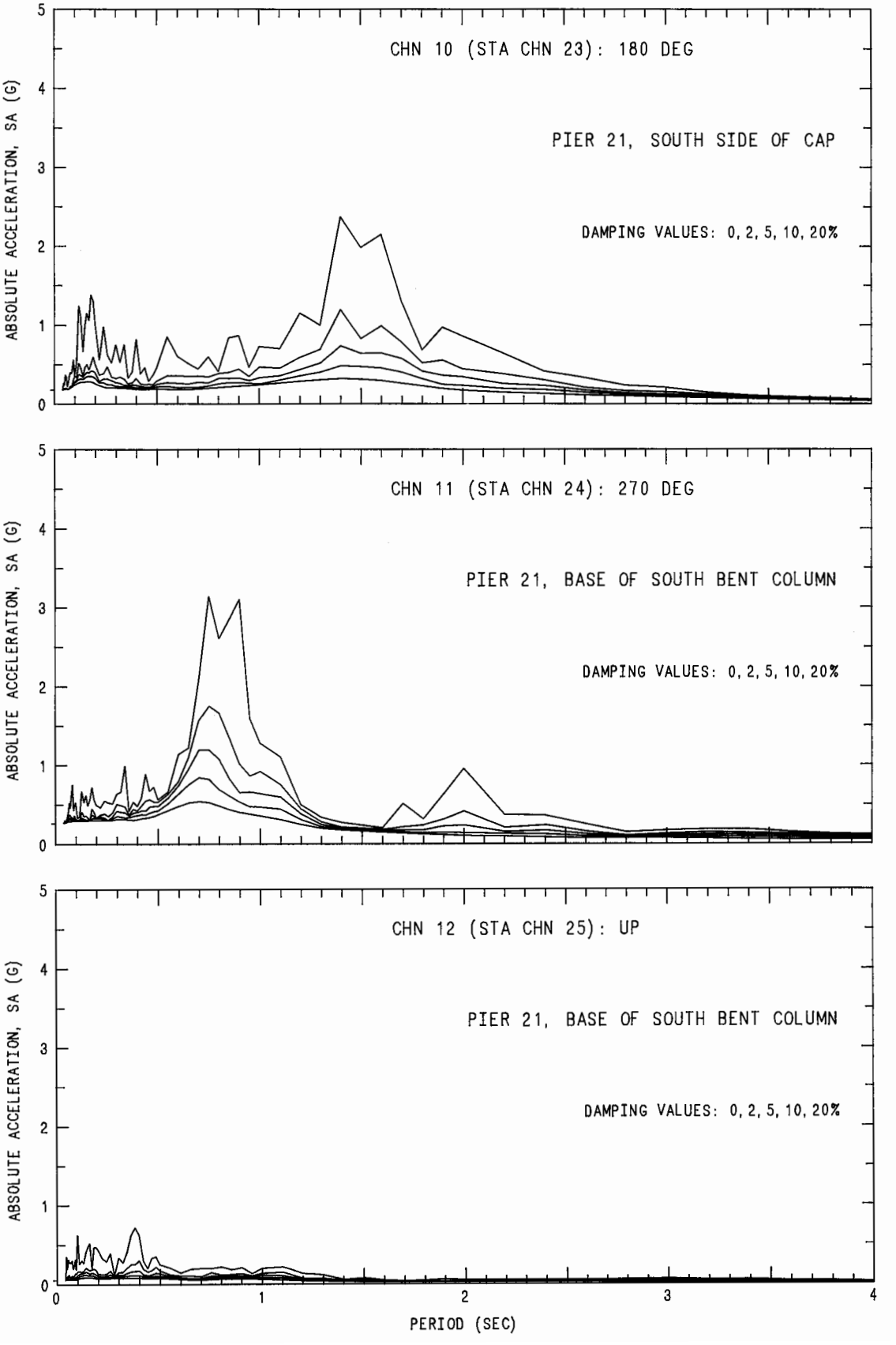


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0289-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)

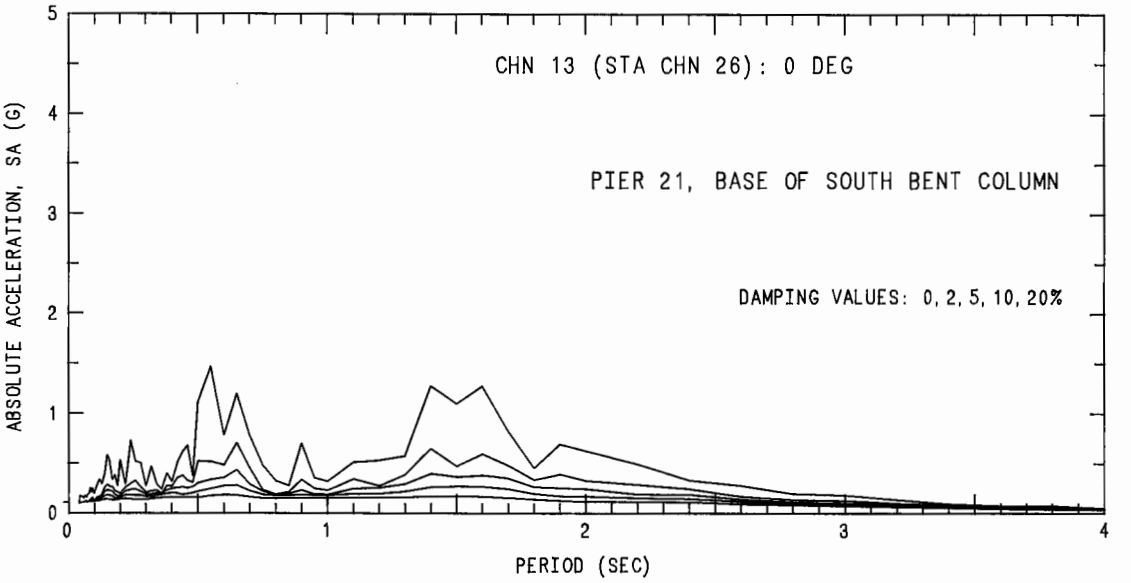


SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0289-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-C0289-90208.13
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



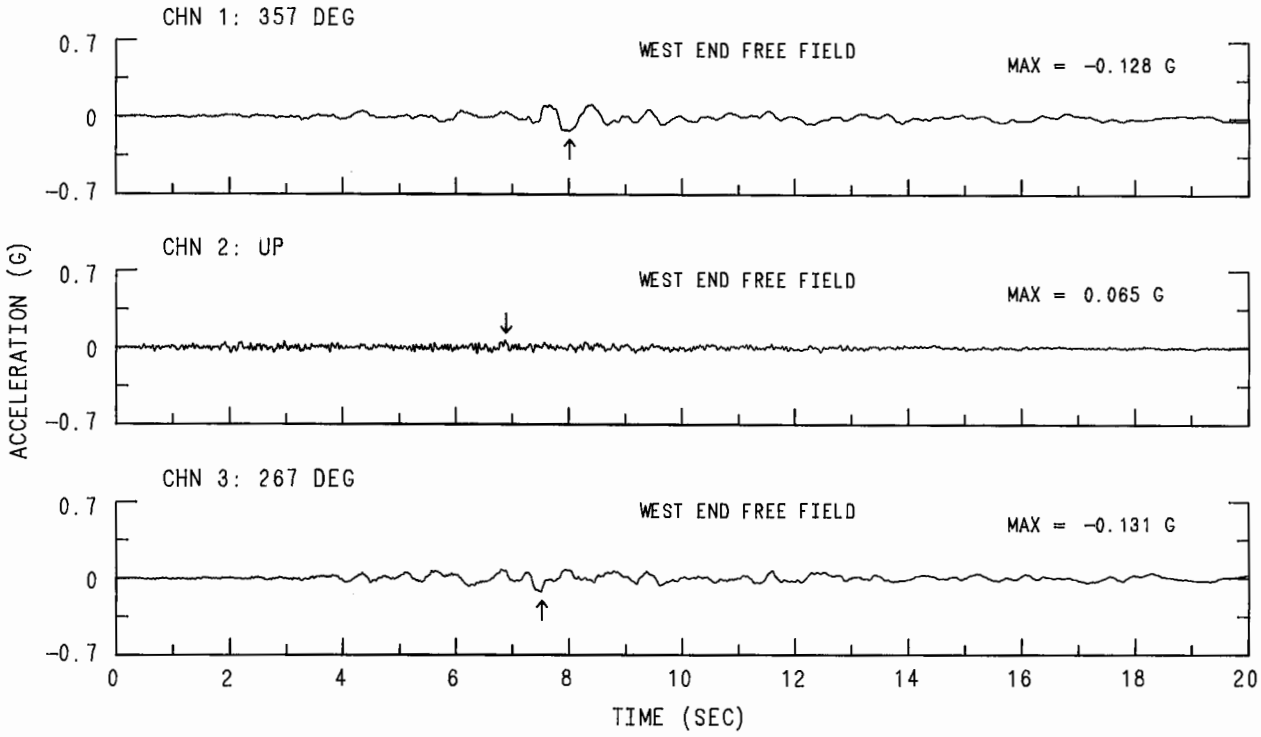
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

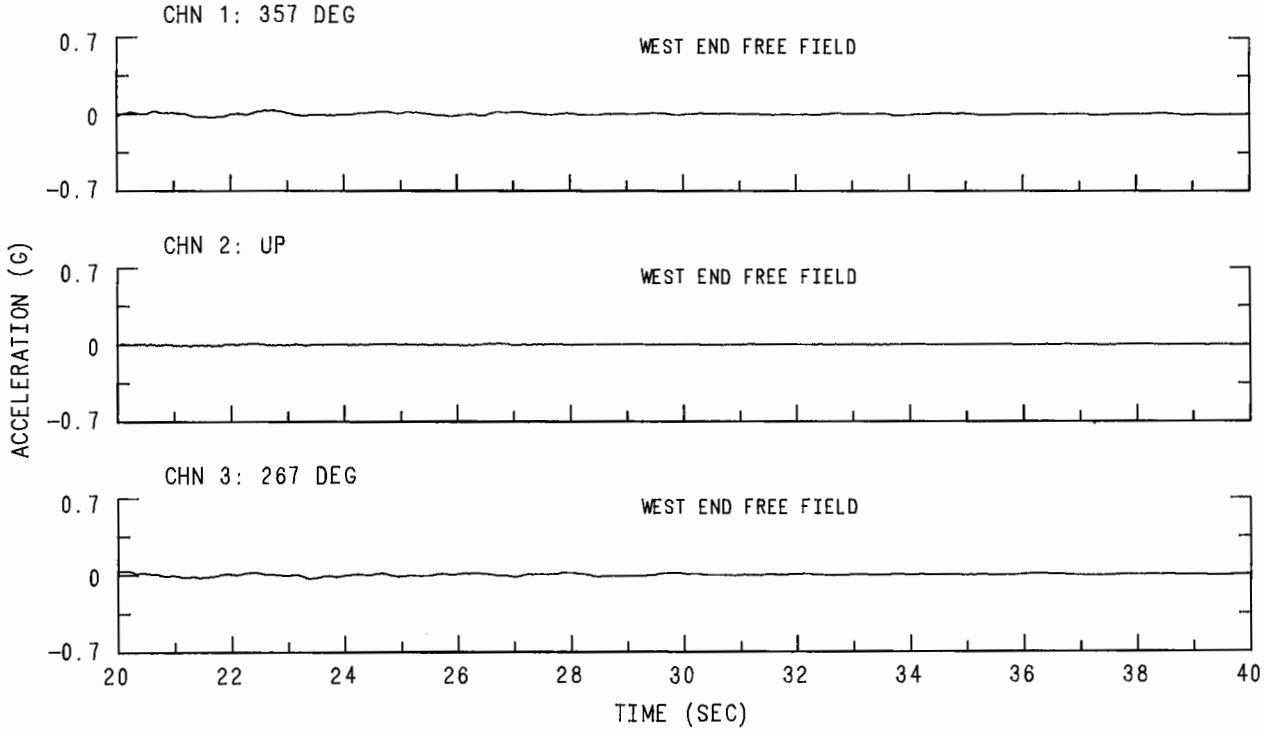
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 1 ACCELERATION

RECORD ID: 58596-S6220-90208.03

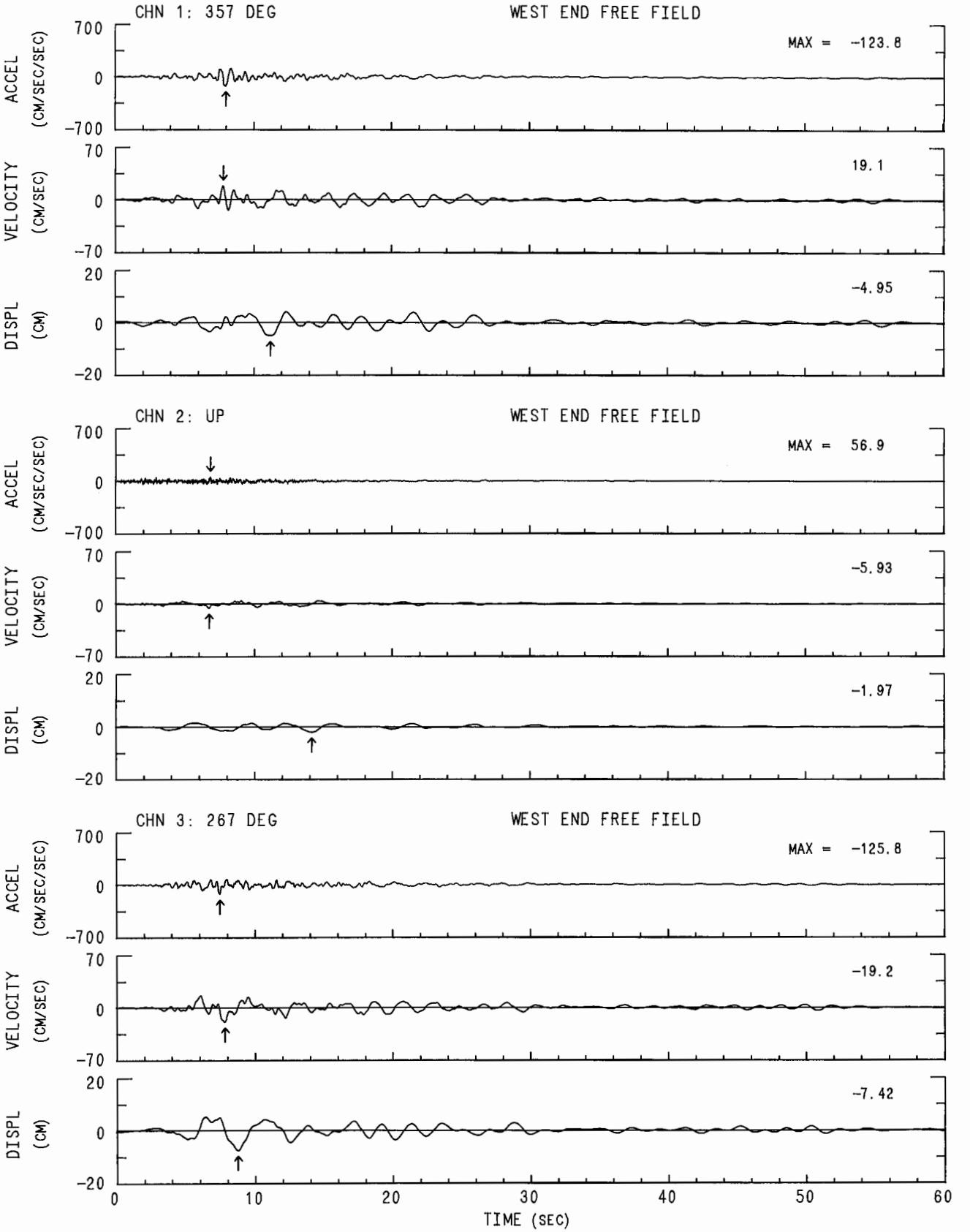
(The FF record started about 1.0 second later than the structure record)





SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58596-S6220-90208.03



SAN FRANCISCO BAY – DUMBARTON BRIDGE: CSMIP S/N 596

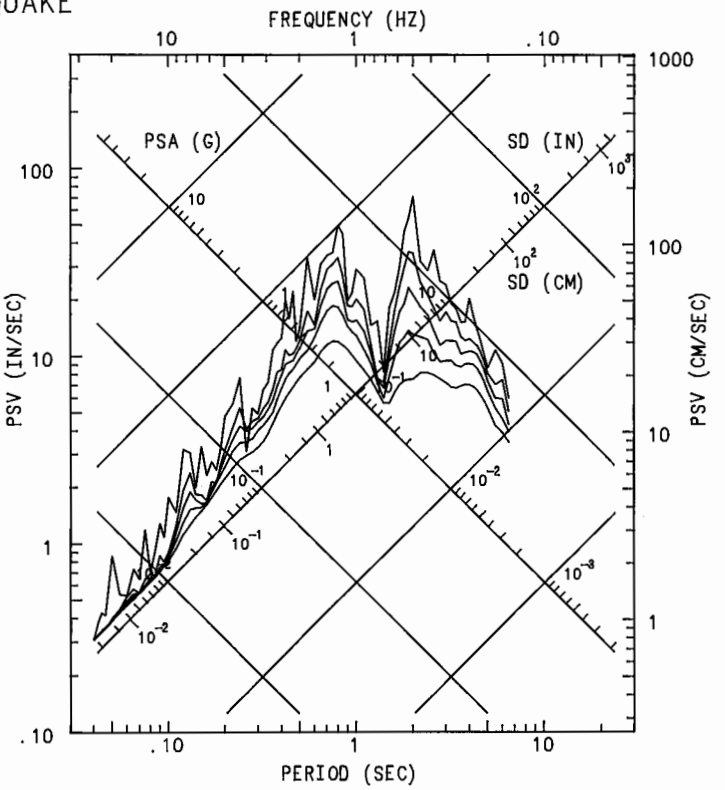
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

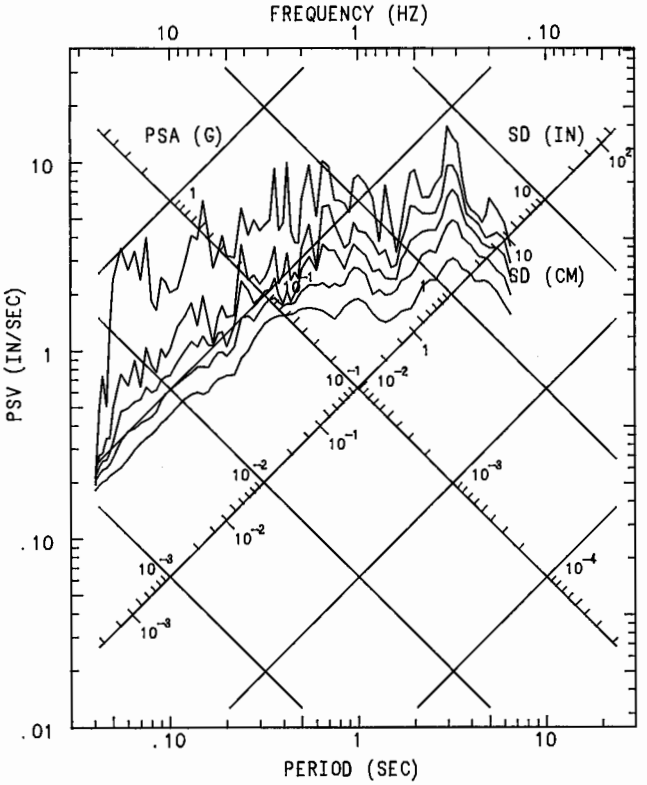
RECORD ID: 58596-S6220-90208.03

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

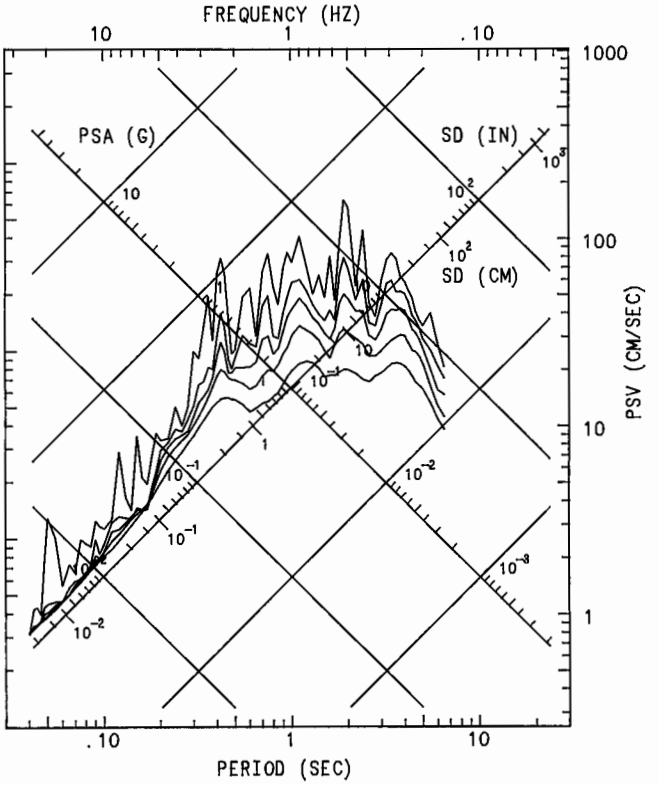
CHN 1: 357 DEG
WEST END FREE FIELD



CHN 2: UP
WEST END FREE FIELD

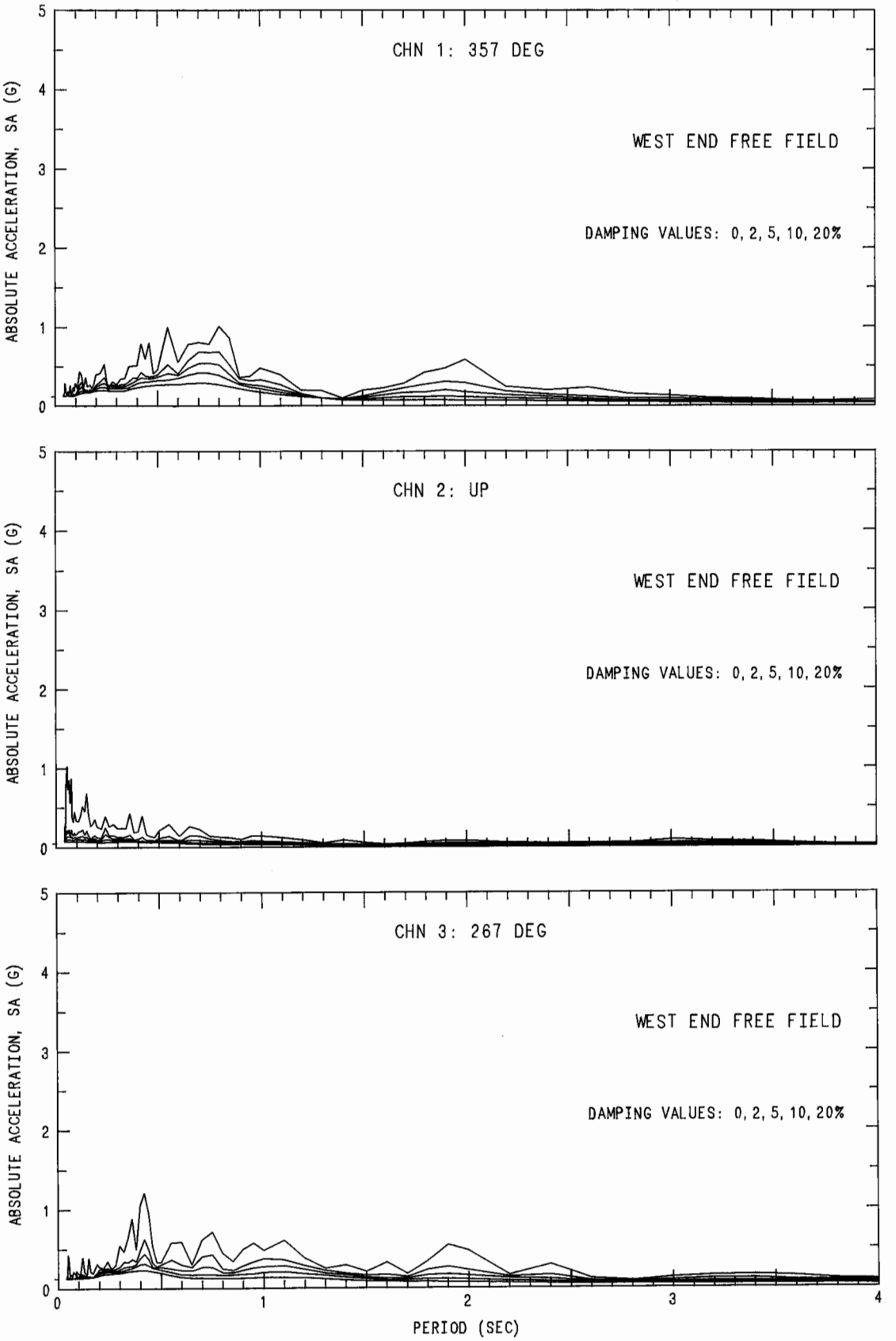


CHN 3: 267 DEG
WEST END FREE FIELD



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
SAN FRANCISCO BAY - DUMBARTON BRIDGE: CSMIP S/N 596

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58596-S6220-90208.03
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



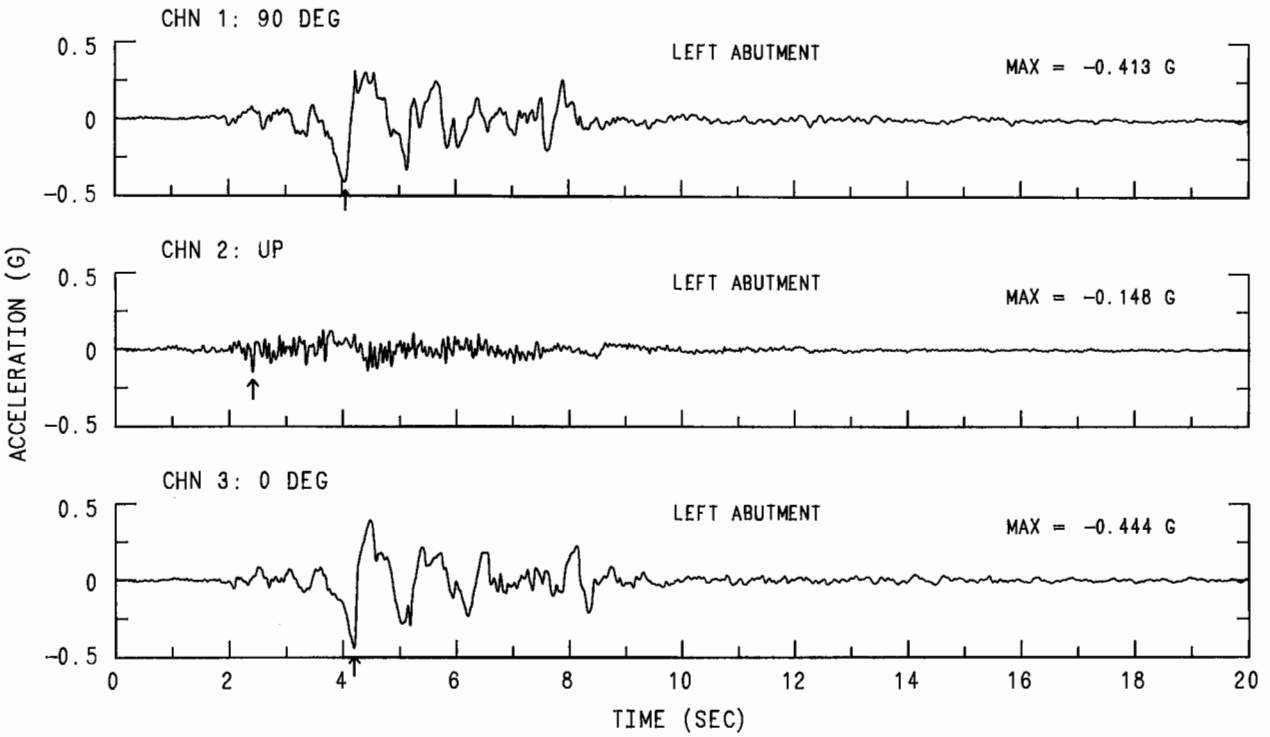
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

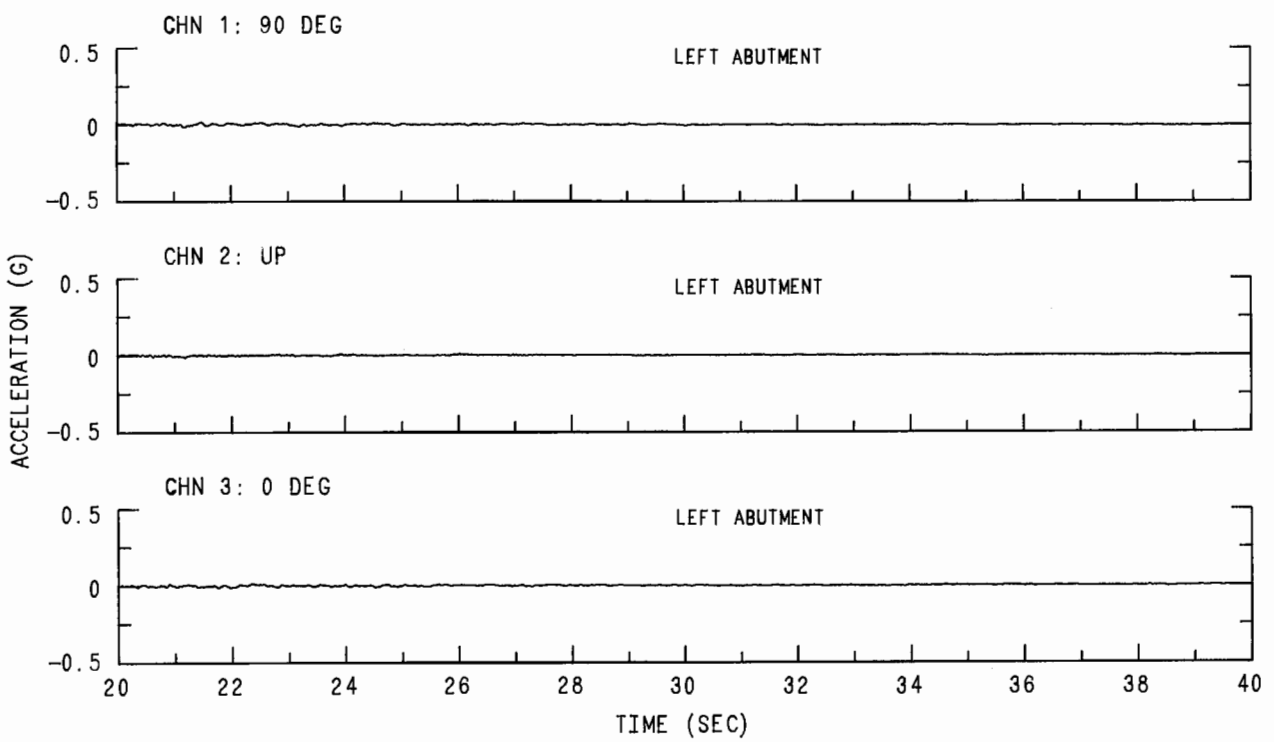
LEXINGTON DAM: CSMIP S/N 180

PHASE 1 ACCELERATION

RECORD ID: 57180-S2130-89292.02

* The three recorders are not interconnected to begin recording simultaneously.
(Trigger times are within 0.1 to 0.2 sec of each other)



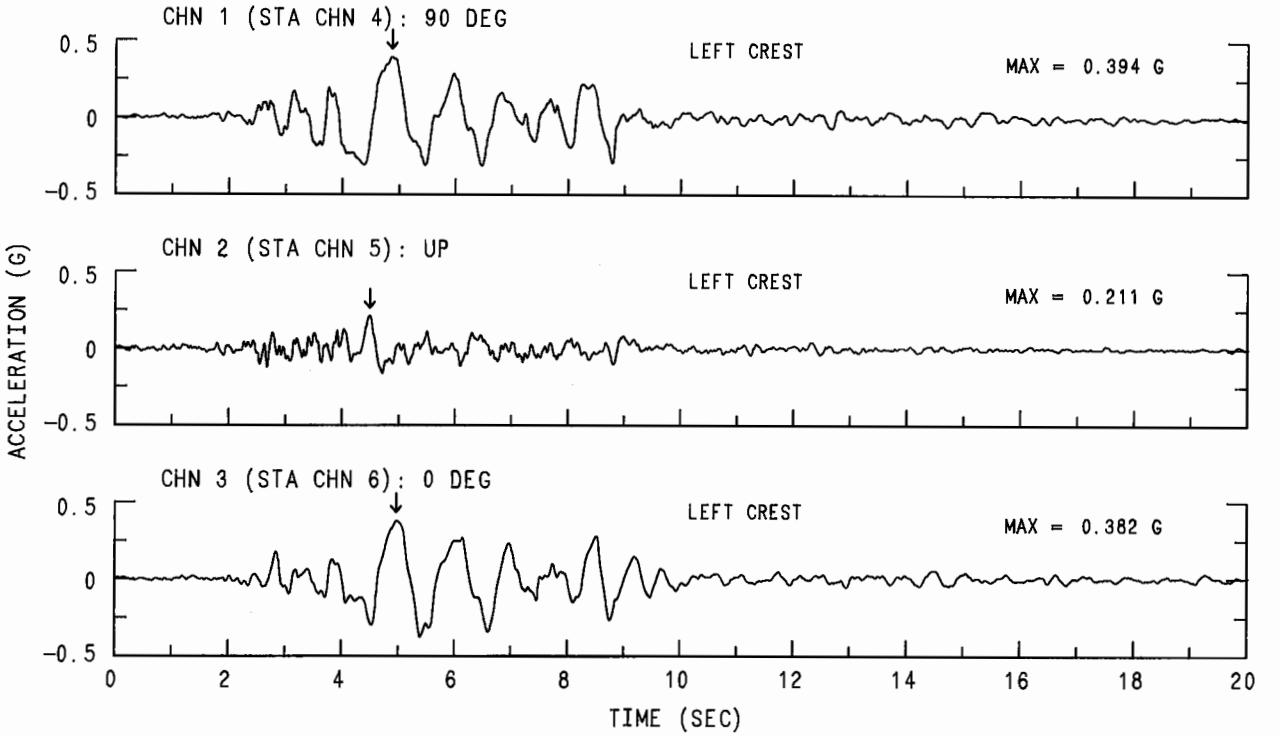


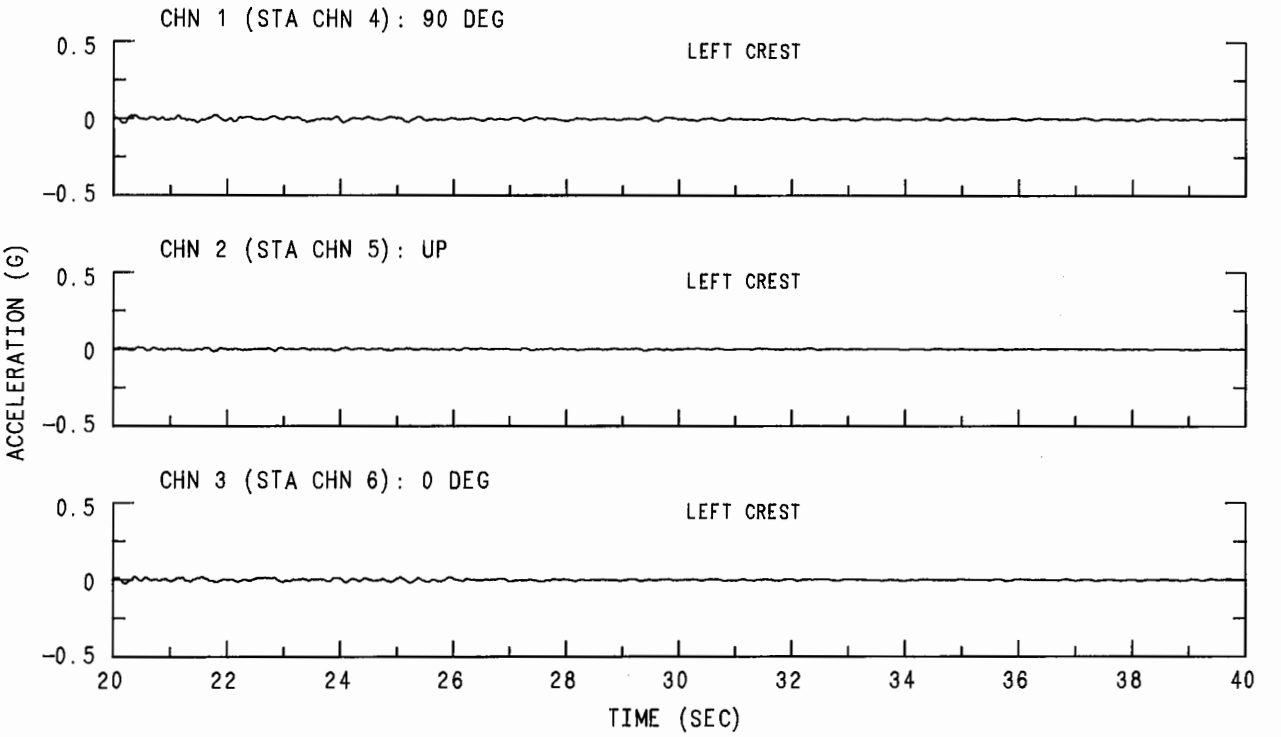
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

LEXINGTON DAM: CSMIP S/N 180

PHASE 1 ACCELERATION

RECORD ID: 57180-S2131-89292.03



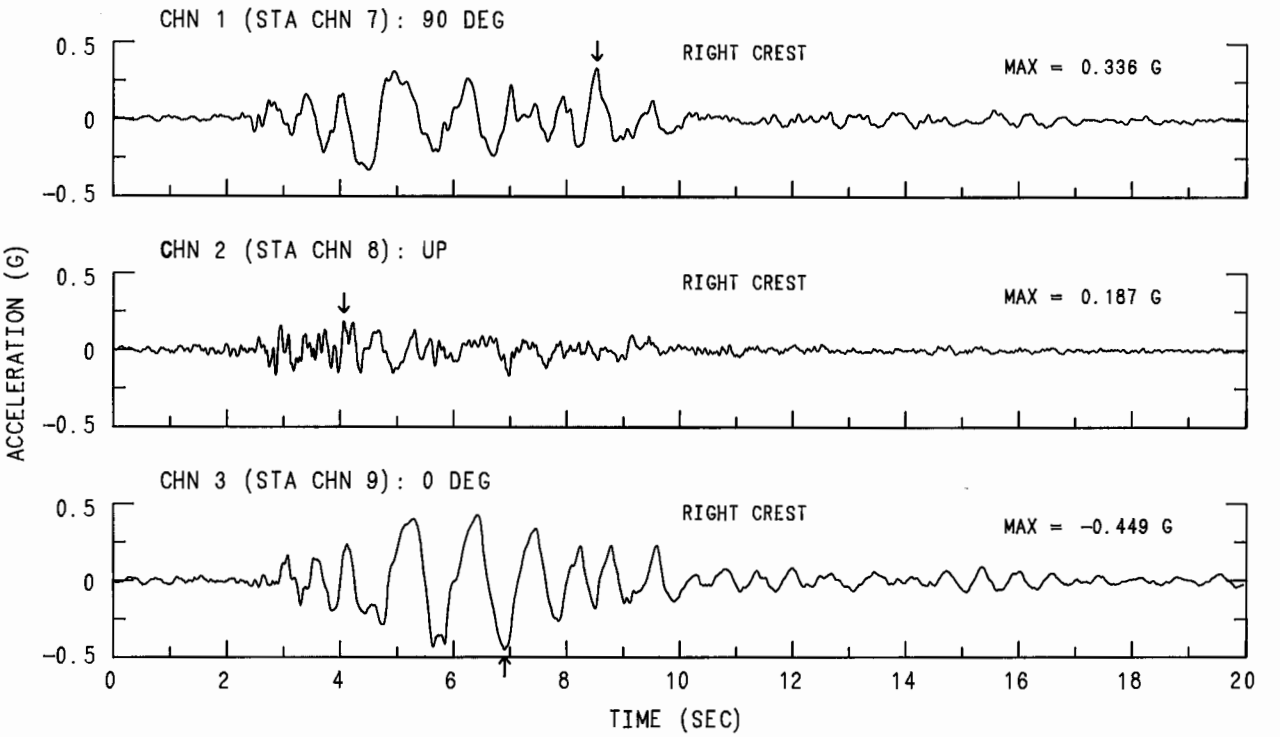


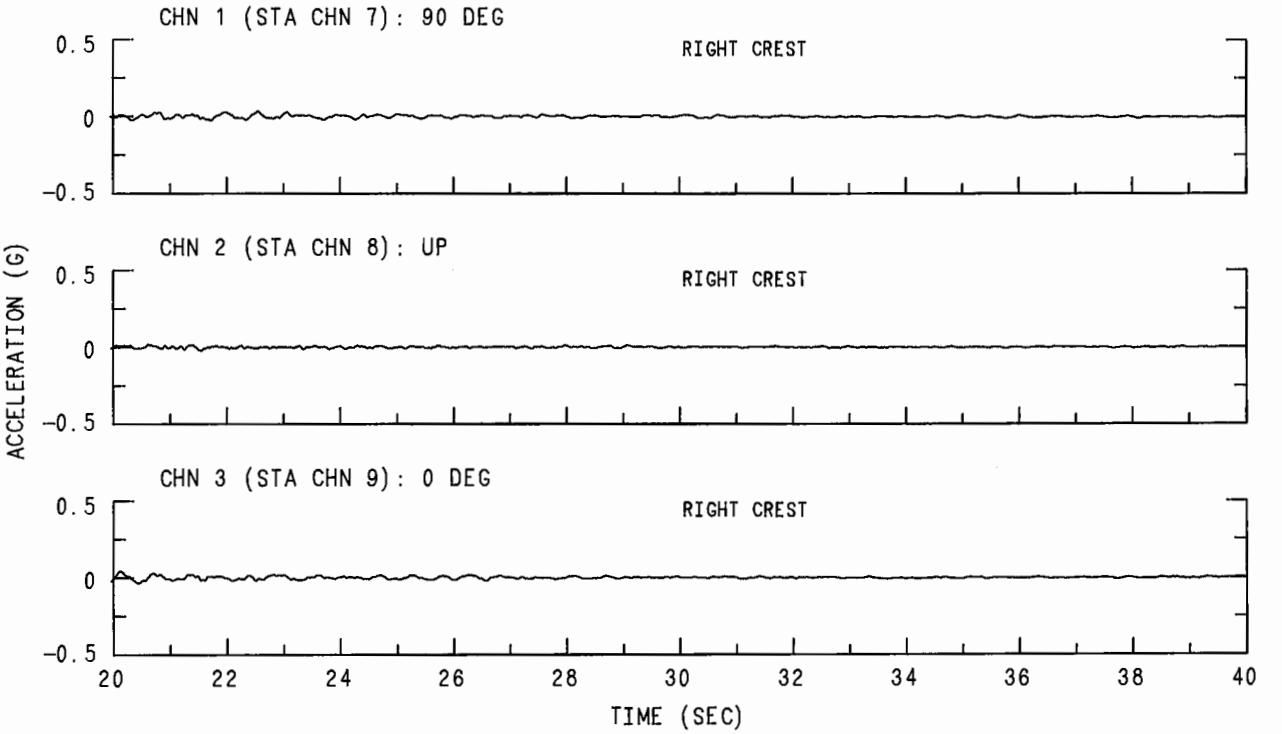
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

LEXINGTON DAM: CSMIP S/N 180

PHASE 1 ACCELERATION

RECORD ID: 57180-S2132-89292.04

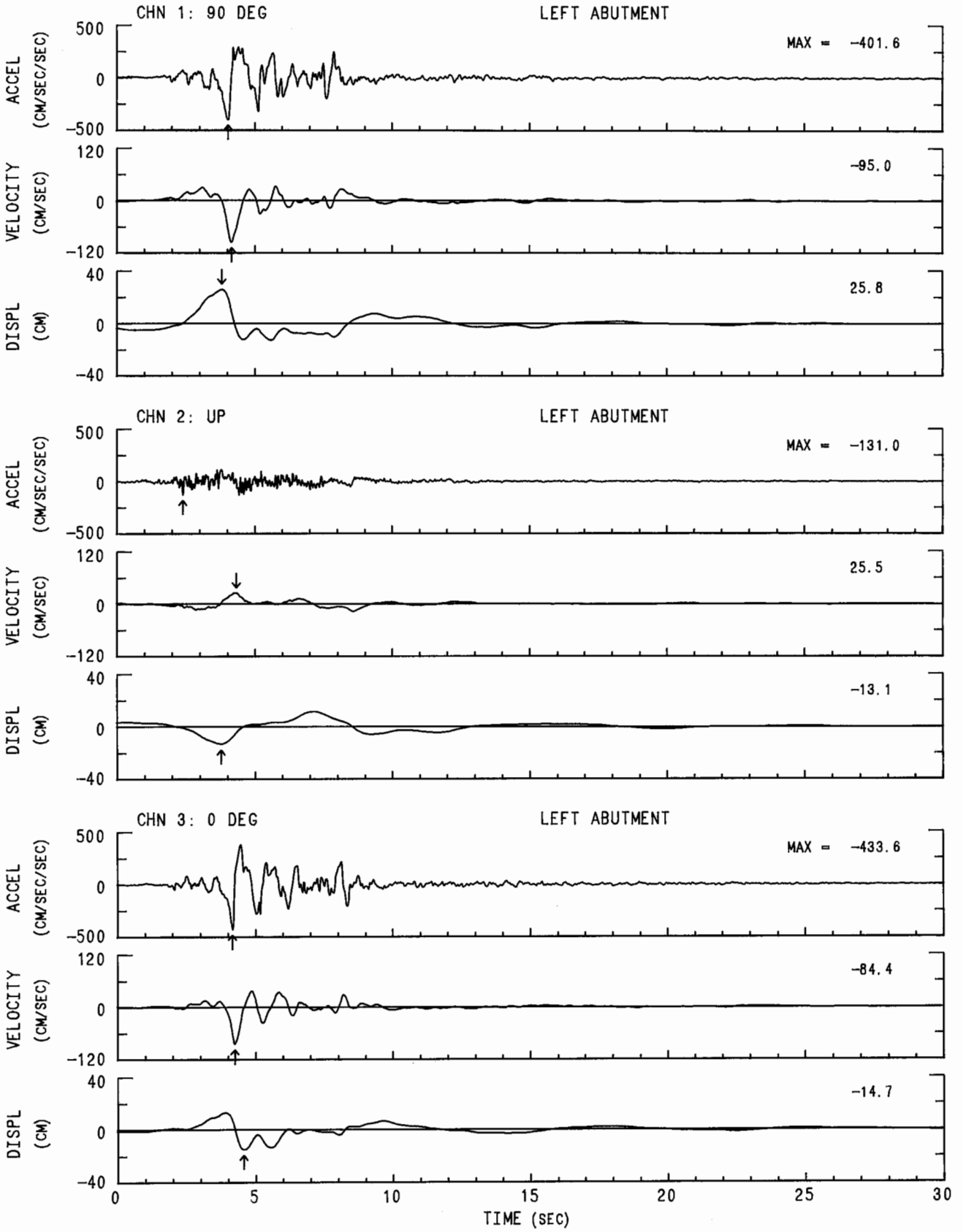




SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

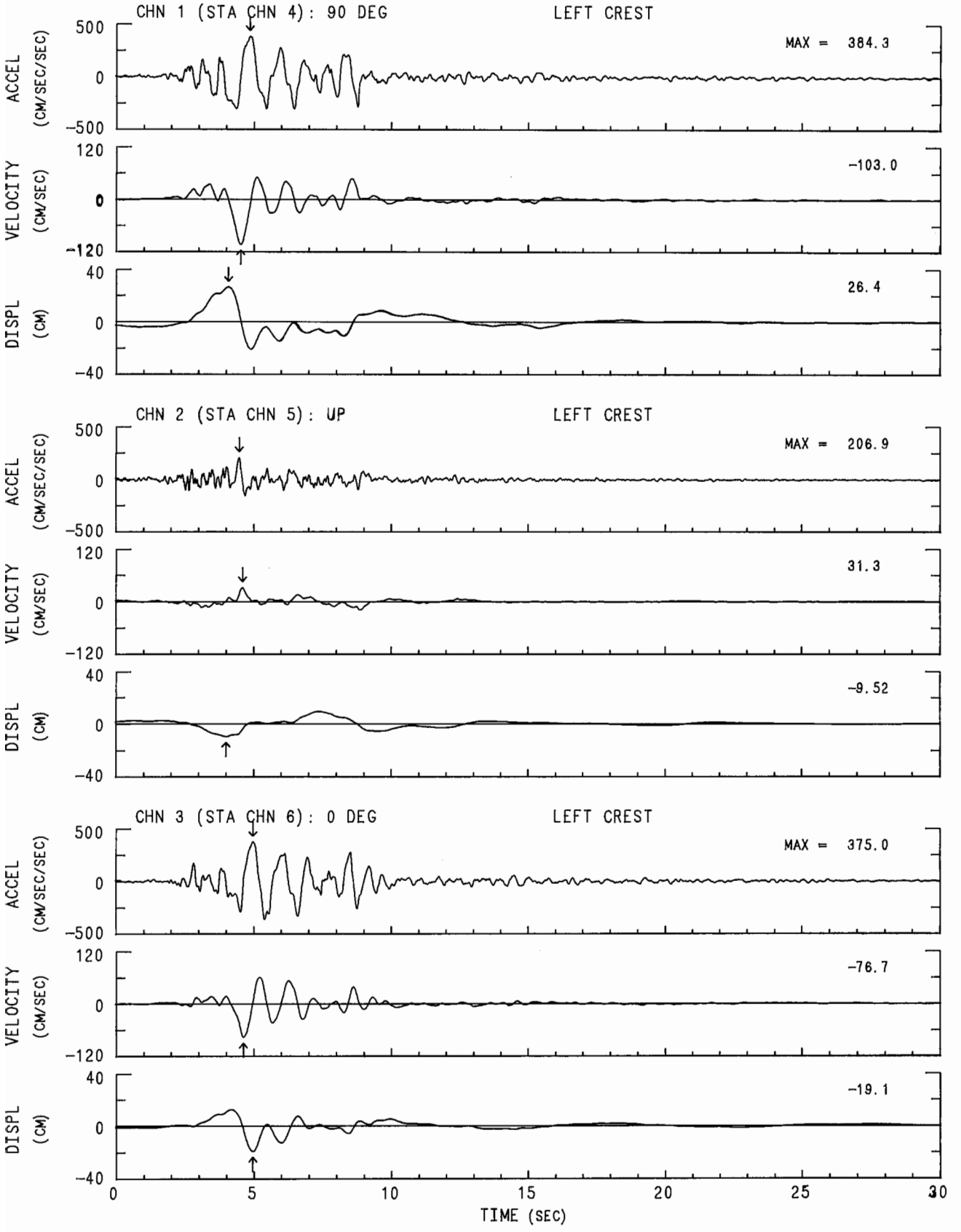
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC) RECORD ID: 57180-S2130-89292.02



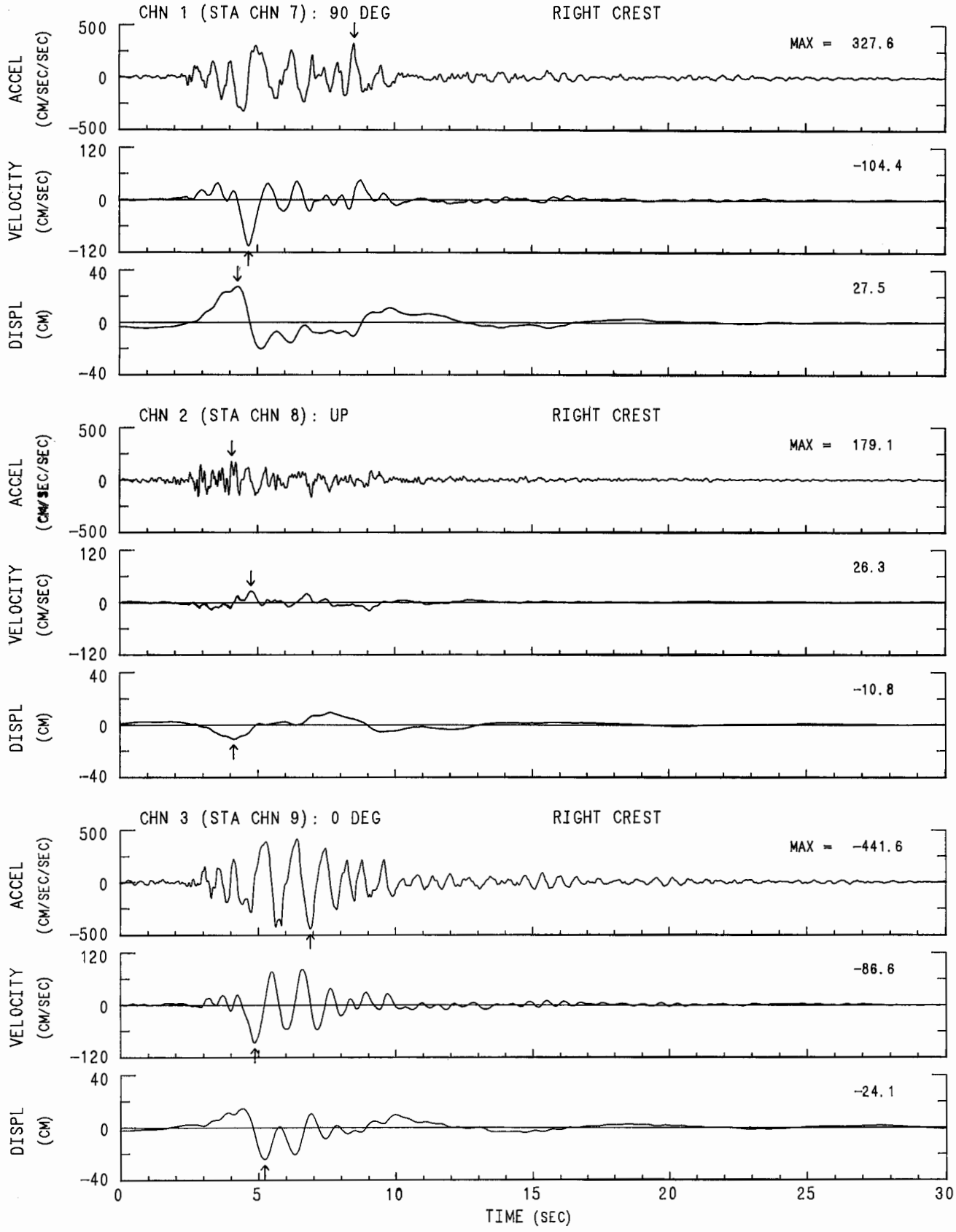
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC) RECORD ID: 57180-S2131-89292.03



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC) RECORD ID: 57180-S2132-89292.04



LEXINGTON DAM: CSMIP S/N 180

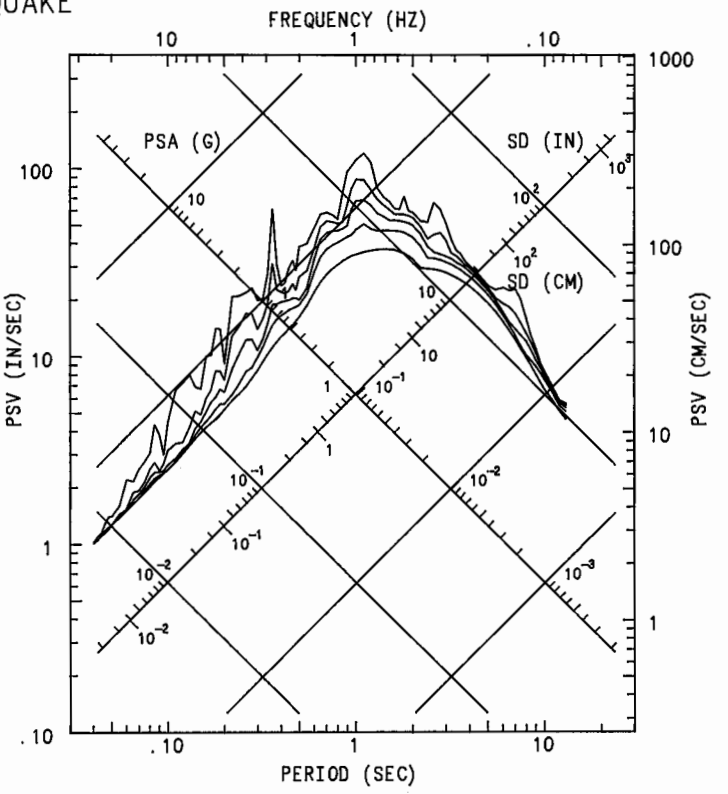
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ
(0.04 TO 11.8 SEC)

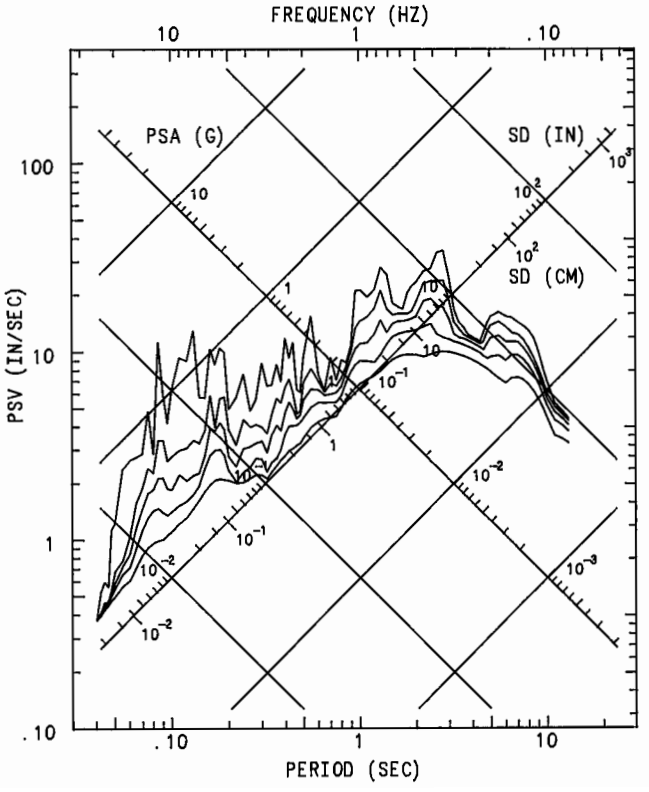
RECORD ID: 57180-S2130-89292.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

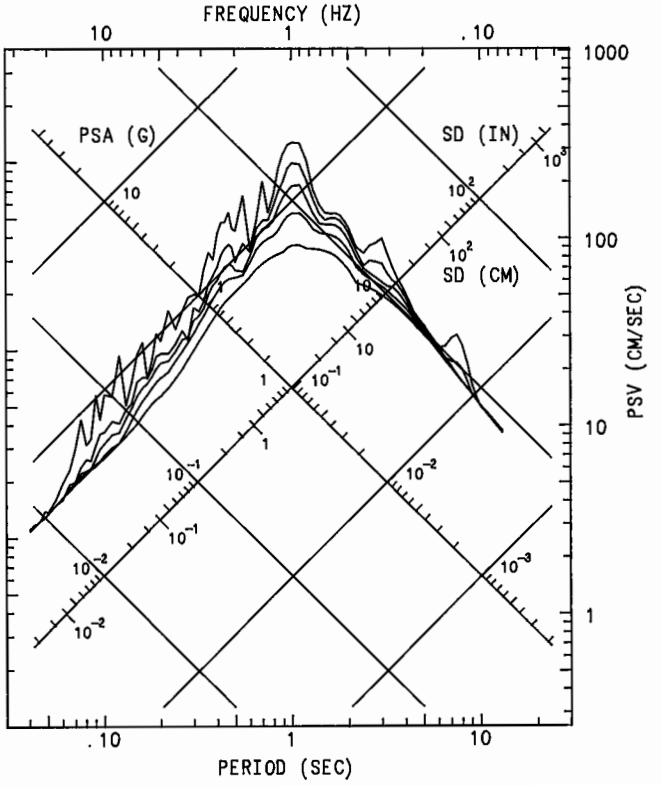
CHN 1: 90 DEG
LEFT ABUTMENT



CHN 2: UP
LEFT ABUTMENT



CHN 3: 0 DEG
LEFT ABUTMENT



LEXINGTON DAM: CSMIP S/N 180

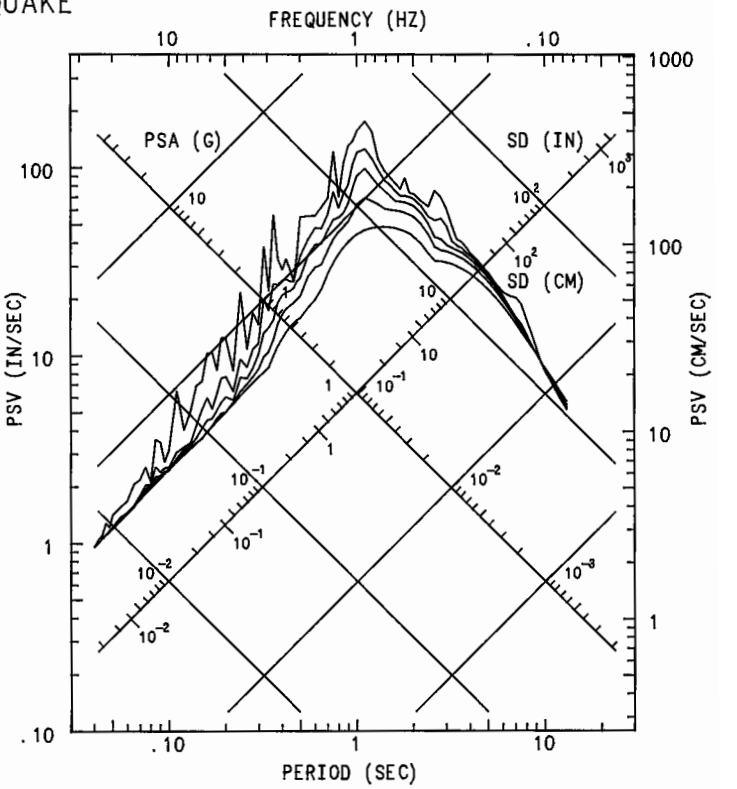
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ
(0.04 TO 11.8 SEC)

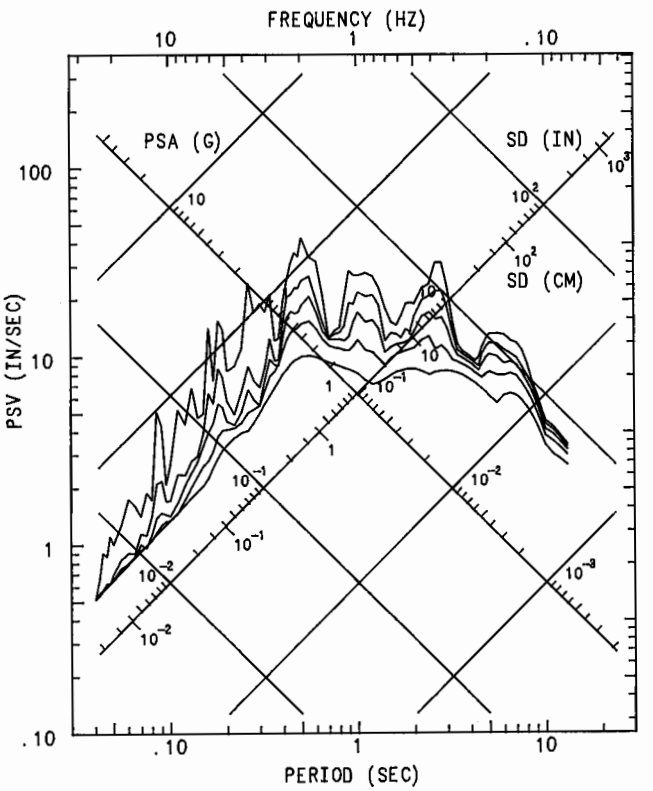
RECORD ID: 57180-S2131-89292.03

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

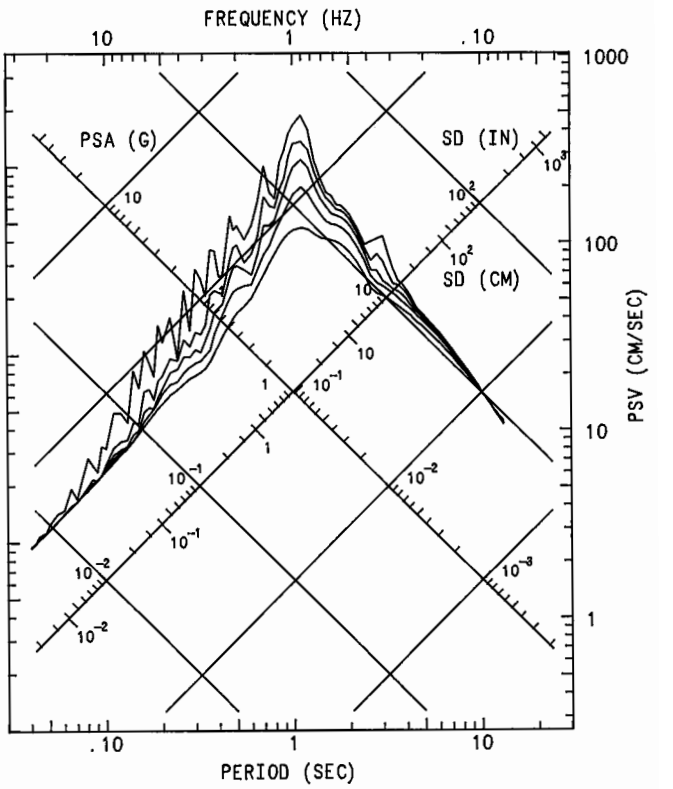
CHN 1 (STA CHN 4): 90 DEG
LEFT CREST



CHN 2 (STA CHN 5): UP
LEFT CREST



CHN 3 (STA CHN 6): 0 DEG
LEFT CREST



LEXINGTON DAM: CSMIP S/N 180

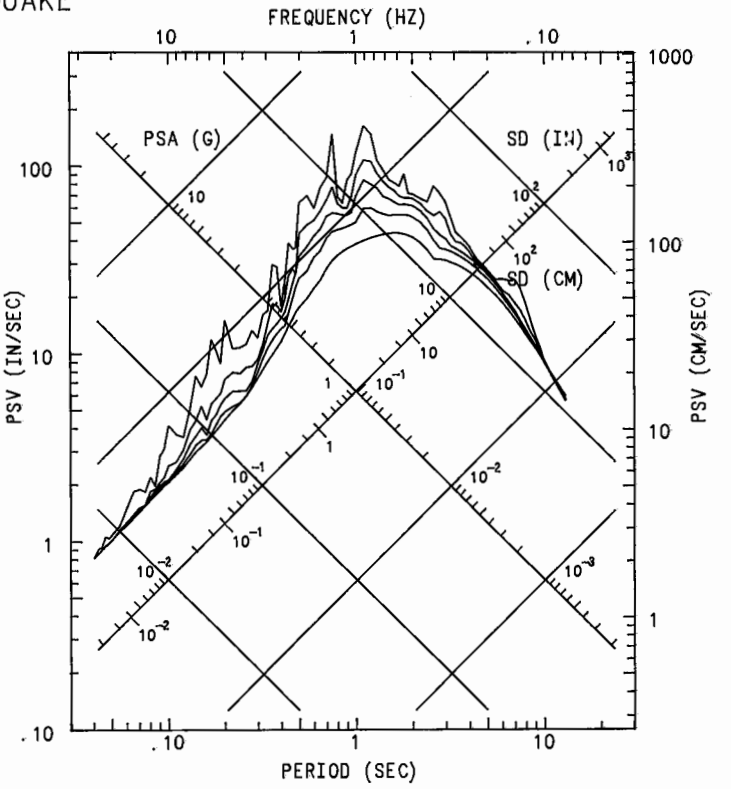
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ
(0.04 TO 11.8 SEC)

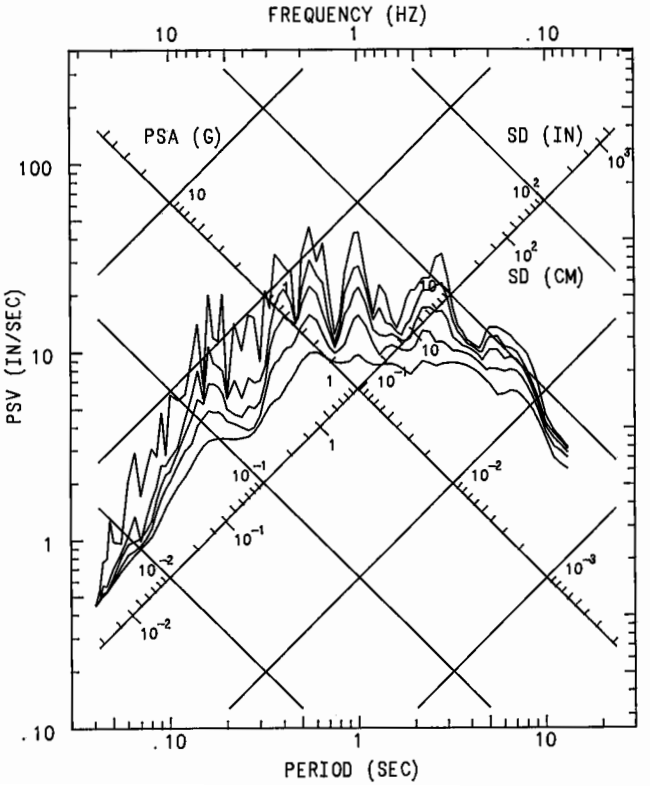
RECORD ID: 57180-S2132-89292.04

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

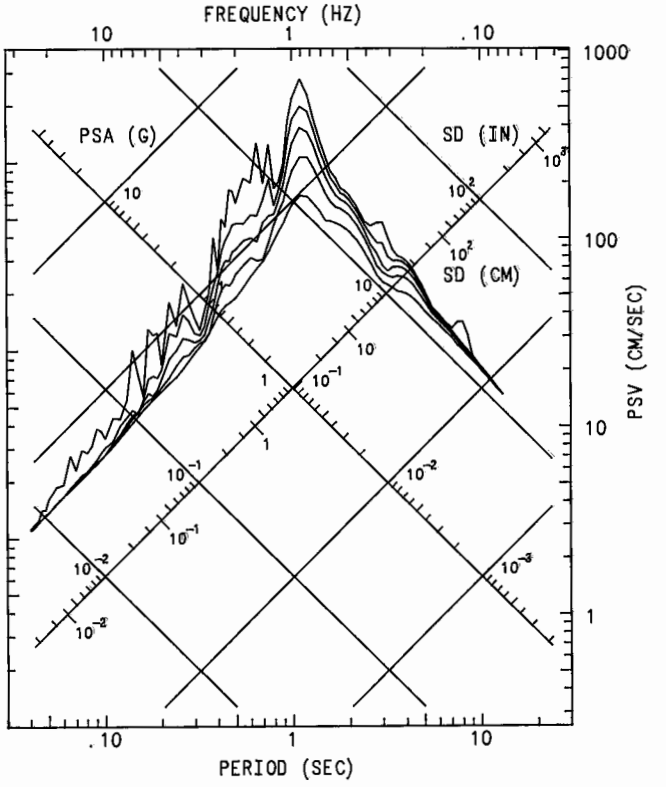
CHN 1 (STA CHN 7): 90 DEG
RIGHT CREST



CHN 2 (STA CHN 8): UP
RIGHT CREST

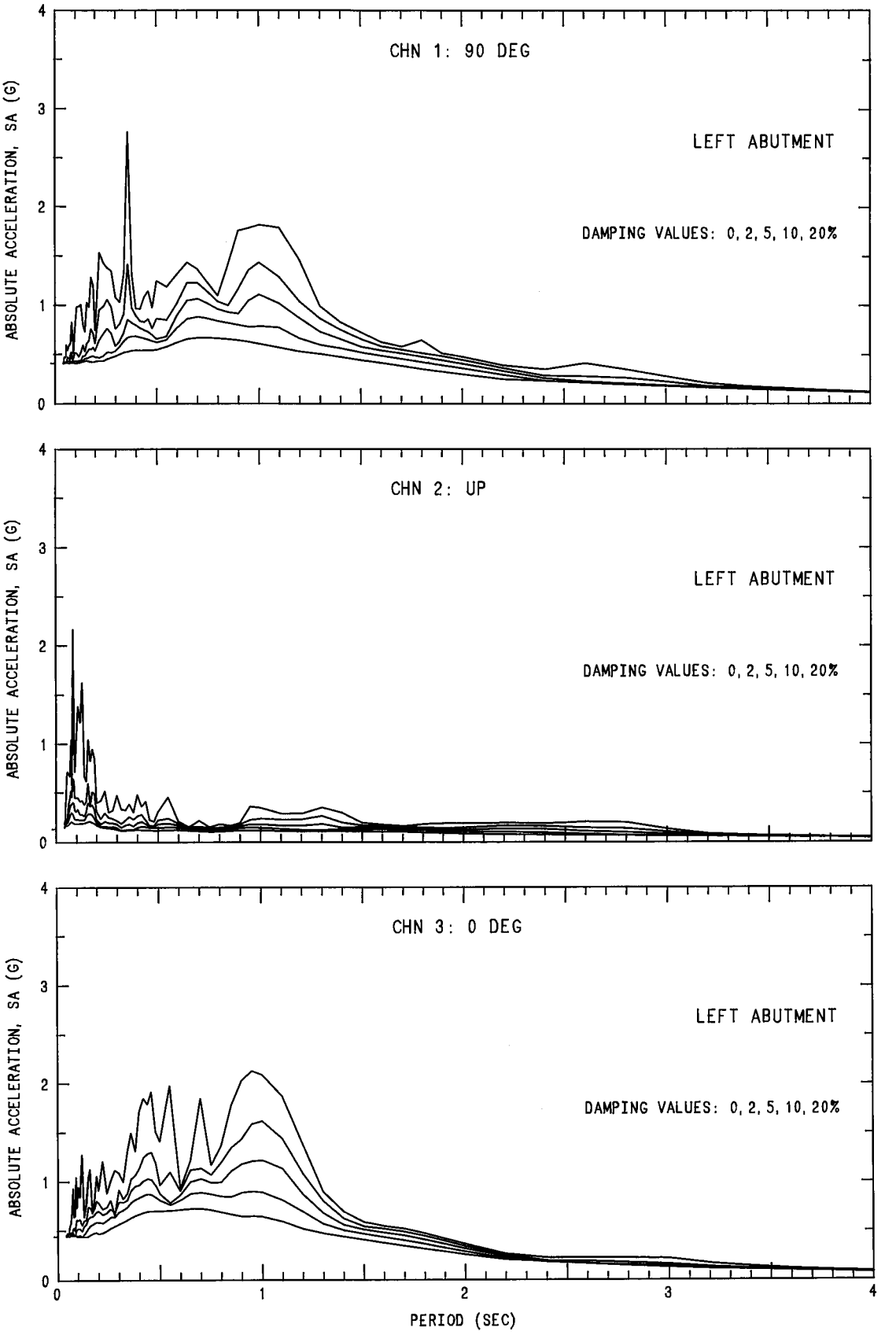


CHN 3 (STA CHN 9): 0 DEG
RIGHT CREST



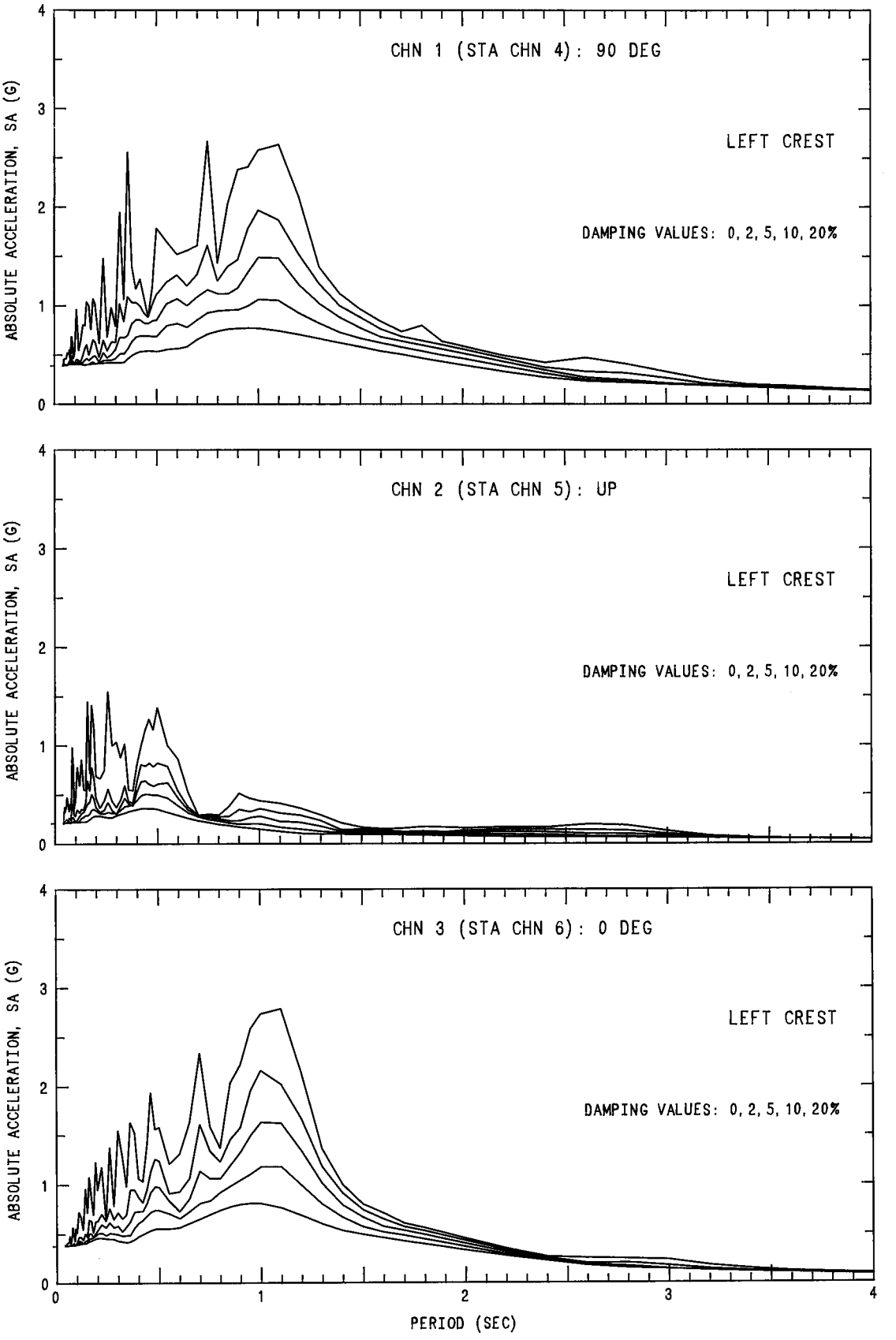
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 57180-S2130-89292.02
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC)



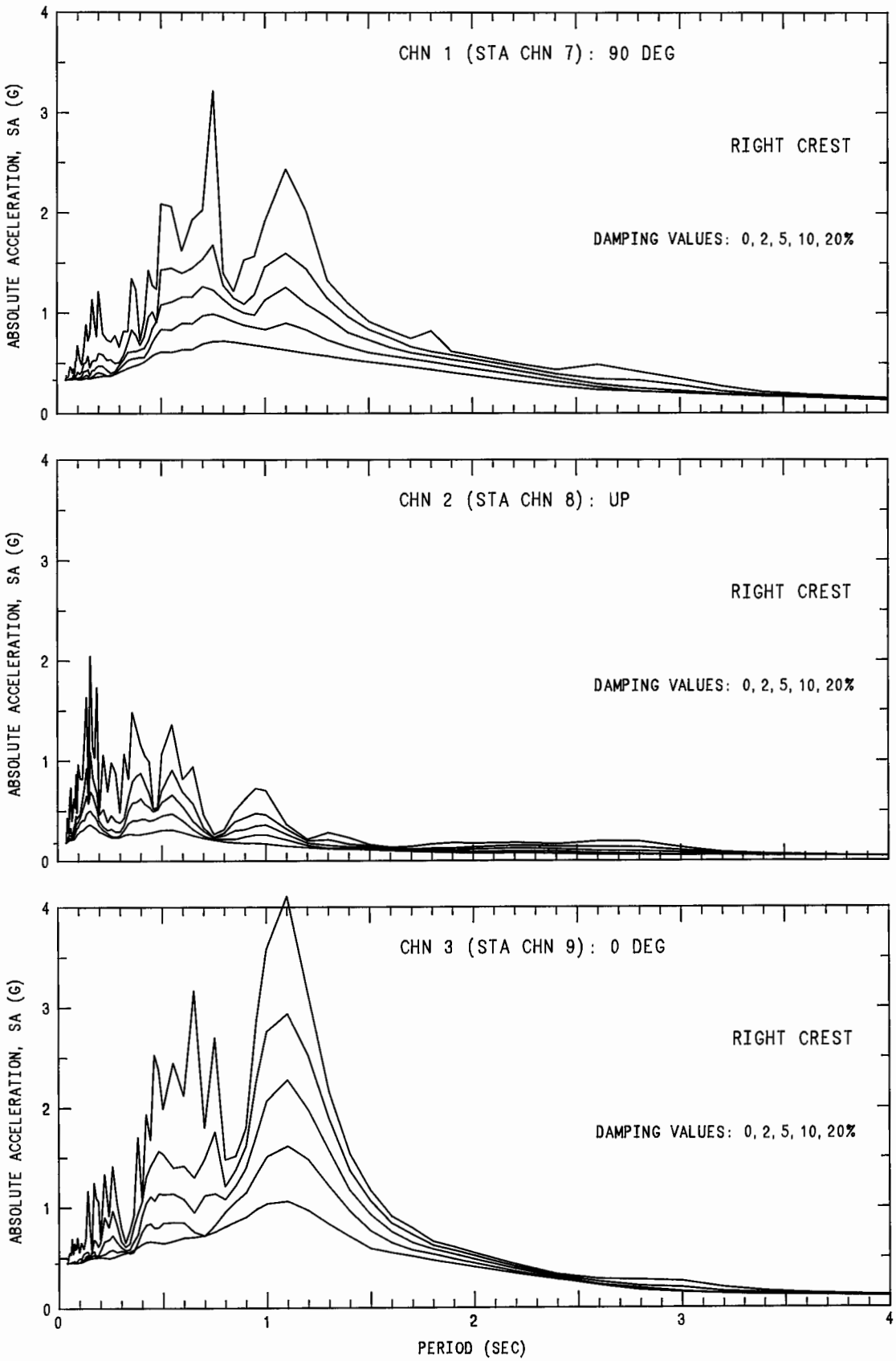
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 57180-S2131-89292.03
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LEXINGTON DAM: CSMIP S/N 180

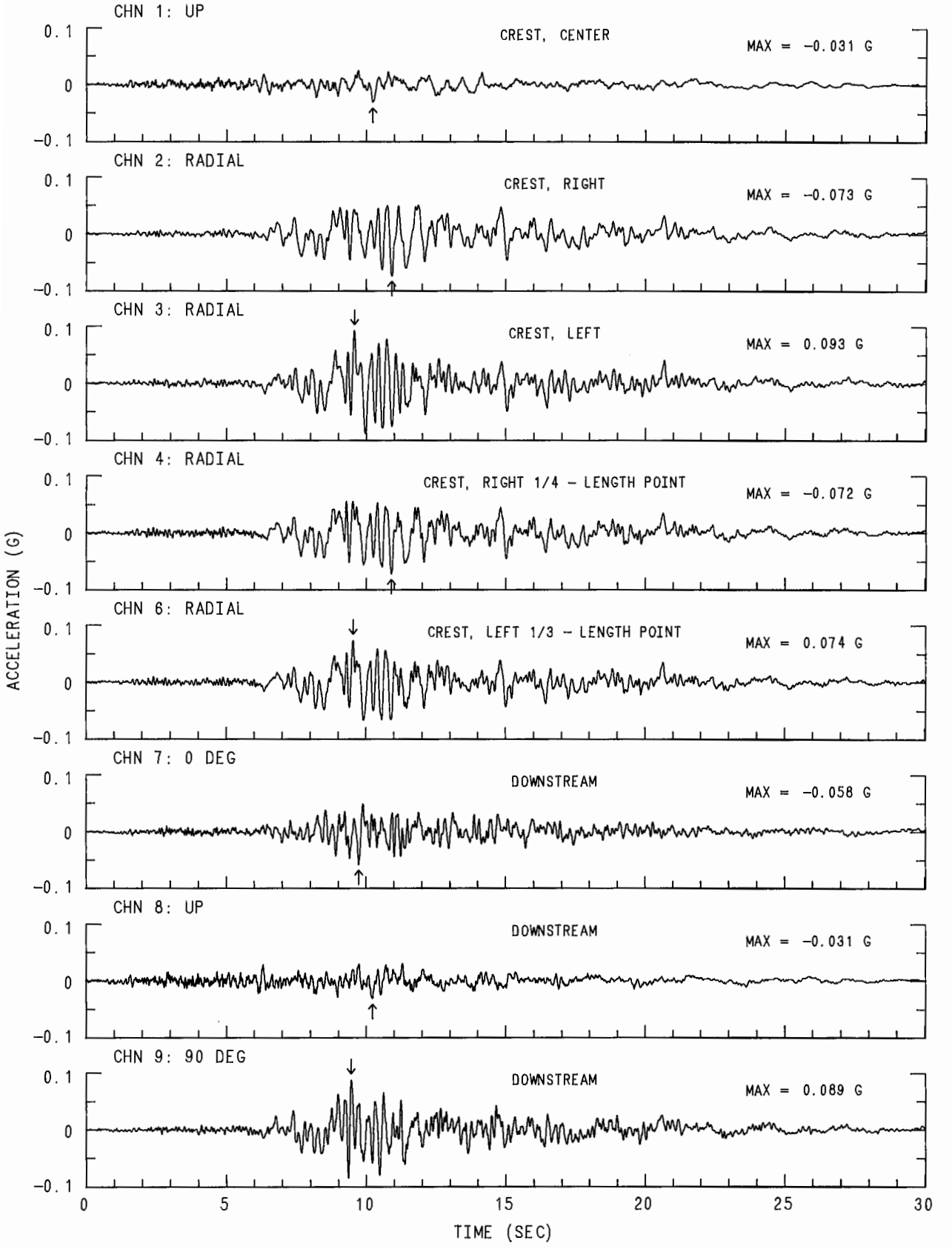
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 57180-S2132-89292.04
USABLE DATA BANDWIDTH: 0.08 TO 23.6 HZ (0.04 TO 11.8 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 1 ACCELERATION. RECORD ID: 58233-C0143-89293.01

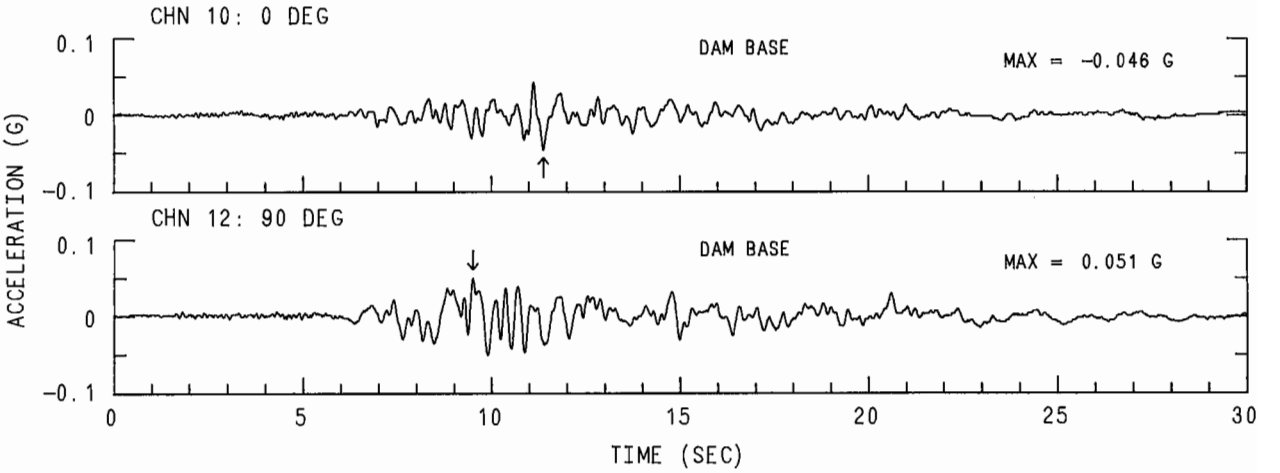


* The two recorders are not interconnected to begin recording simultaneously.
(Trigger times are within 0.1 sec of each other)

SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

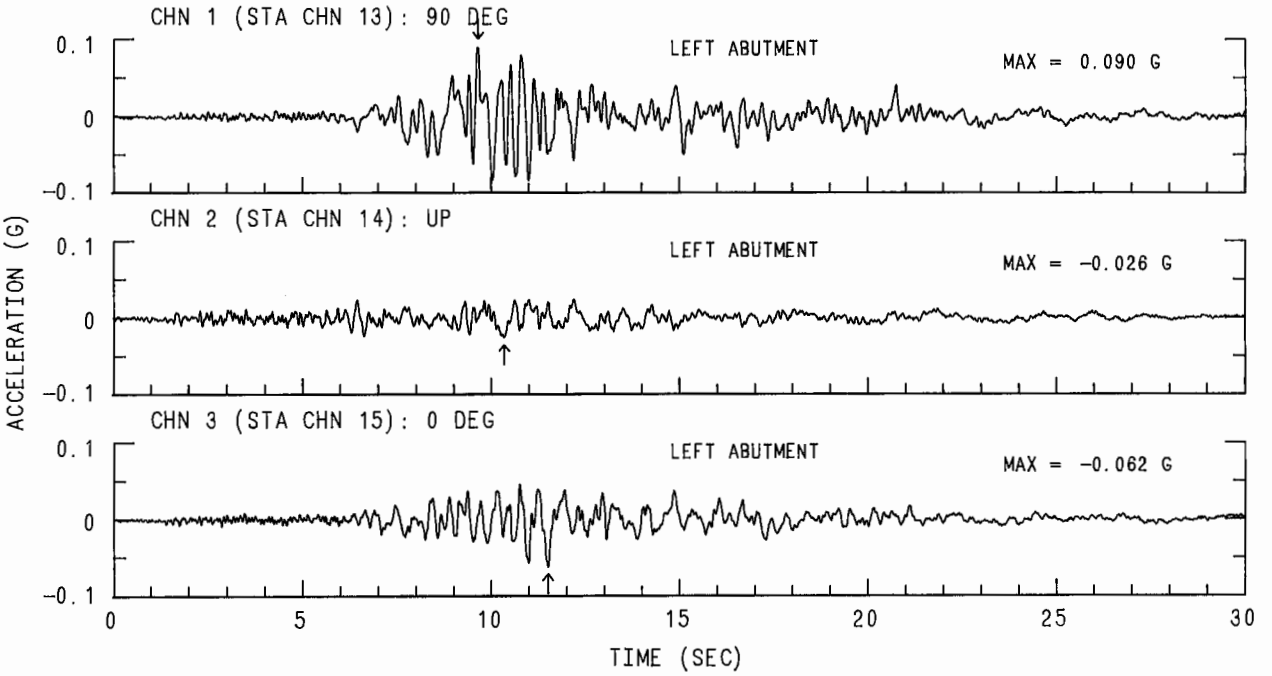
PHASE 1 ACCELERATION. RECORD ID: 58233-C0143-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

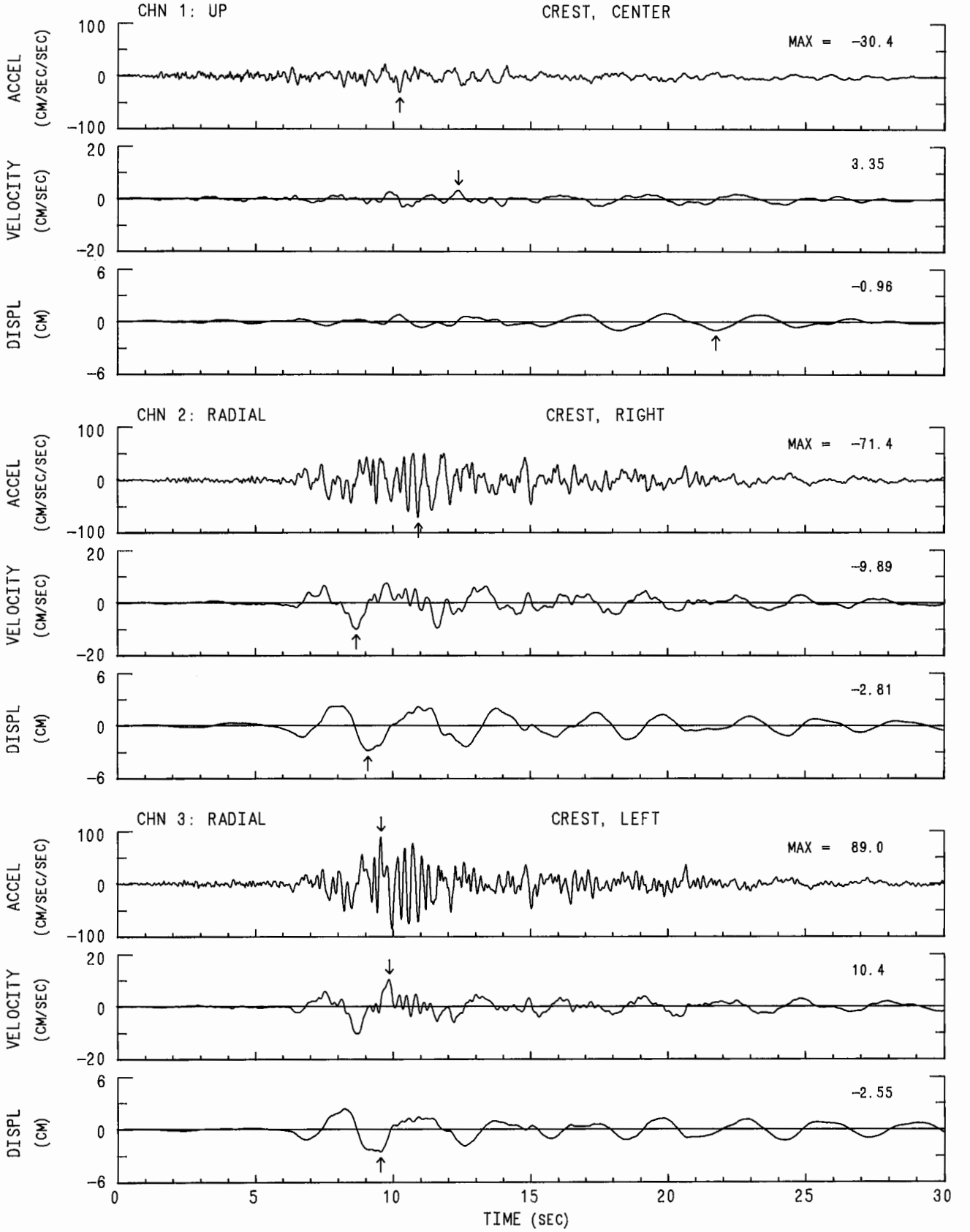
PHASE 1 ACCELERATION. RECORD ID: 58233-S1686-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

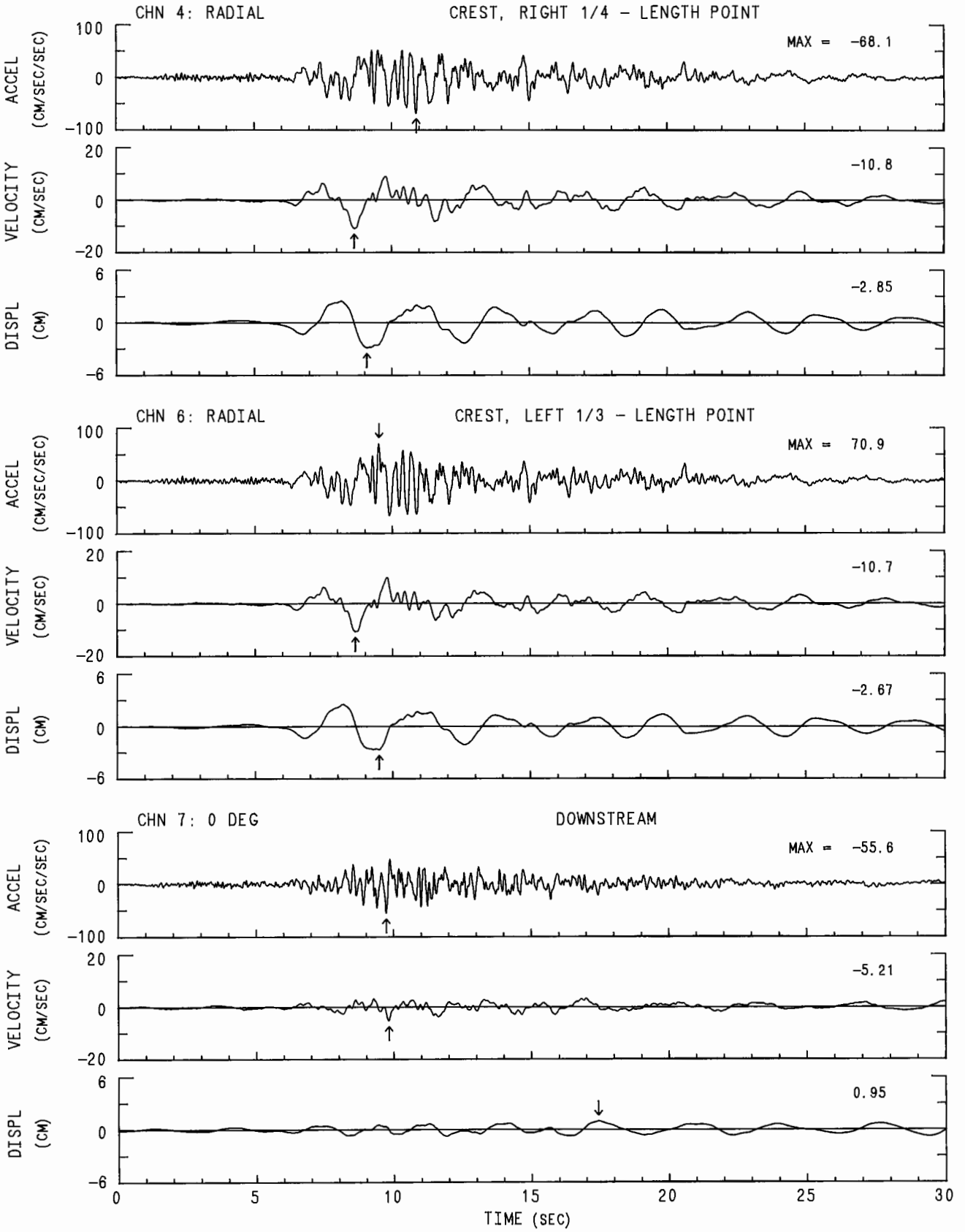
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58233-C0143-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

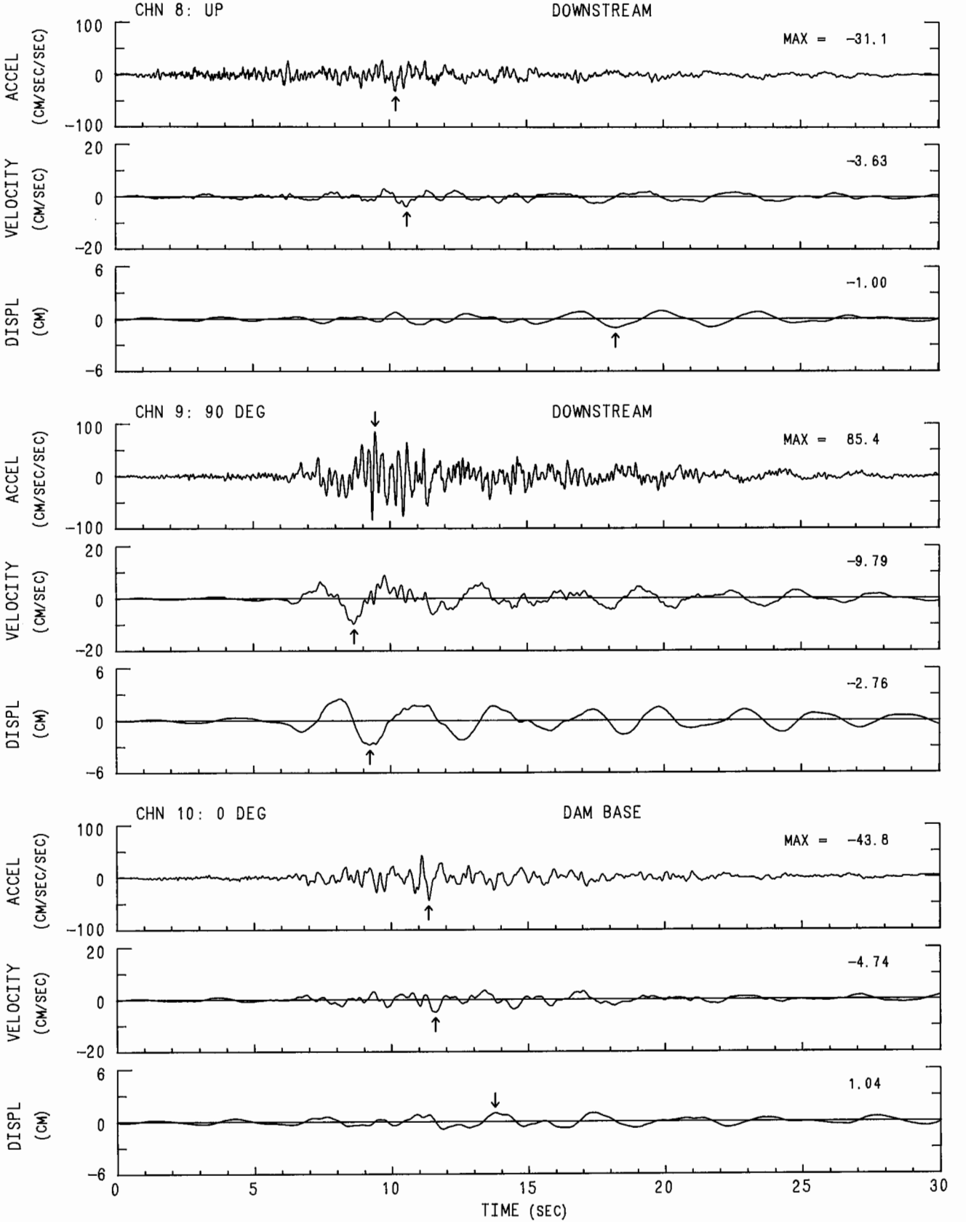
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58233-C0143-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

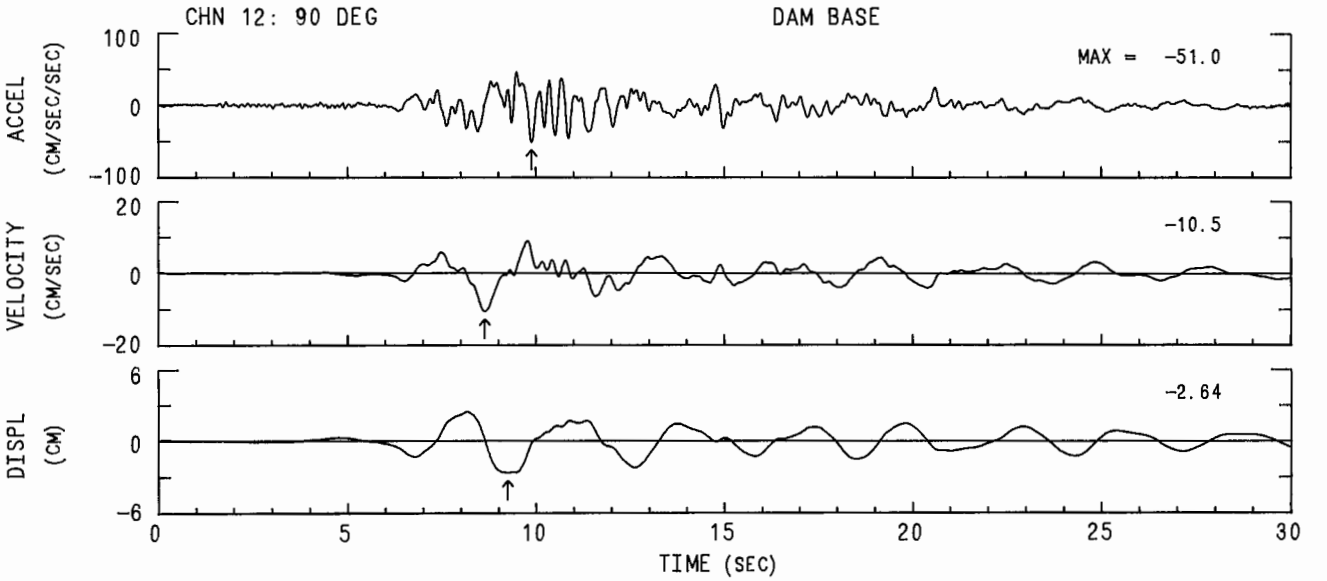
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58233-C0143-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

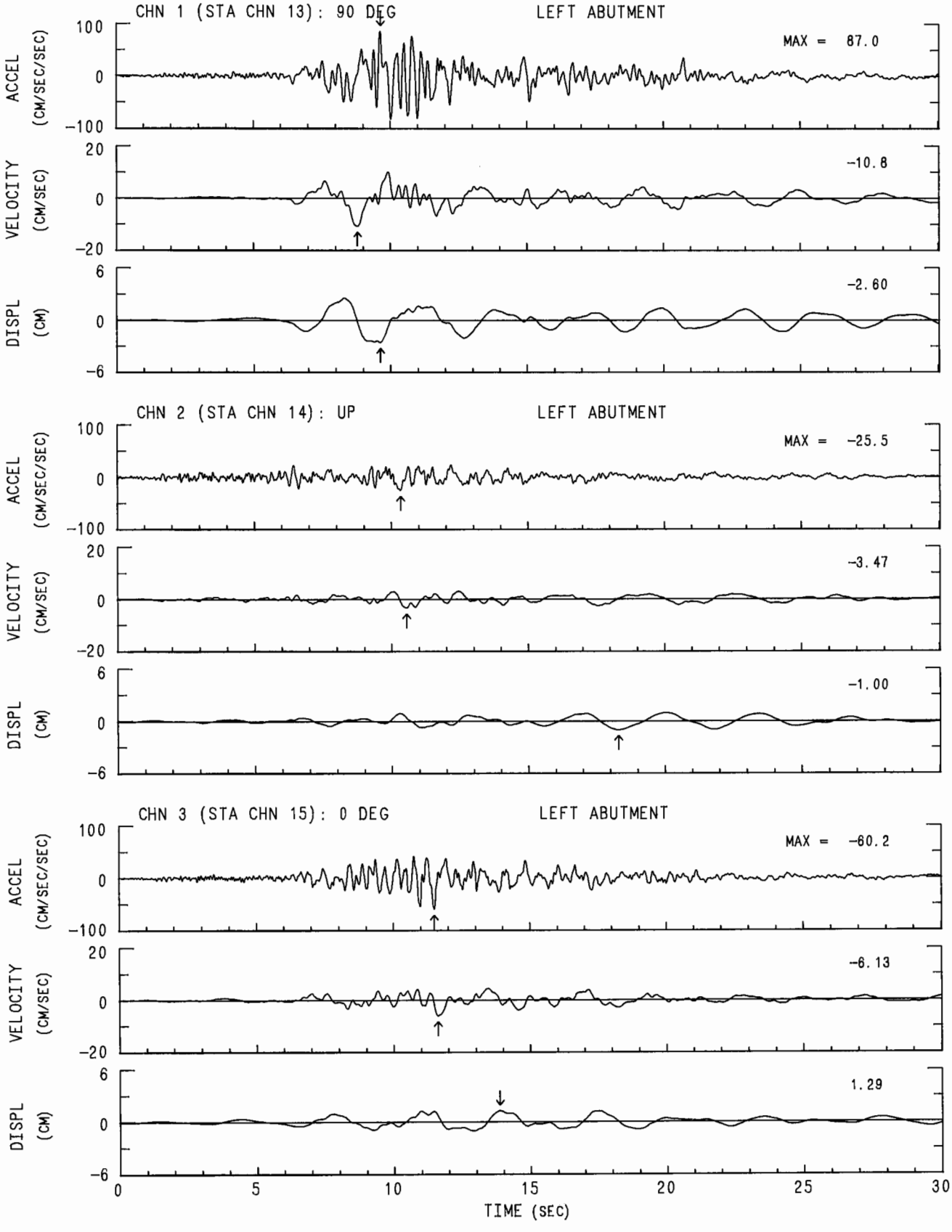
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58233-C0143-89293.01



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC) RECORD ID: 58233-S1686-89293.01



LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

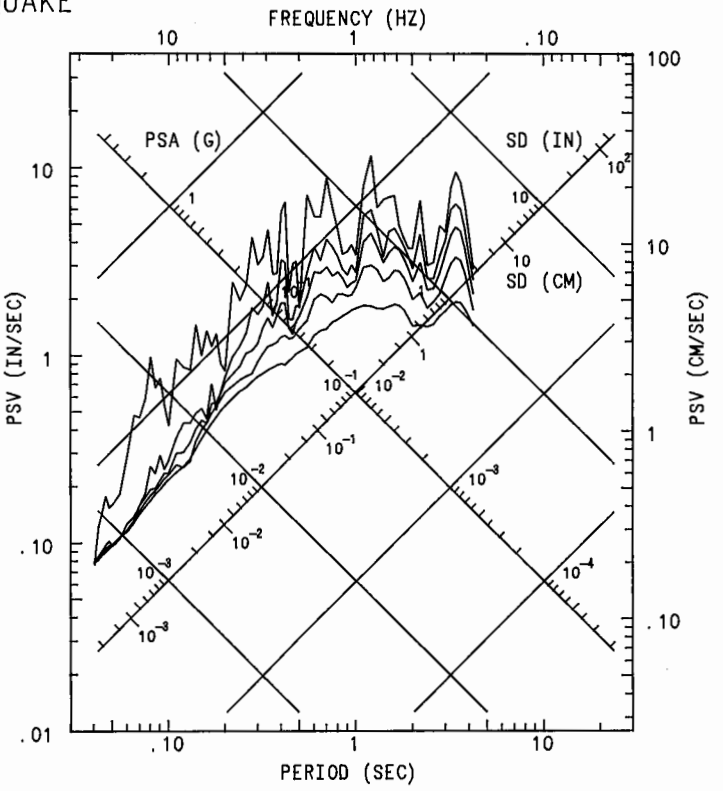
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

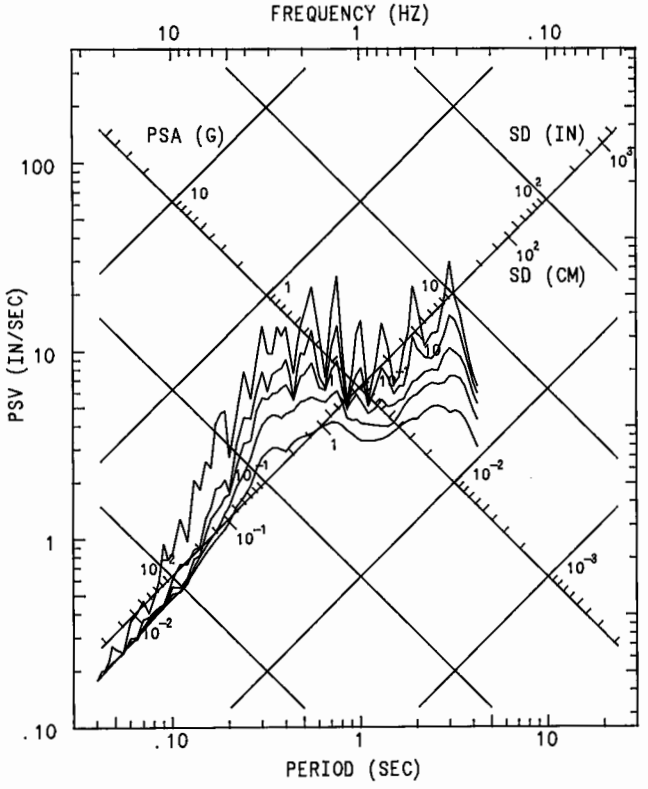
RECORD ID: 58233-C0143-89293.01

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

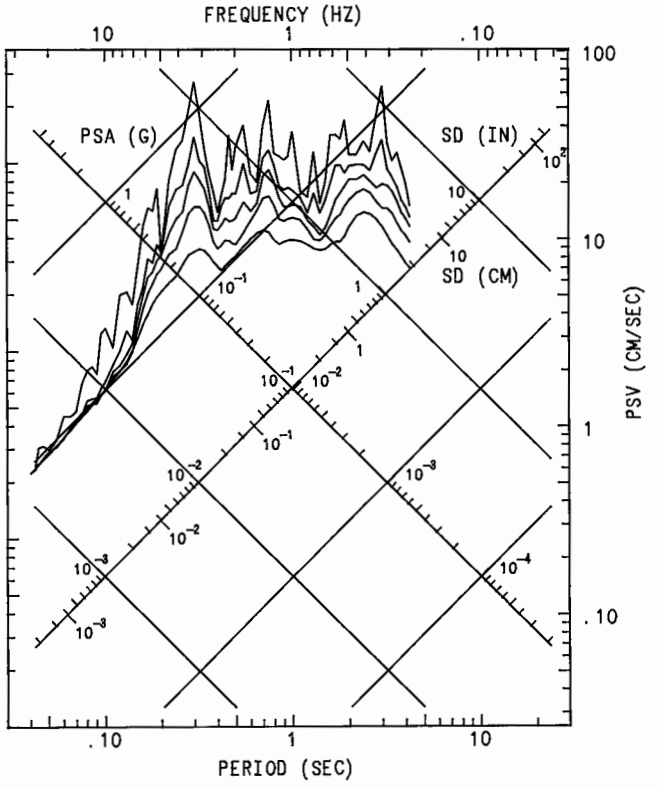
CHN 1: UP
CREST, CENTER



CHN 2: RADIAL
CREST, RIGHT



CHN 3: RADIAL
CREST, LEFT



LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

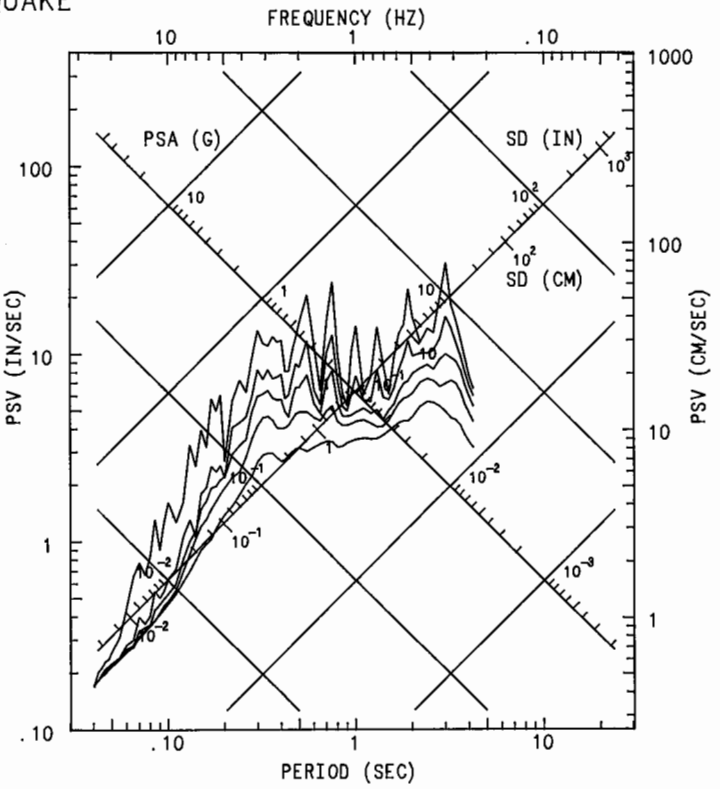
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

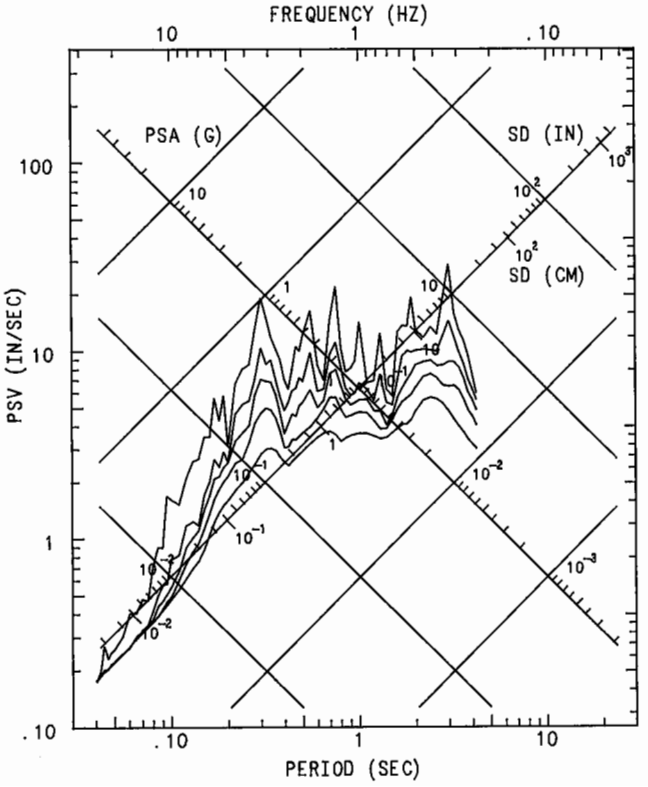
RECORD ID: 58233-C0143-89293.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

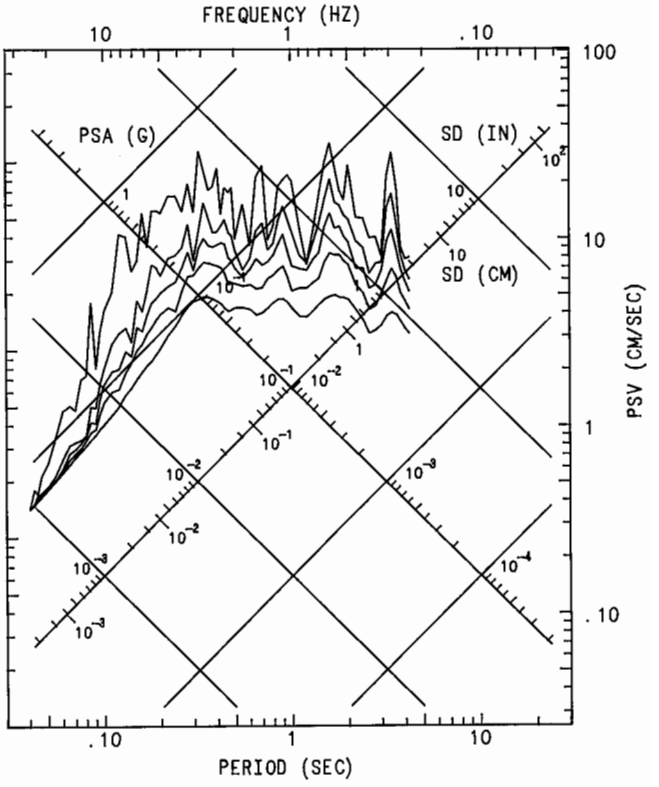
CHN 4: RADIAL
CREST, RIGHT 1/4 - LENGTH POINT



CHN 6: RADIAL
CREST, LEFT 1/3 - LENGTH POINT



CHN 7: 0 DEG
DOWNSTREAM



LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

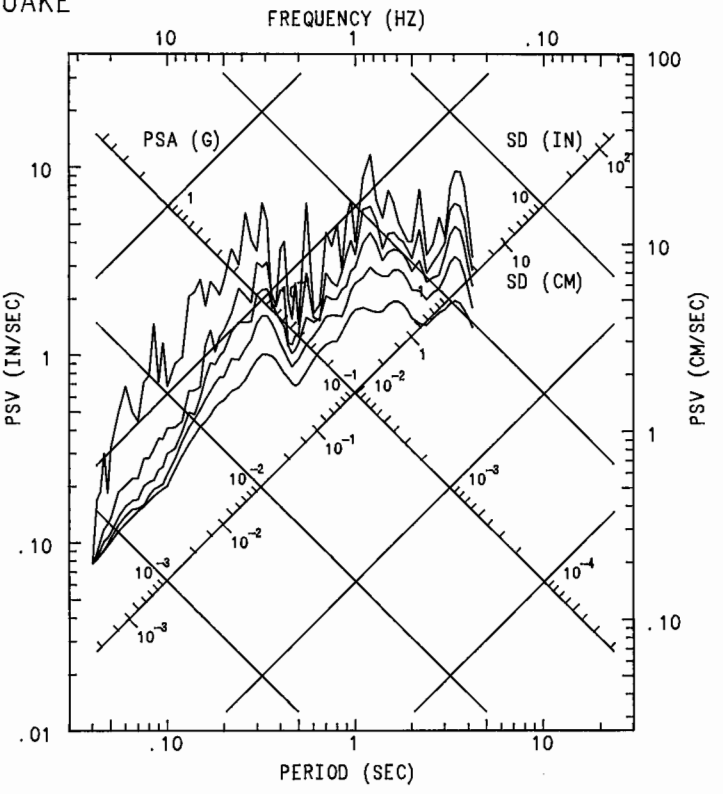
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

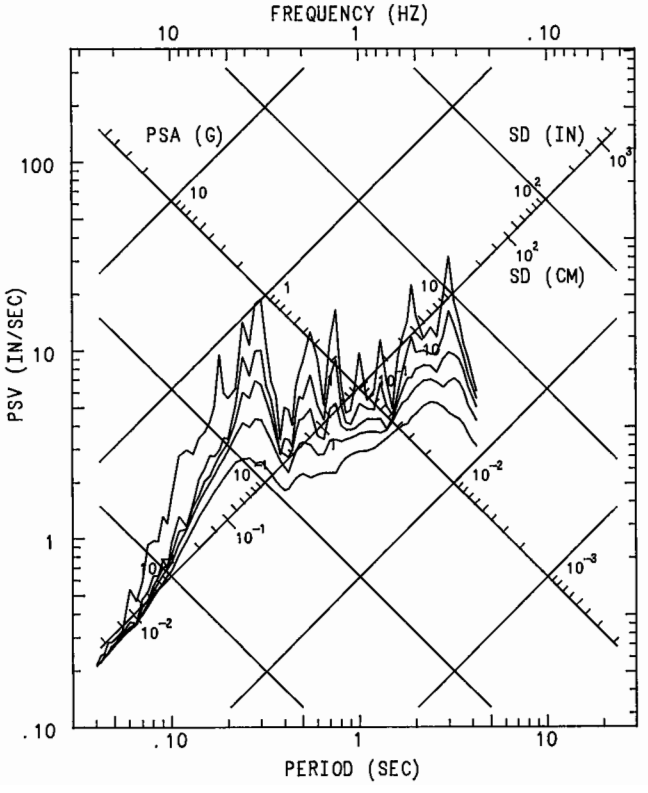
RECORD ID: 58233-C0143-89293.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

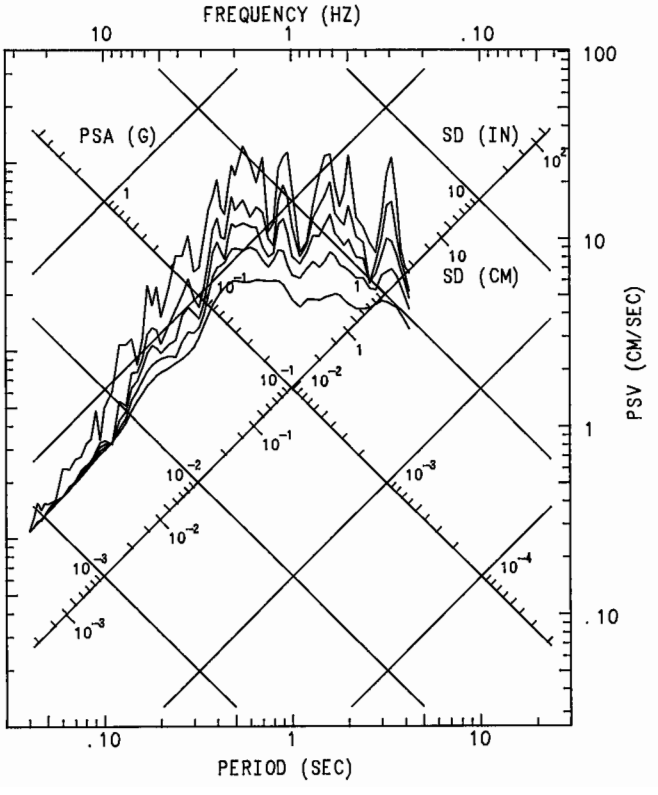
CHN 8: UP
DOWNSTREAM



CHN 9: 90 DEG
DOWNSTREAM



CHN 10: 0 DEG
DAM BASE



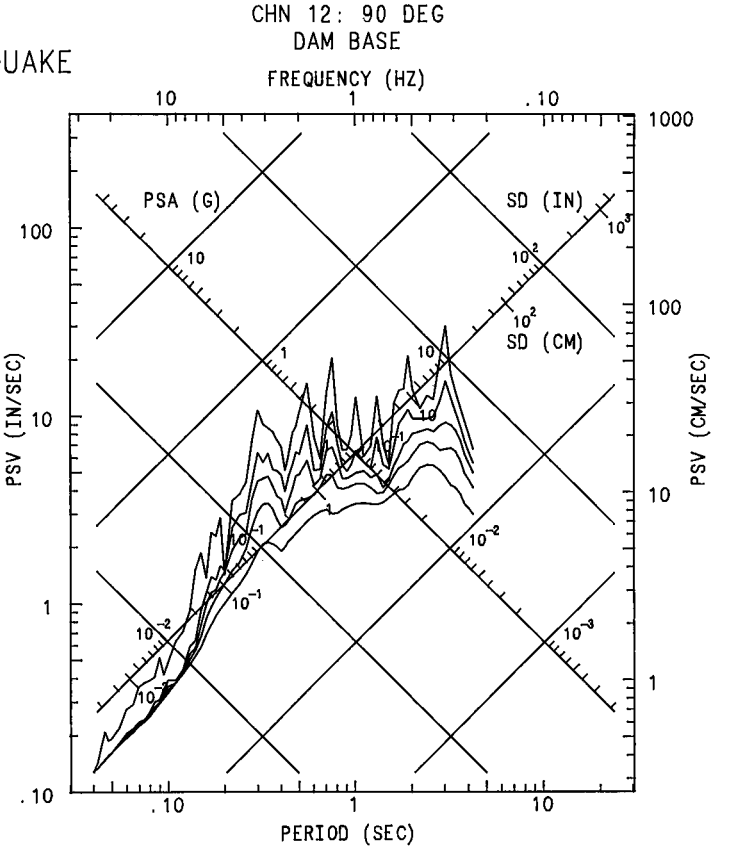
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

RECORD ID: 58233-C0143-89293.01

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%



LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

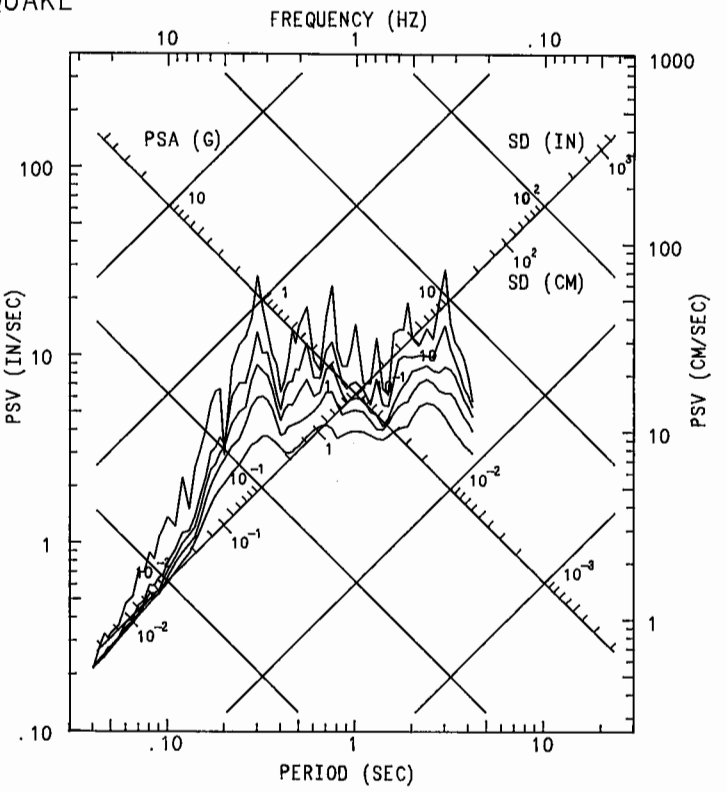
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ
(0.04 TO 3.92 SEC)

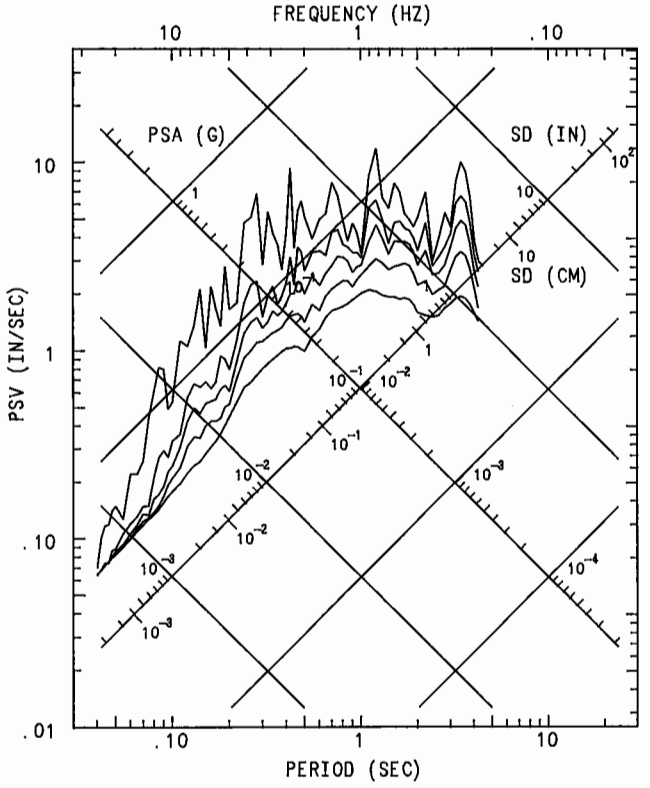
RECORD ID: 58233-S1686-89293.01

RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

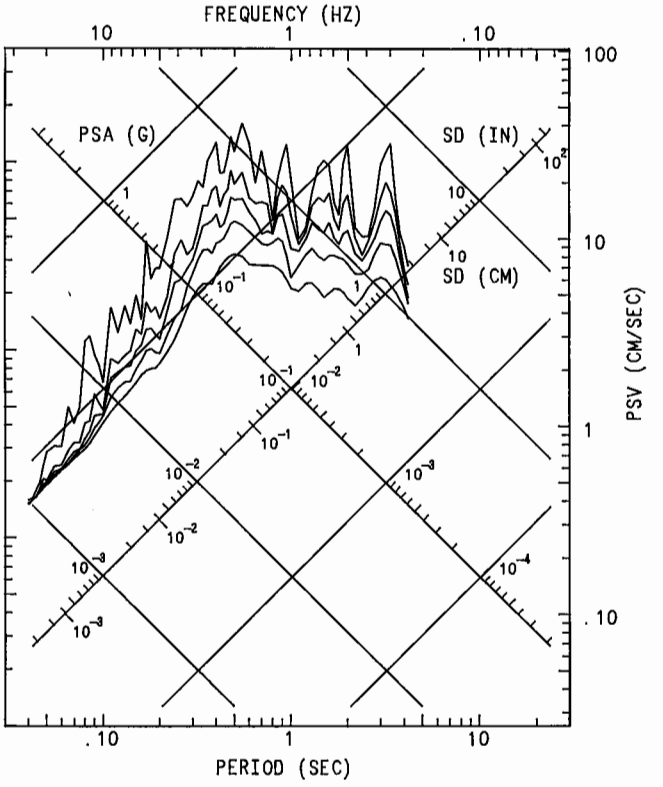
CHN 1 (STA CHN 13): 90 DEG
LEFT ABUTMENT



CHN 2 (STA CHN 14): UP
LEFT ABUTMENT

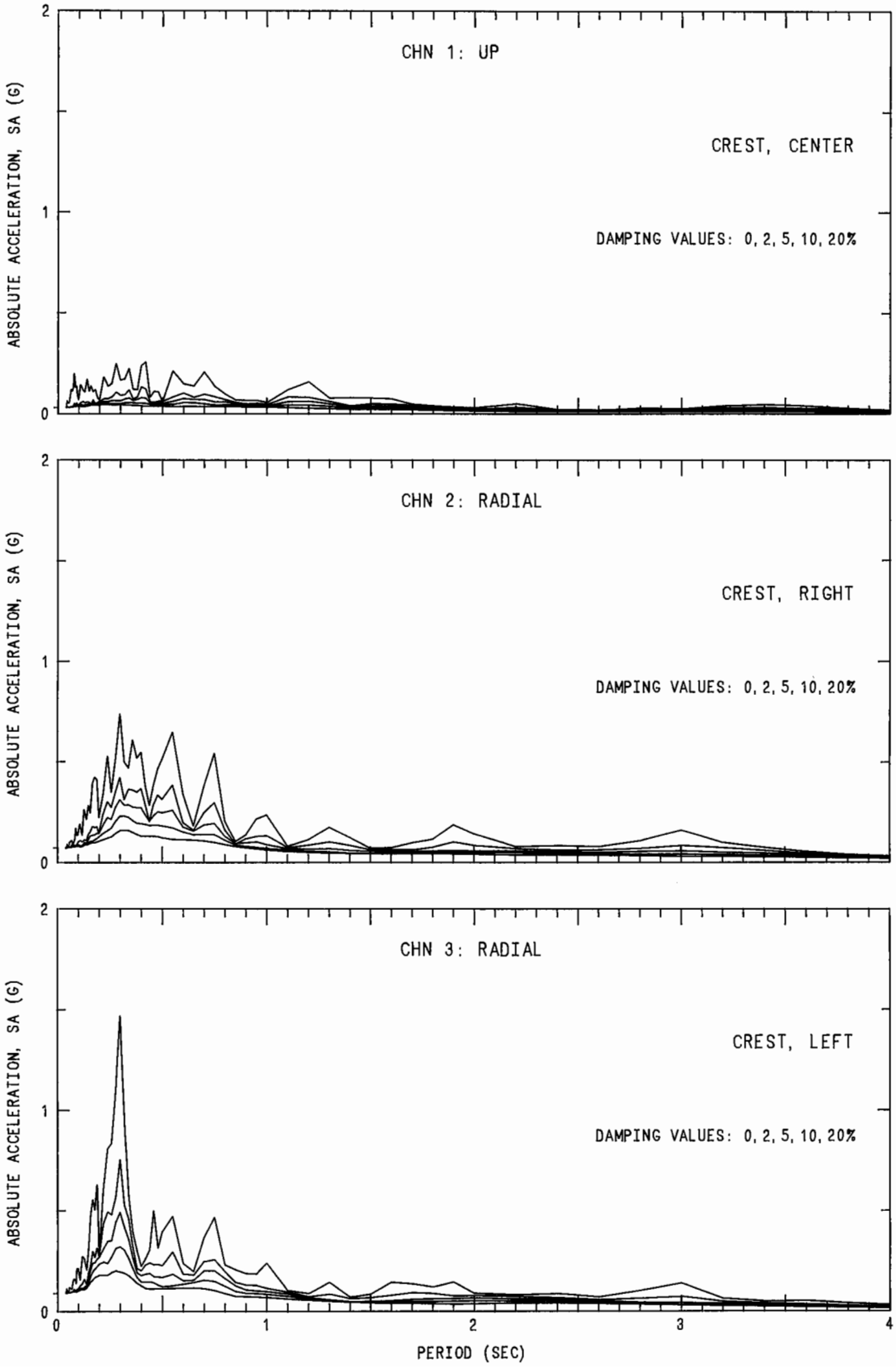


CHN 3 (STA CHN 15): 0 DEG
LEFT ABUTMENT



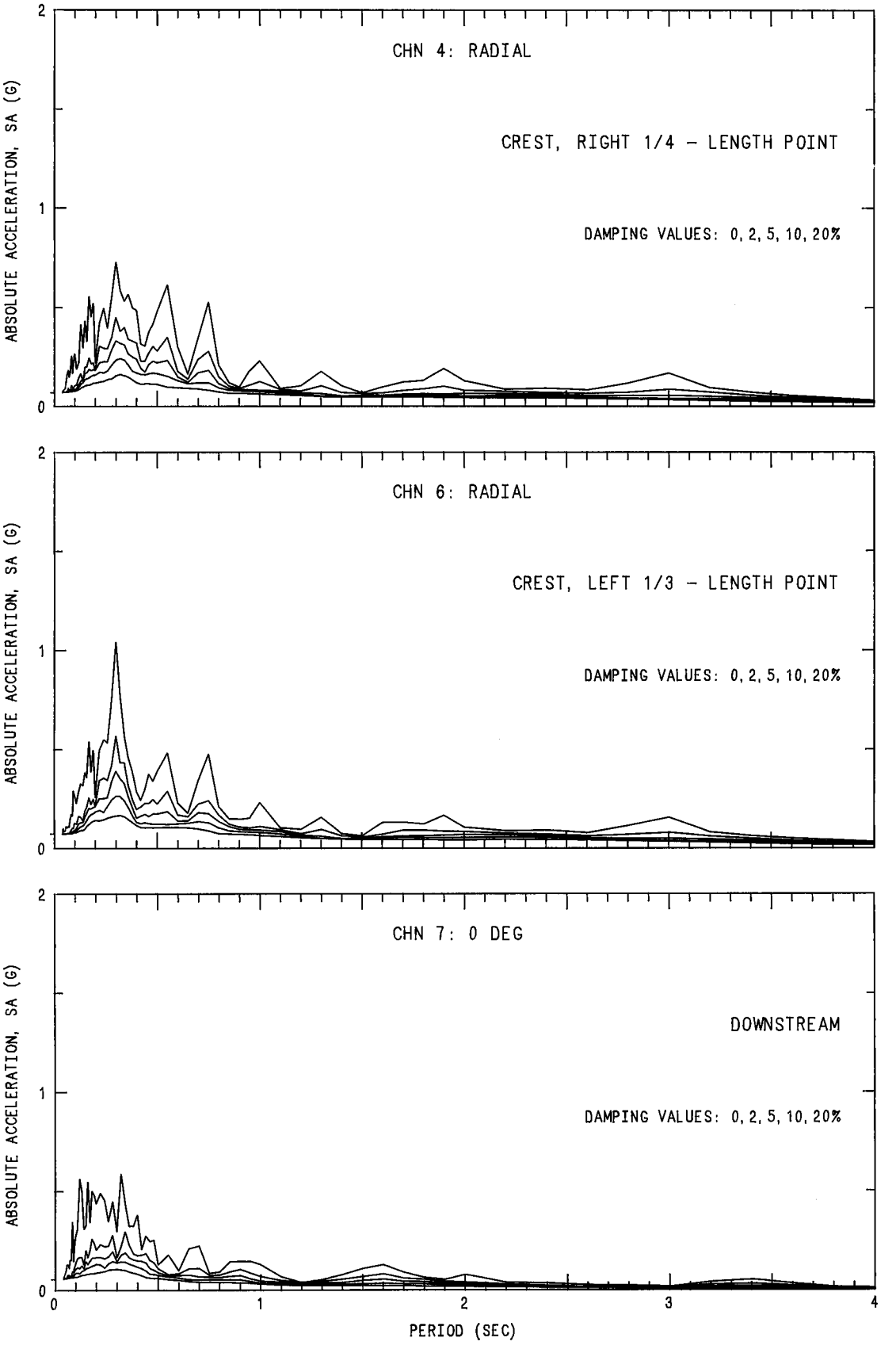
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58233-C0143-89293.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



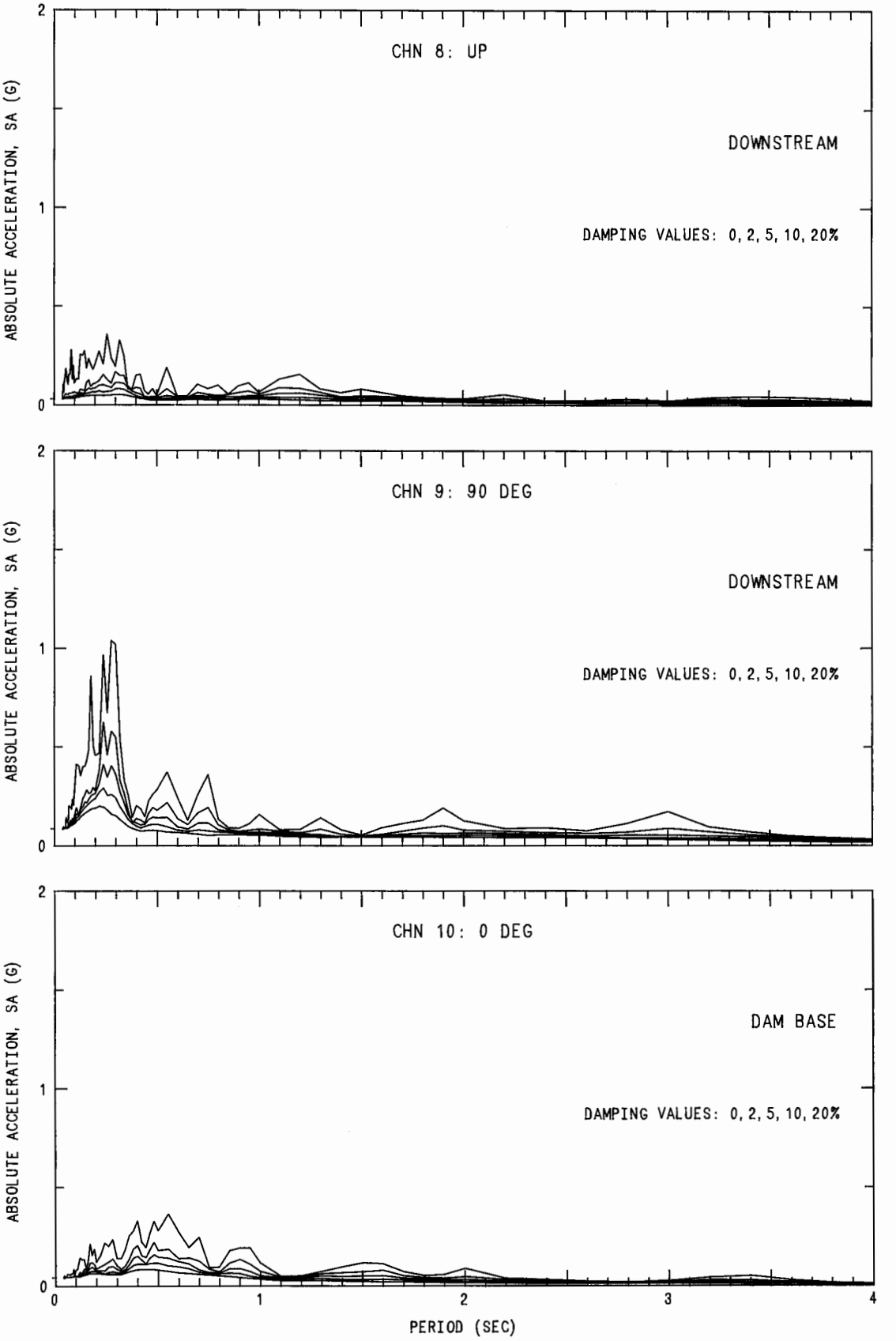
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58233-C0143-89293.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



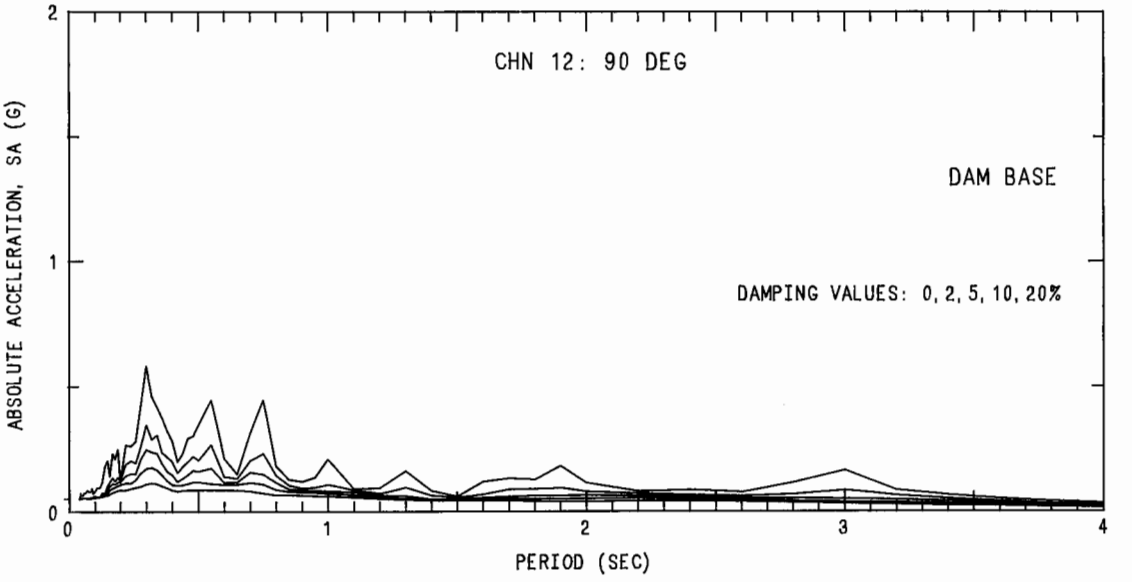
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58233-C0143-89293.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



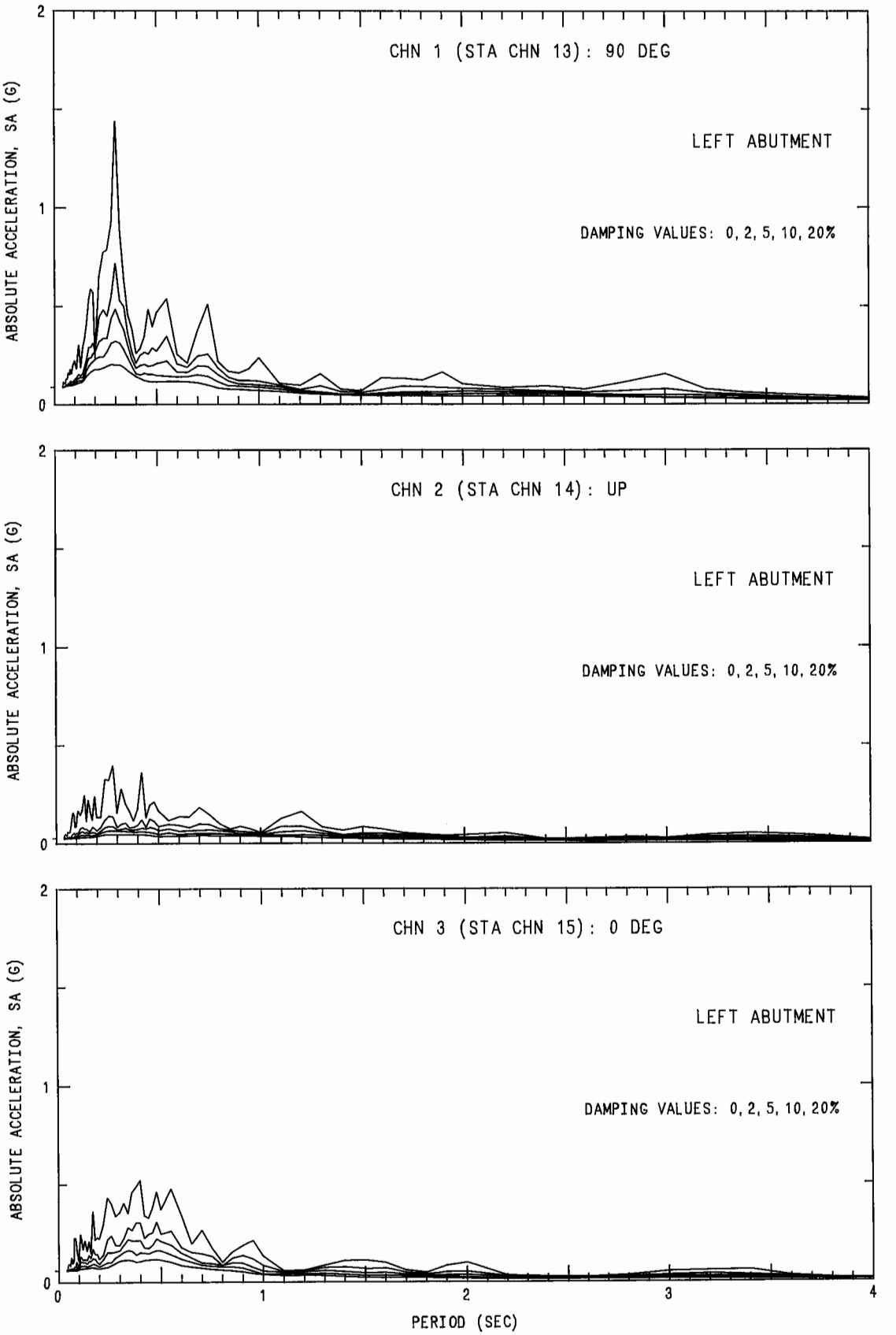
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58233-C0143-89293.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
LOWER CRYSTAL SPRINGS DAM: CSMIP S/N 233

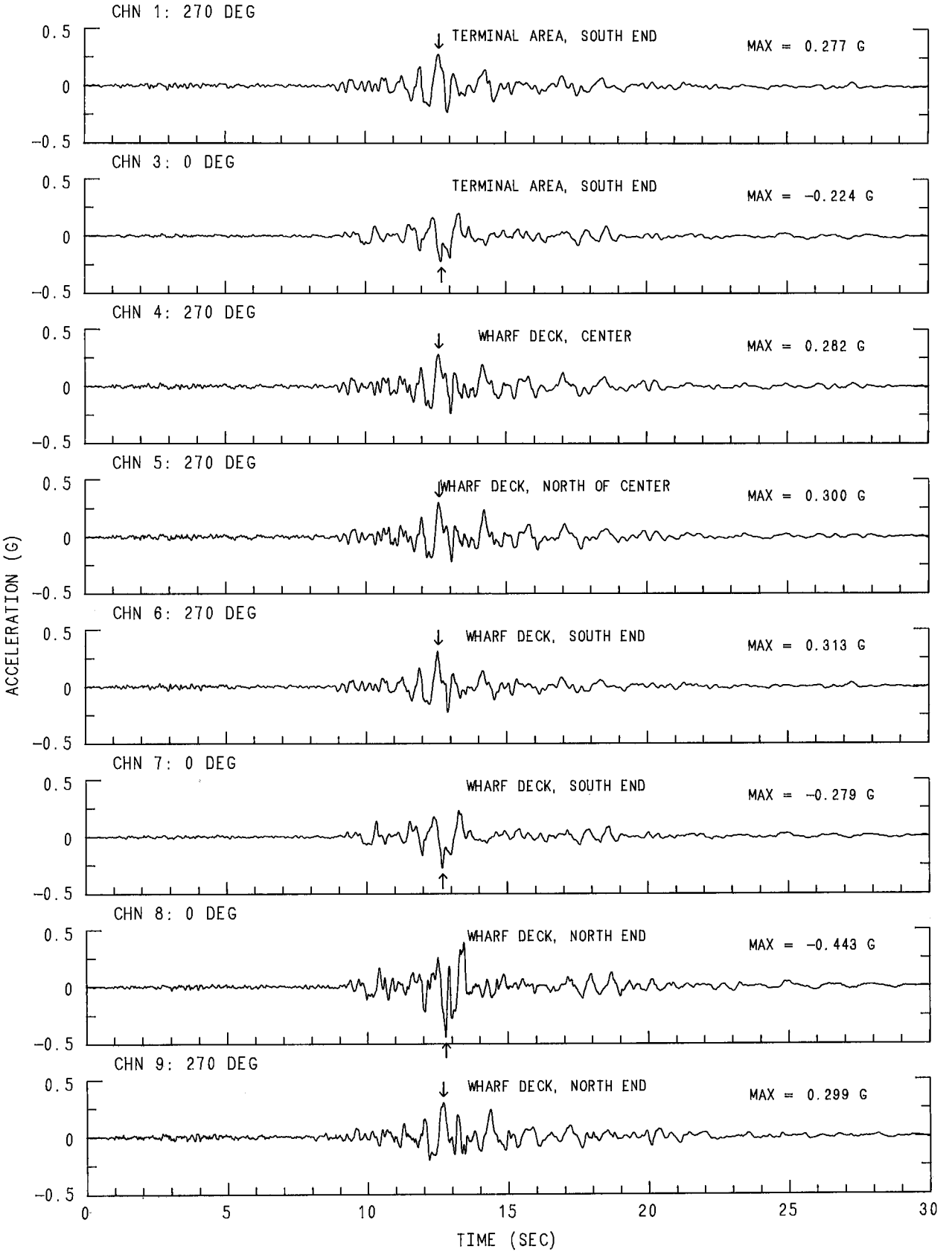
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58233-S1686-89293.01
USABLE DATA BANDWIDTH: 0.25 TO 23.6 HZ (0.04 TO 3.92 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

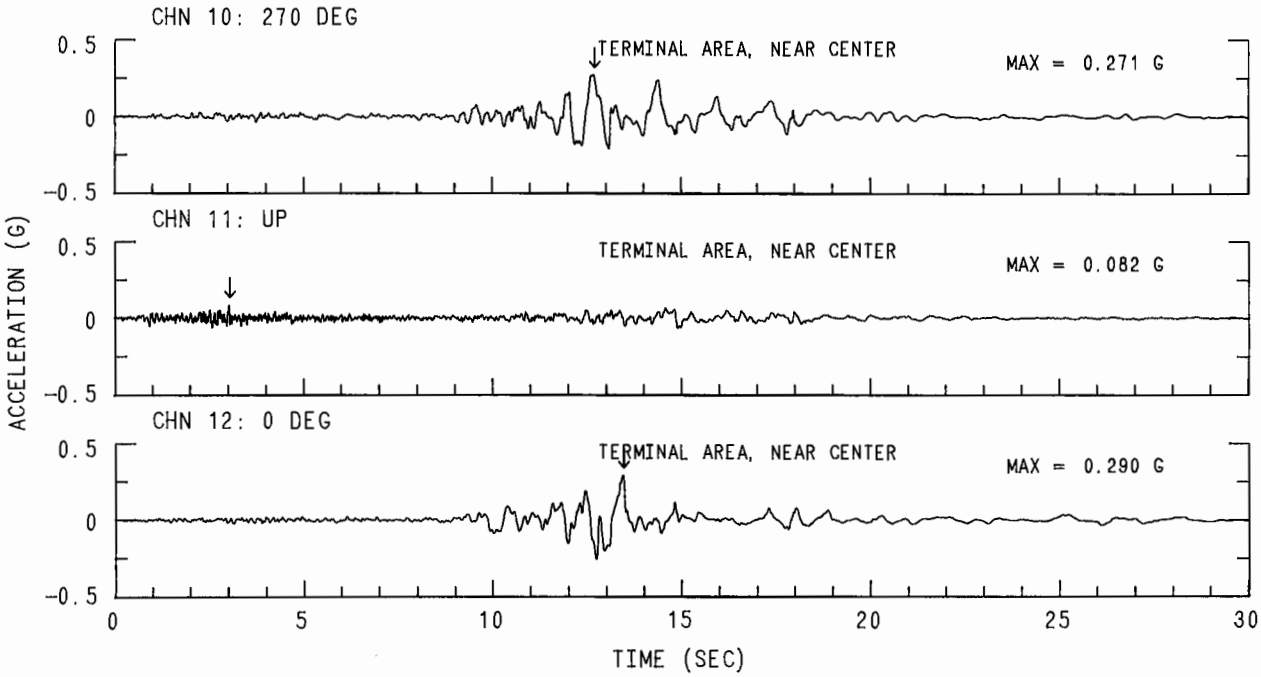
PHASE 1 ACCELERATION. RECORD ID: 58472-C0221-89293.05



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT

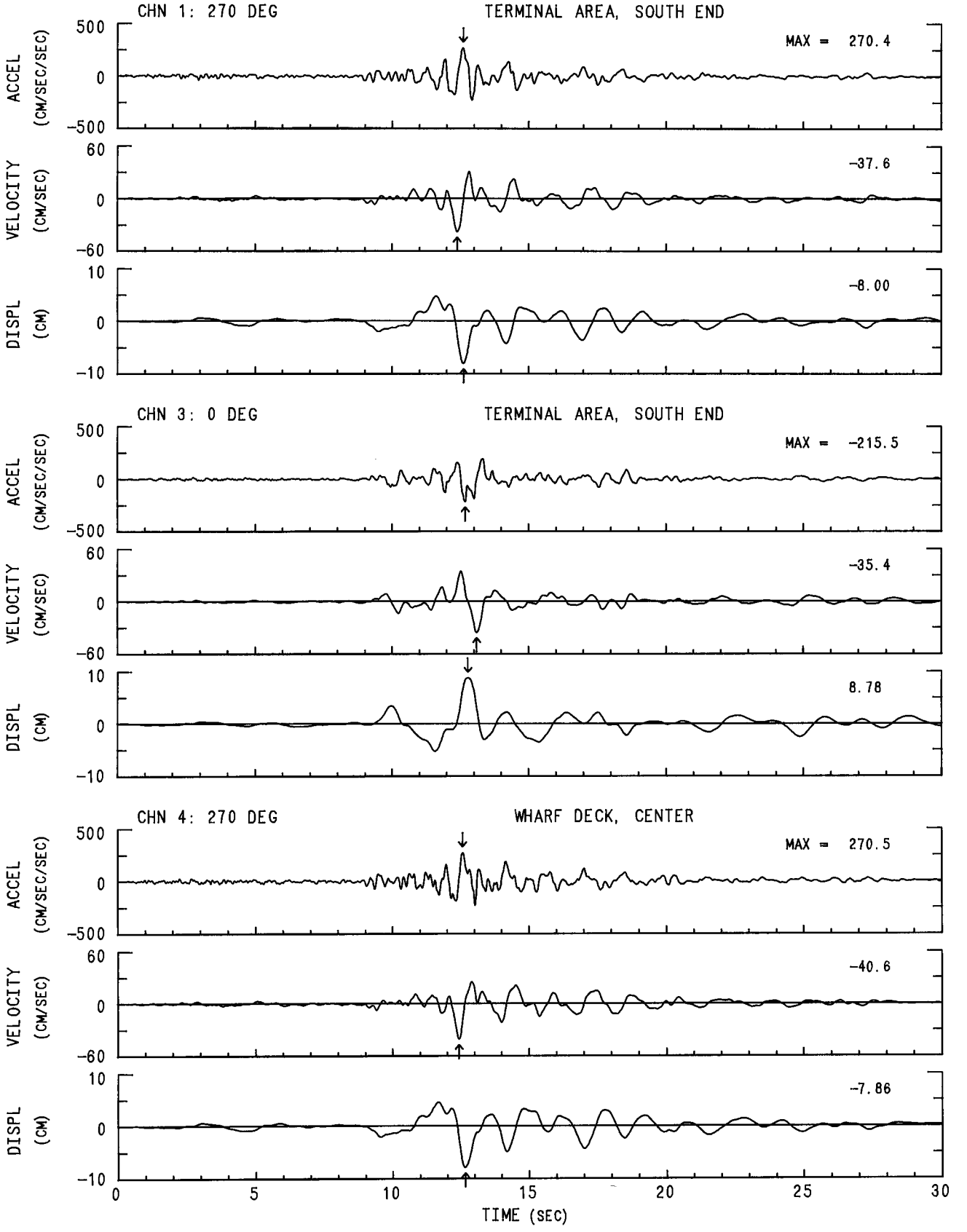
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 1 ACCELERATION. RECORD ID: 58472-C0221-89293.05



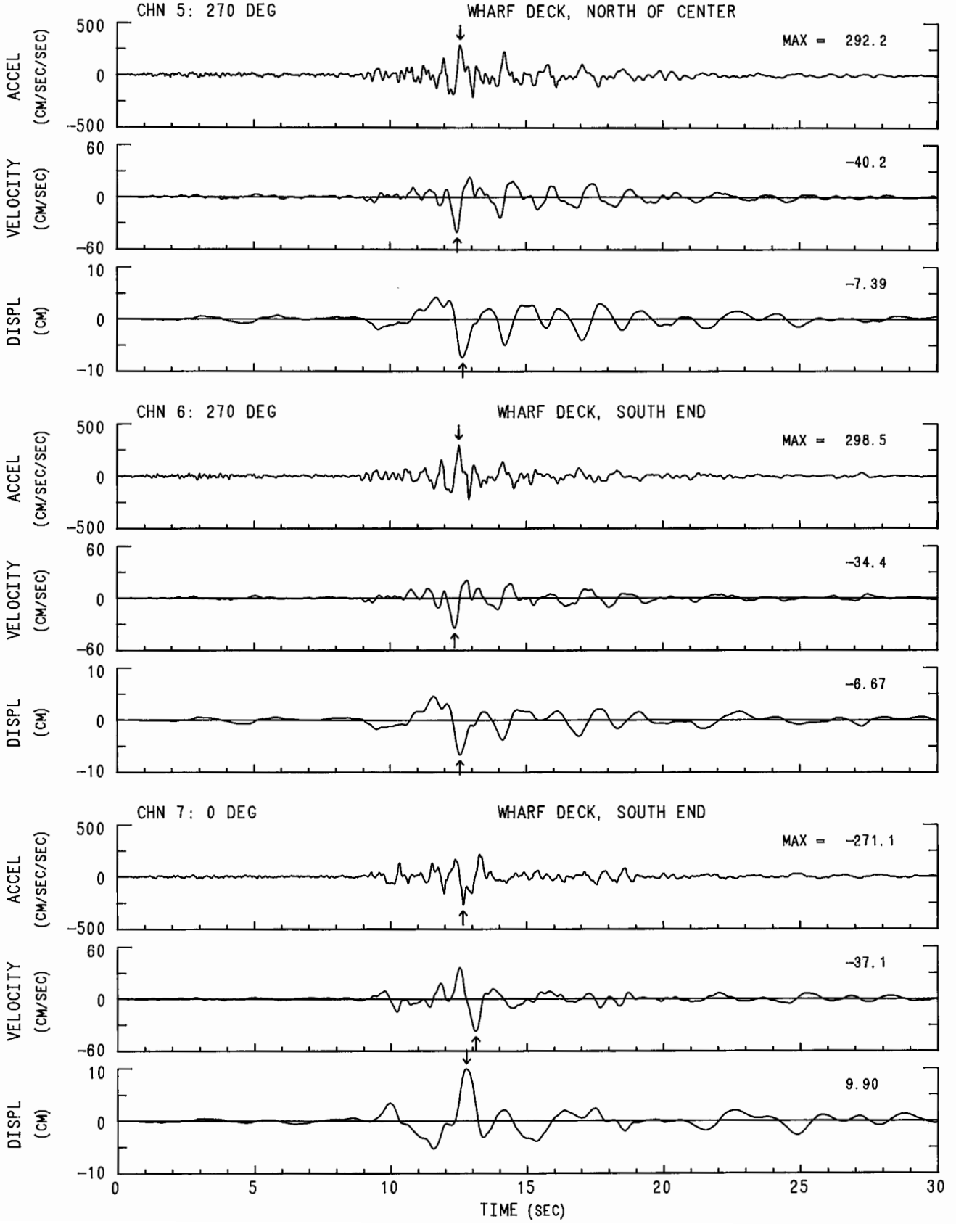
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58472-C0221-89293.05



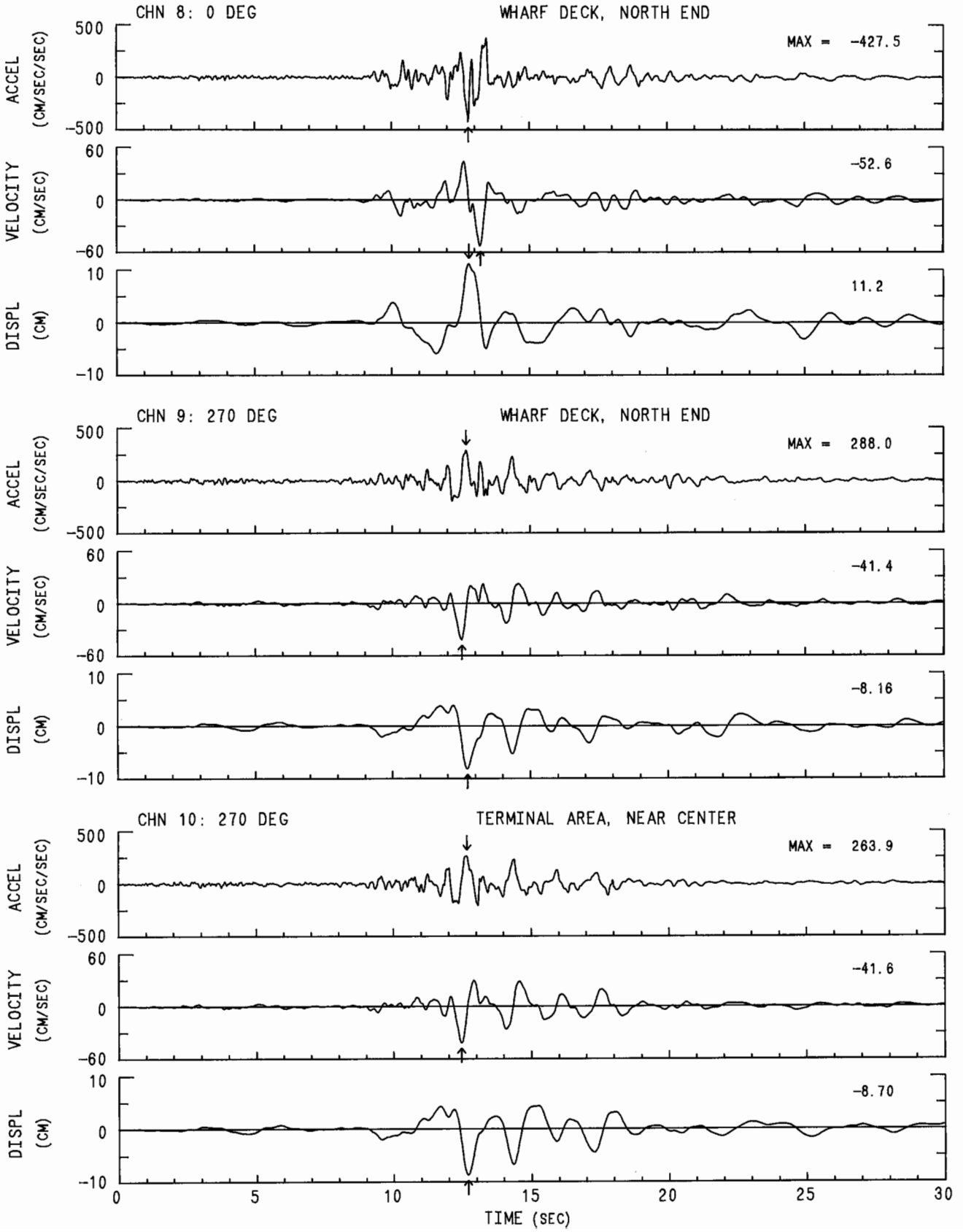
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58472-C0221-89293.05



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

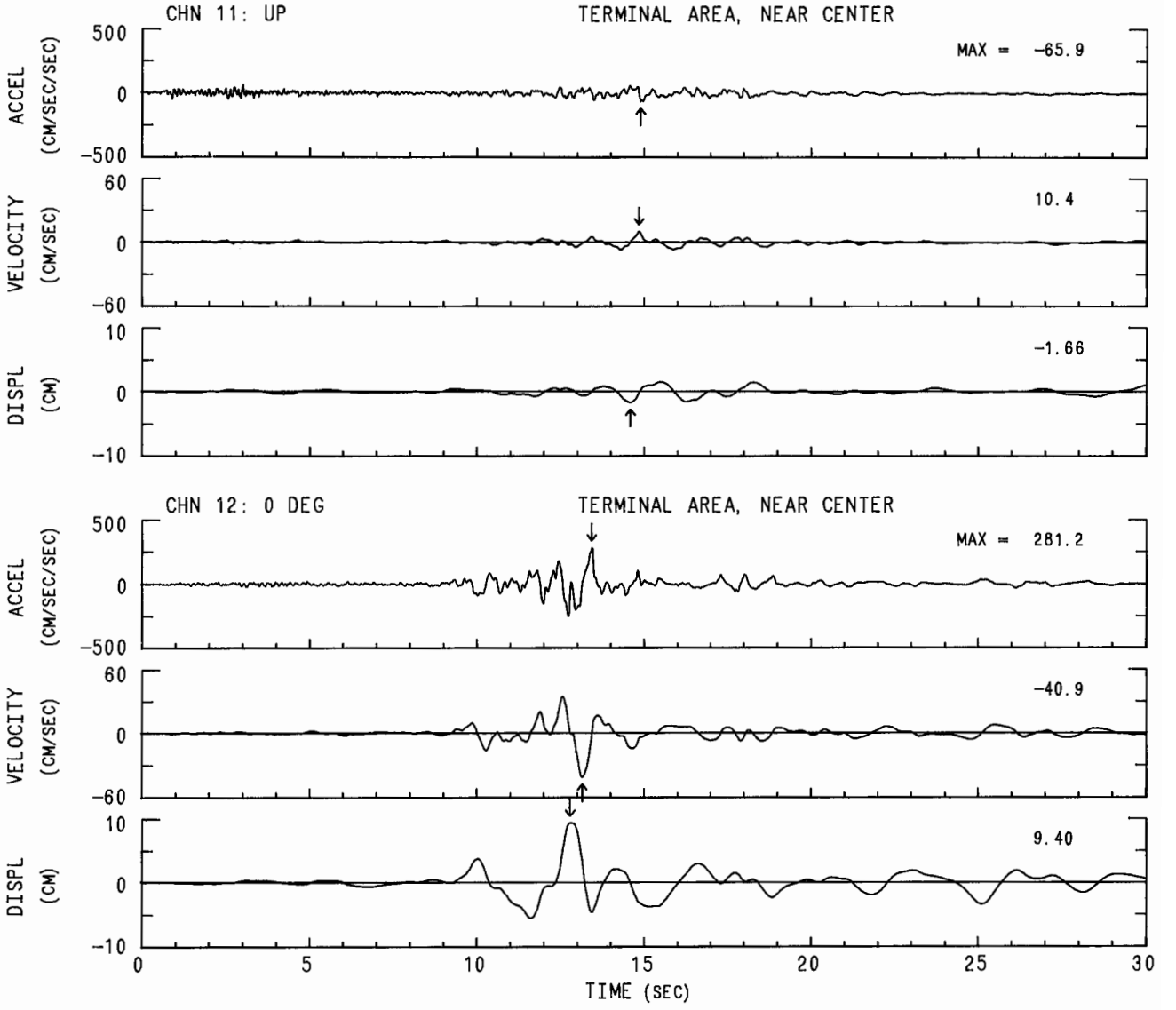
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58472-C0221-89293.05



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC) RECORD ID: 58472-C0221-89293.05



OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

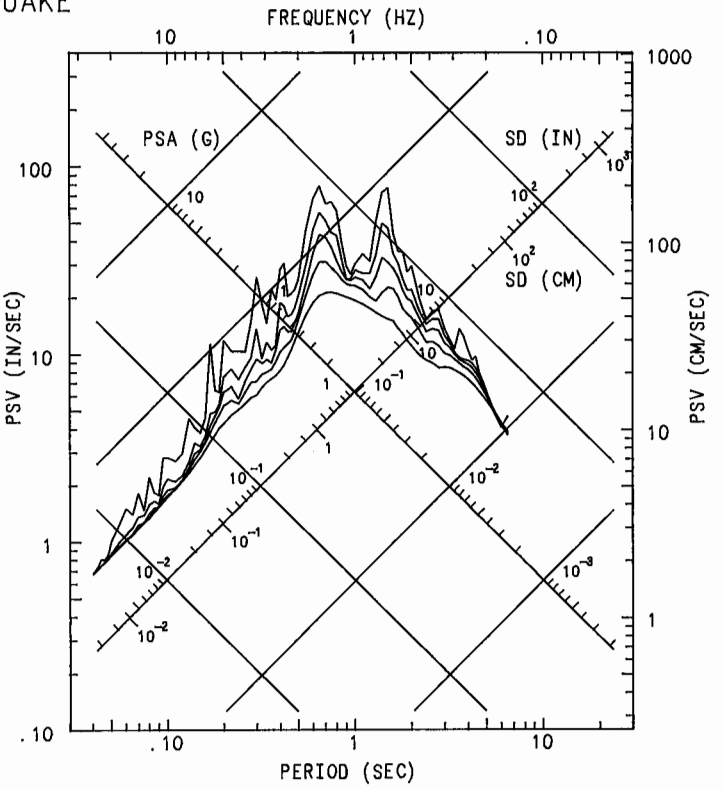
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

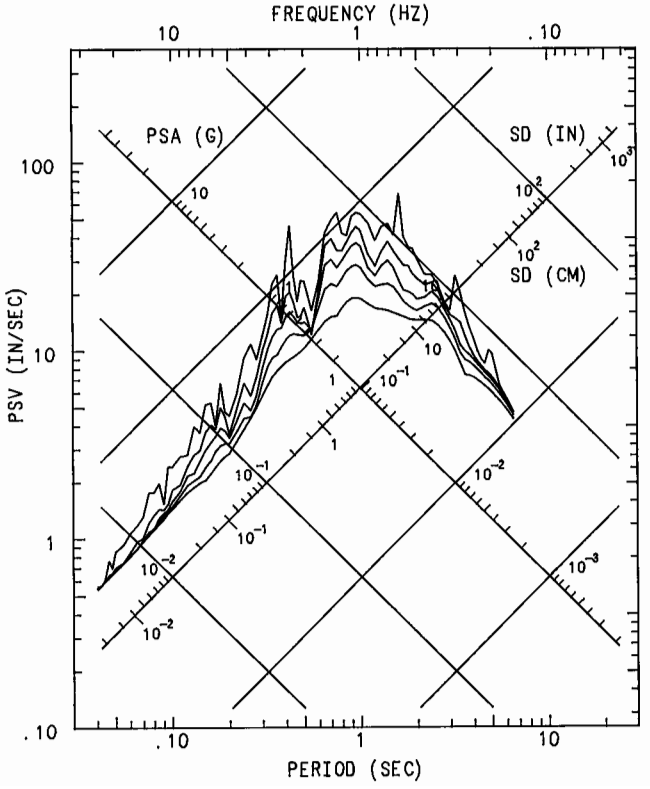
RECORD ID: 58472-C0221-89293.05

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

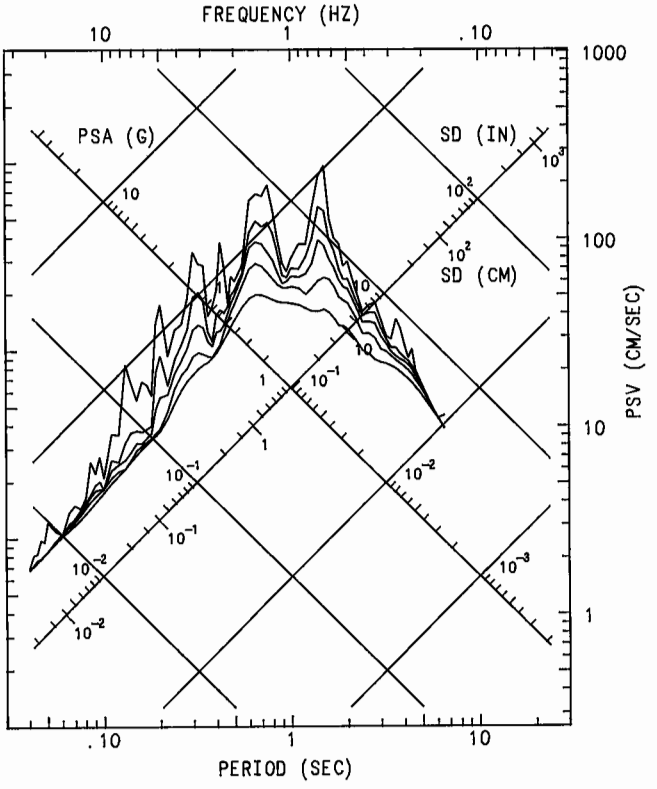
CHN 1: 270 DEG
TERMINAL AREA, SOUTH END



CHN 3: 0 DEG
TERMINAL AREA, SOUTH END



CHN 4: 270 DEG
WHARF DECK, CENTER



OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

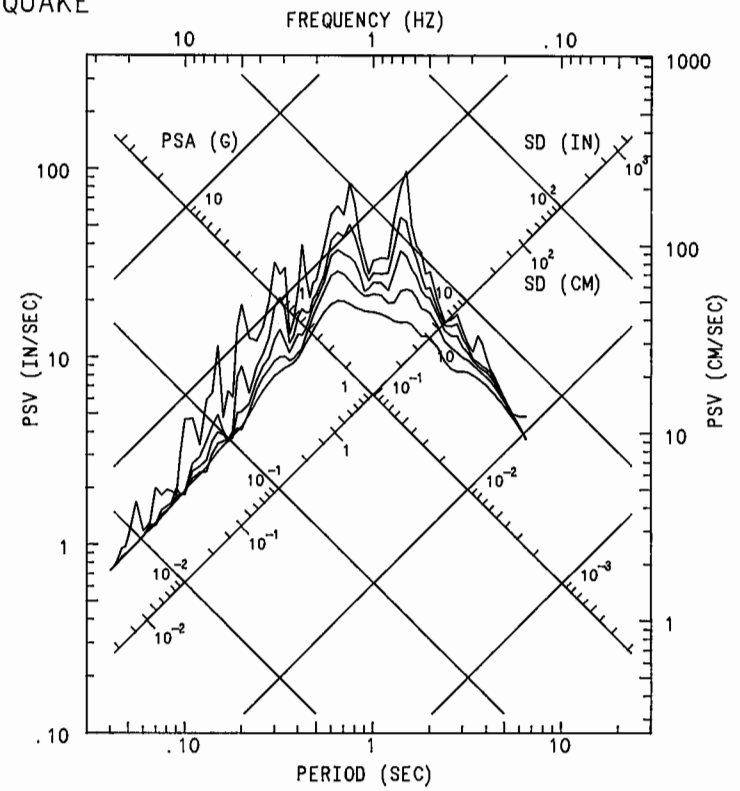
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

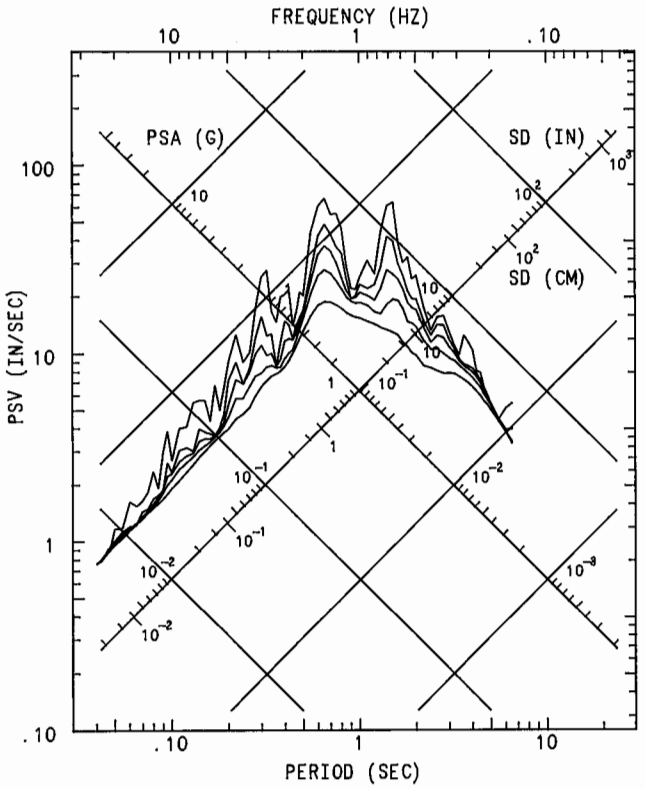
RECORD ID: 58472-C0221-89293.05

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

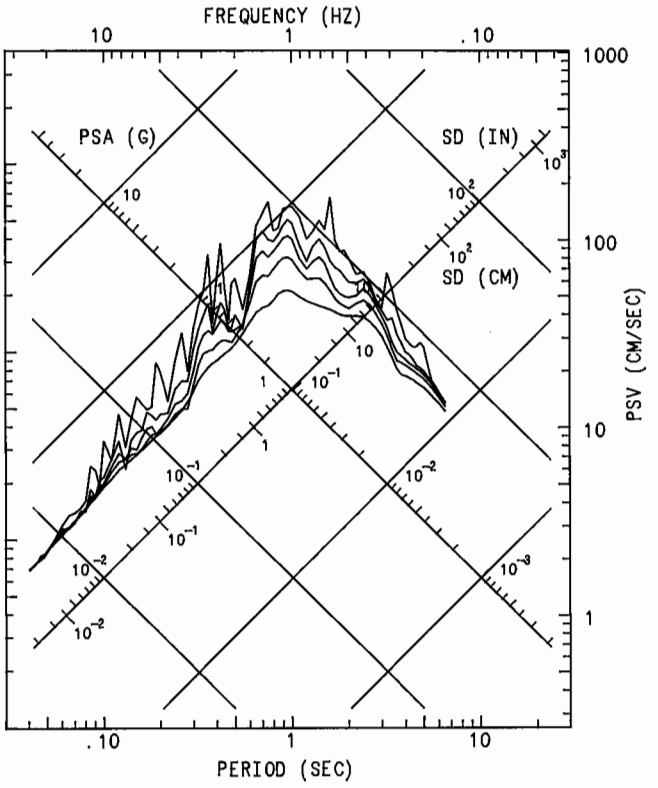
CHN 5: 270 DEG
WHARF DECK, NORTH OF CENTER



CHN 6: 270 DEG
WHARF DECK, SOUTH END



CHN 7: 0 DEG
WHARF DECK, SOUTH END



OAKLAND – OUTER HARBOR WHARF: CSMIP S/N 472

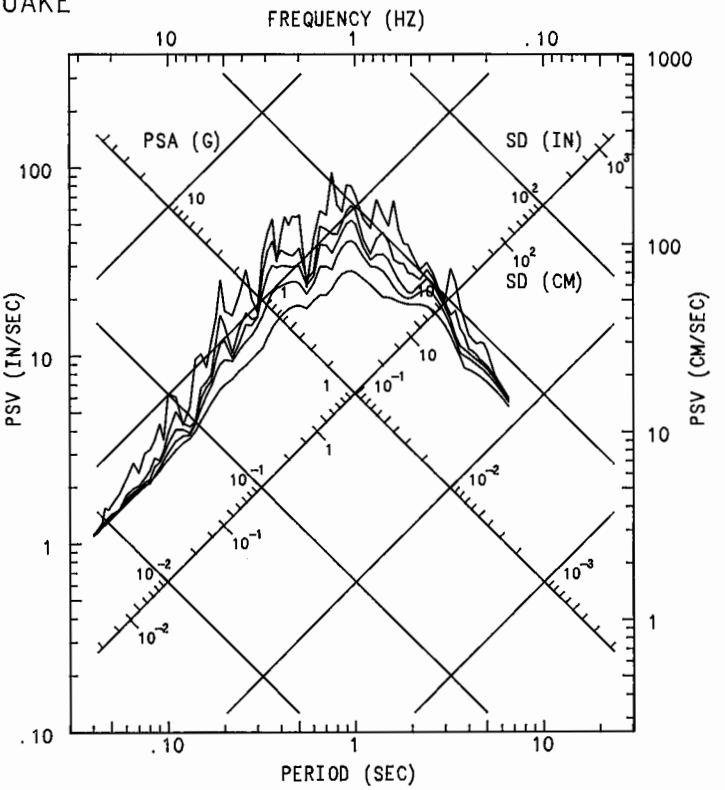
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

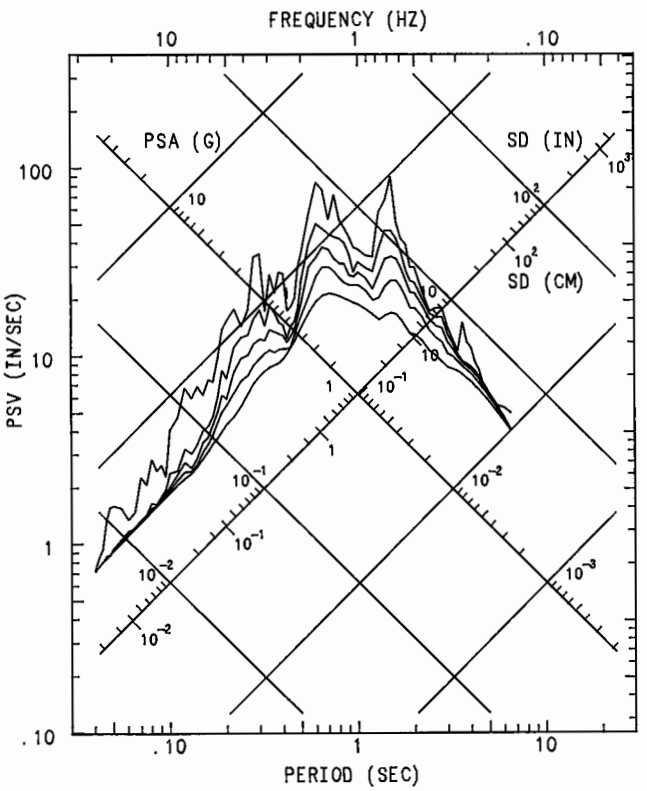
RECORD ID: 58472-C0221-89293.05

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

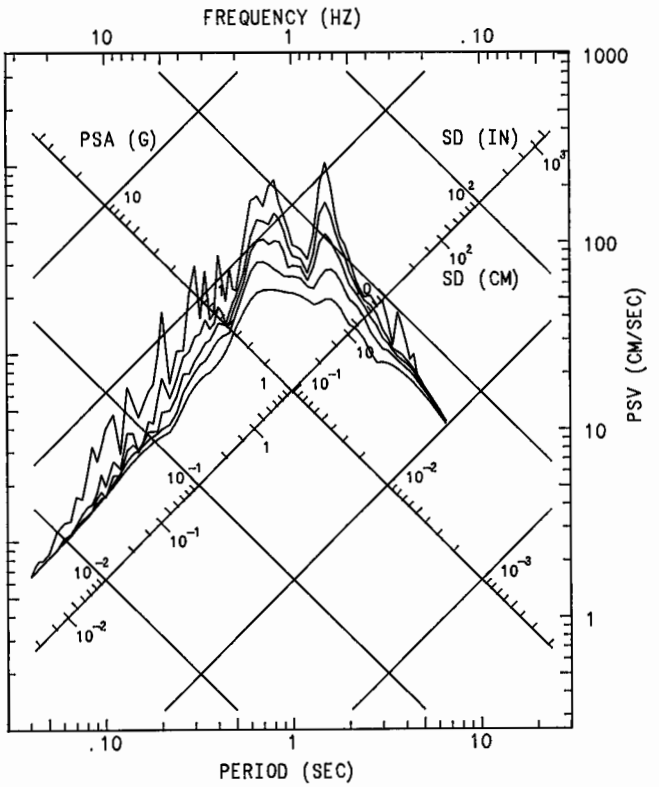
CHN 8: 0 DEG
WHARF DECK, NORTH END



CHN 9: 270 DEG
WHARF DECK, NORTH END



CHN 10: 270 DEG
TERMINAL AREA, NEAR CENTER



OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

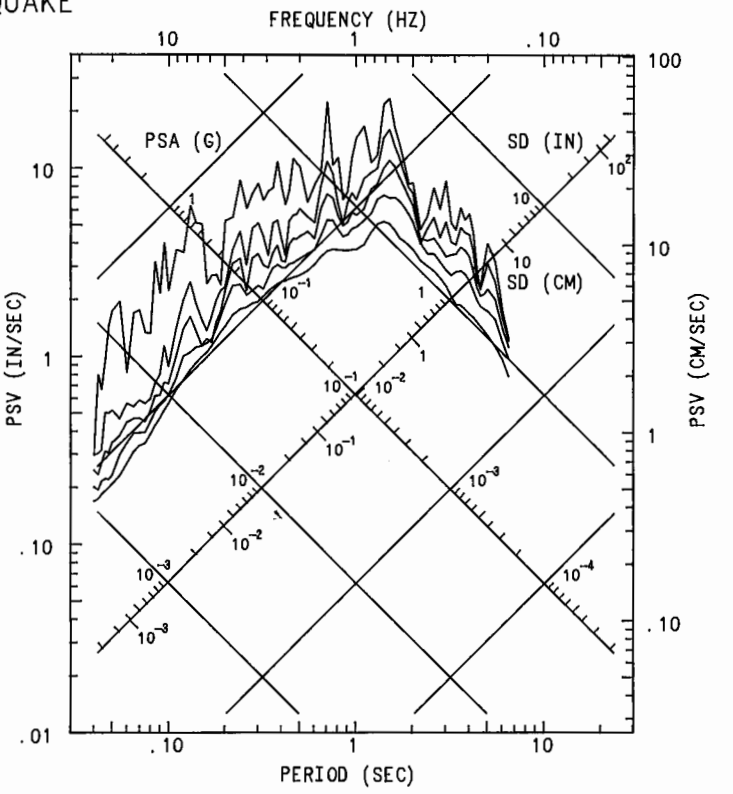
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE
OCTOBER 17, 1989 17:04 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ
(0.04 TO 5.88 SEC)

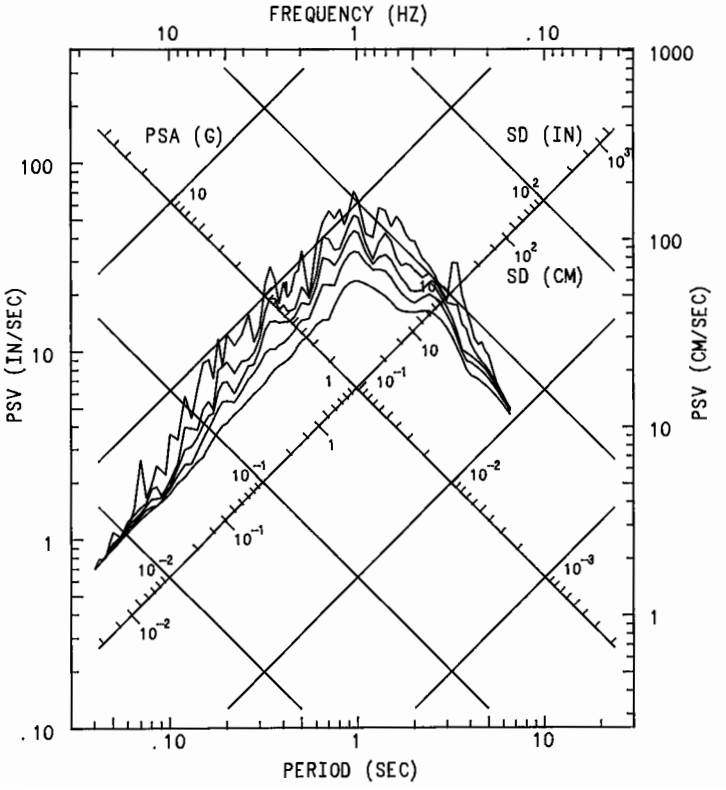
RECORD ID: 58472-C0221-89293.05

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

CHN 11: UP
TERMINAL AREA, NEAR CENTER

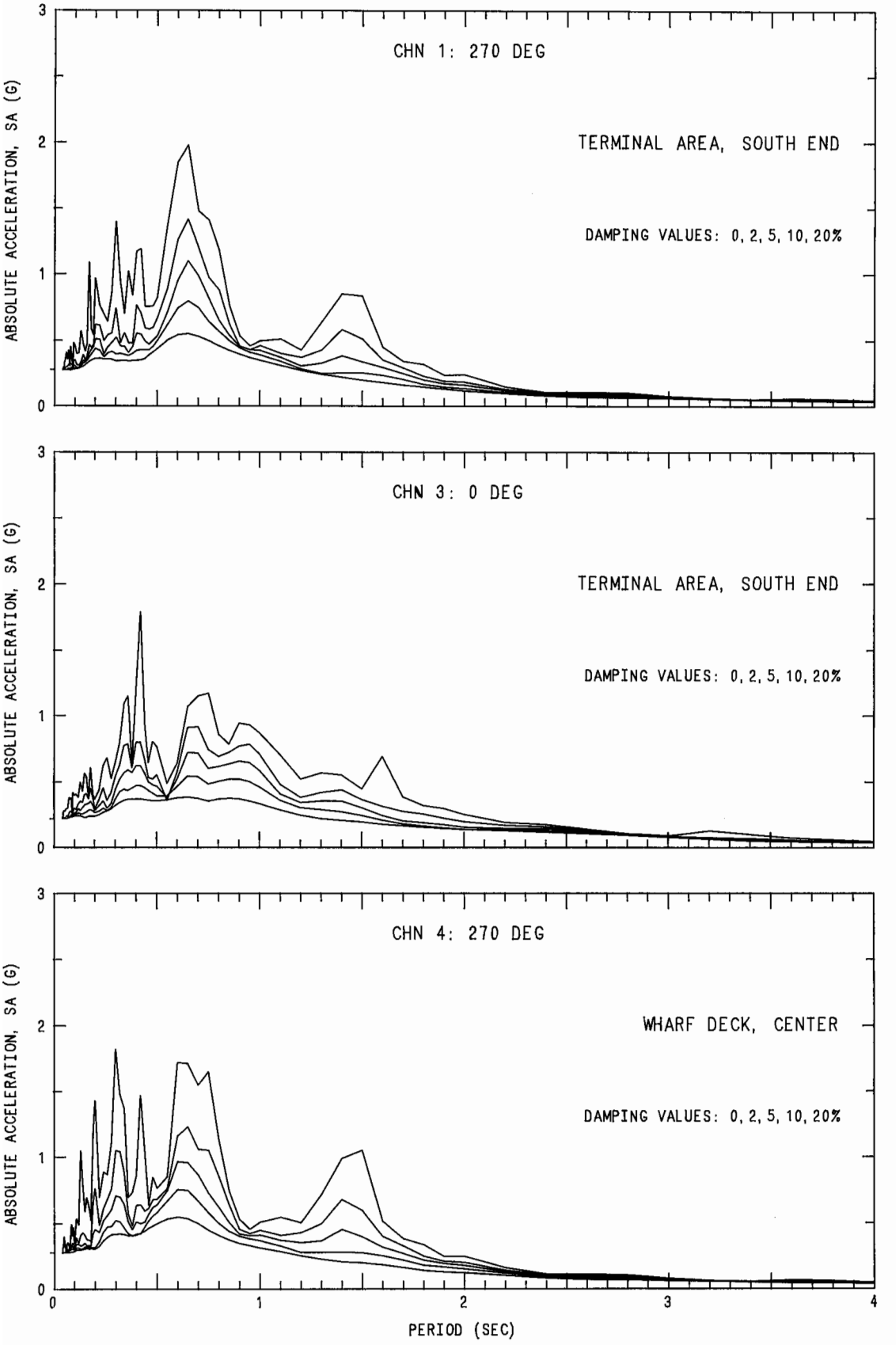


CHN 12: 0 DEG
TERMINAL AREA, NEAR CENTER



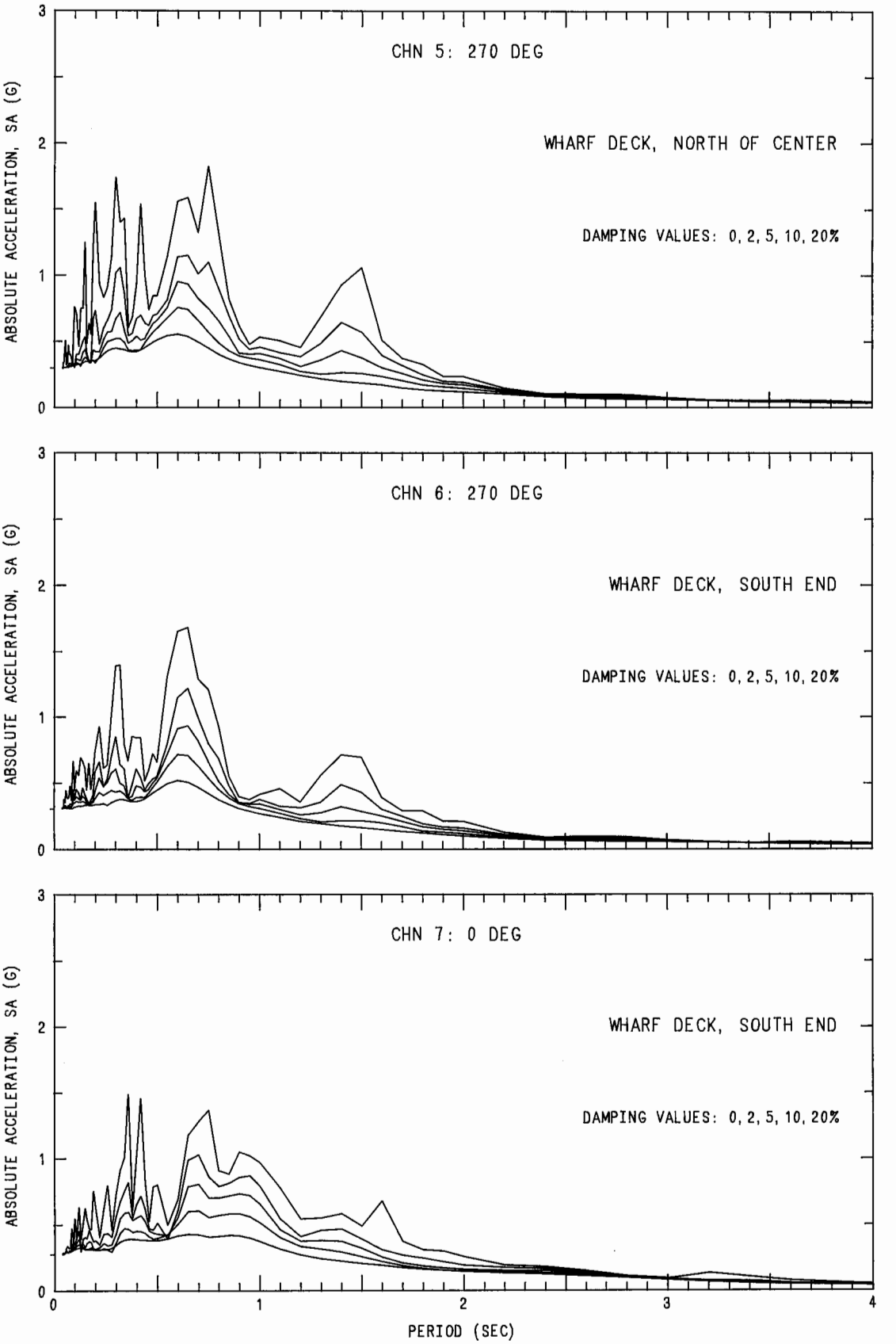
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58472-C0221-89293.05
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



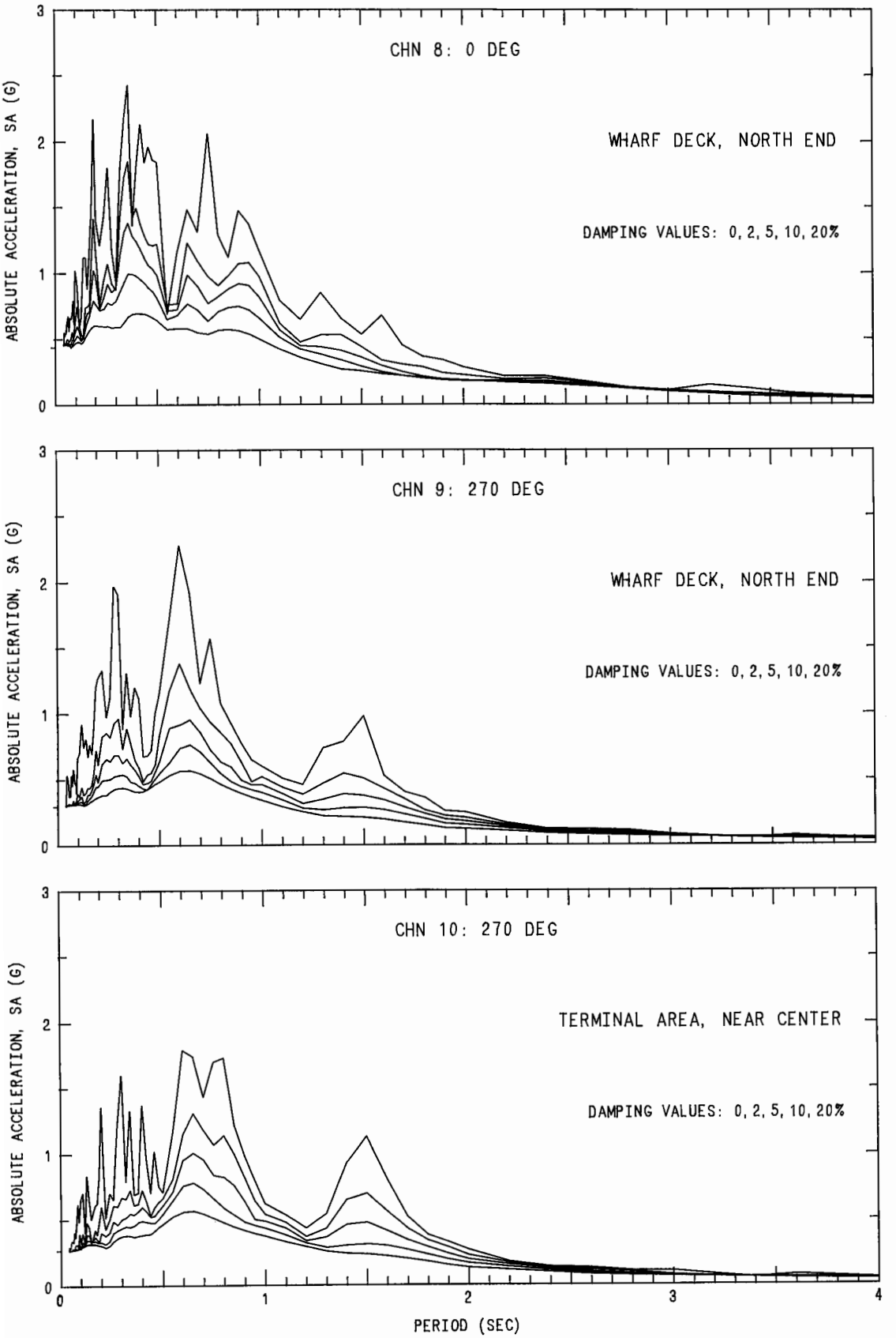
SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

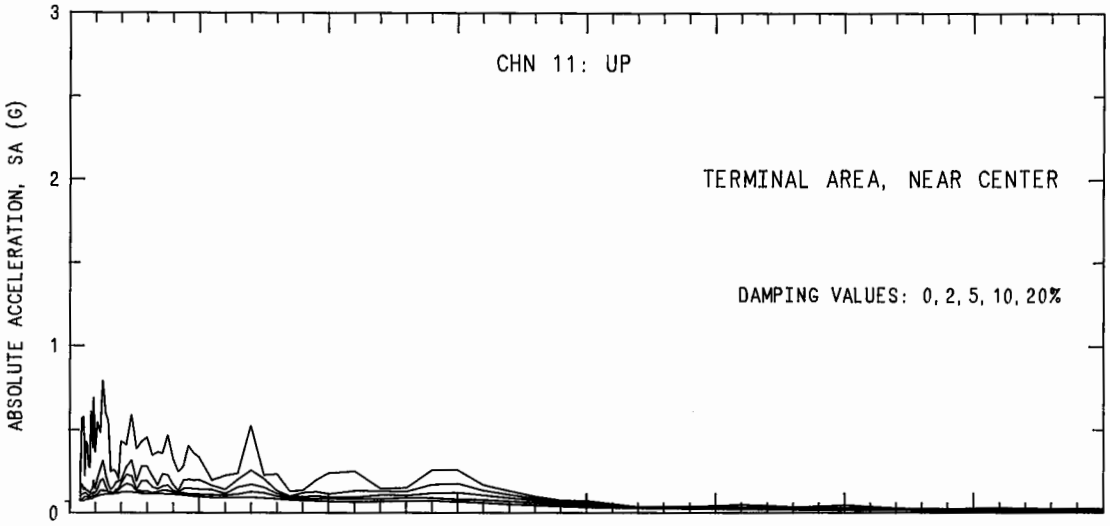
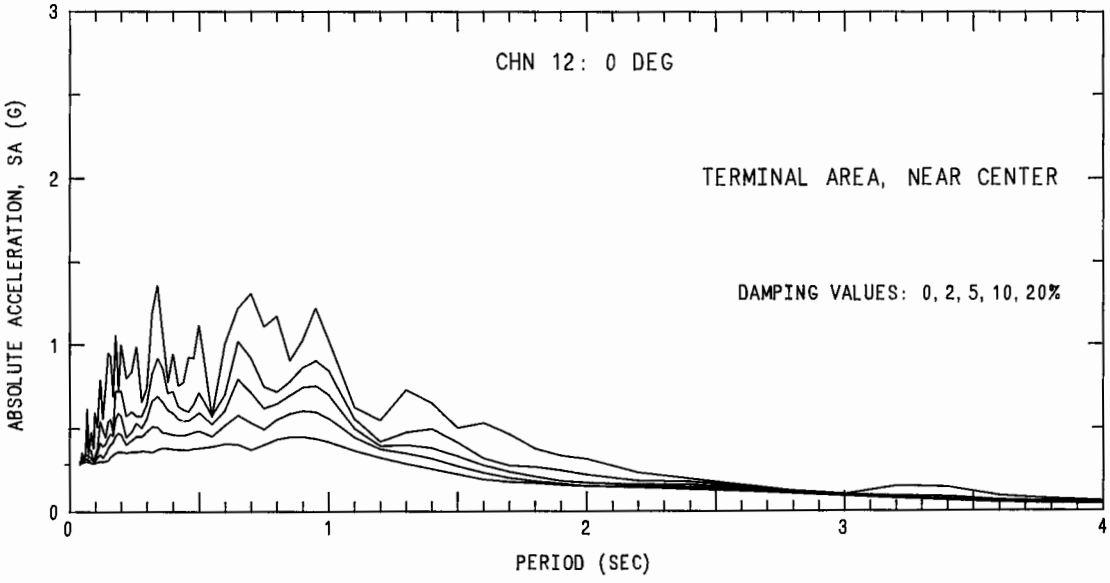
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58472-C0221-89293.05
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND – OUTER HARBOR WHARF: CSMIP S/N 472

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 58472-C0221-89293.05
USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)



SANTA CRUZ MTNS (LOMA PRIETA) EARTHQUAKE OCTOBER 17, 1989 17:04 PDT
OAKLAND - OUTER HARBOR WHARF: CSMIP S/N 472

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USABLE DATA BANDWIDTH: 0.17 TO 23.6 HZ (0.04 TO 5.88 SEC)