FIRST INTERIM SET OF CSMIP PROCESSED STRONG-MOTION RECORDS FROM THE SIERRA MADRE, CALIFORNIA EARTHQUAKE OF 28 JUNE 1991

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California Strong Motion Instrumentation Program

California Department of Conservation

Division of Mines and Geology

Office of Strong Motion Studies

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INTRODUCTION

Strong-motion records were recovered from 94 stations of the California Strong Motion Instrumentation Program (CSMIP) following the Sierra Madre earthquake of June 28, 1991 which occurred under the San Gabriel Mountains, approximately 20 km northeast of downtown Pasadena. The records from these 94 stations are presented in the CSMIP data report on the earthquake (see Reference).

Digitization and processing of the records recovered by CSMIP started after the data report was completed and is continuing. The results of digitizing and processing of the first interim set of records from 10 stations has been completed and the results are presented in this report. These 10 stations include 6 ground response, 3 instrumented buildings and 1 lifeline structure. The plots for these records are arranged as follows:

- o Ground-Response Stations:
  1. Mt. Wilson - Caltech Seismic Station
  2. Altadena - Eaton Canyon Park
  3. San Marino - Southwestern Academy
  4. Los Angeles - Obregon Park
  5. Tarzana - Cedar Hill Nursery
  6. Vasquez Rocks Park
- o Instrumented Buildings:
  7. Burbank - 6-story Commercial Bldg. (13 channels)
  8. Burbank - 10-story Residential Bldg. (16 channels)
  9. Pasadena - 6-story Office Bldg. (16 channels)
- o Instrumented Lifeline Structure:
  10. Cogswell Dam (9 channels)

Information on the earthquake and recording stations are given in the reference. Details on accelerogram digitizing and processing will be presented in the forthcoming final CSMIP processed data report.

PLOTS OF PROCESSED DATA

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

1. Phase 1 (Vol. 1) data: uncorrected accelerations. Acceleration for the full processed length of 40 seconds are plotted with a common amplitude scaling factor for all channels. Three channels are plotted on one page for the ground response and lifeline structure records. Eight channels are plotted on one page for the building records.

2. Phase 2 (Vol. 2) data: instrument and baseline-corrected acceleration, velocity and displacement. The data for the first 20 or 40 seconds are plotted with equal scaling for all channels. Three channels are plotted on each page. The usable frequency bandwidth of the Phase 2 data, as determined during processing, is indicated on the plots and discussed below.

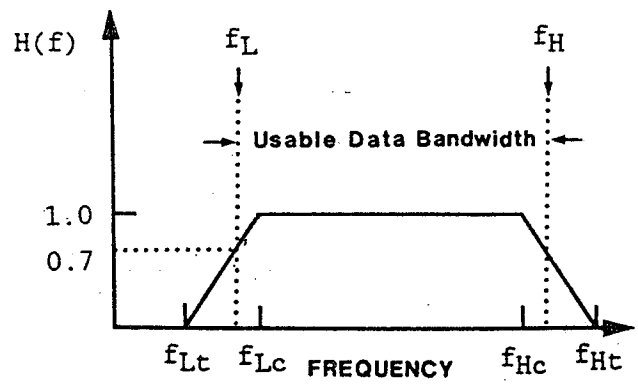
3. Phase 3 (Vol. 3) data: response spectra. The pseudo-velocity spectra (PSV), the pseudo-acceleration spectra (PSA), the displacement spectra (SD) for 0%, 2%, 5%, 10%, and 20% dampings are presented on a tripartite logarithmic plot for each channel. The spectra are plotted for periods

within the usable data bandwidth (see below).

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. 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.

REFERENCE

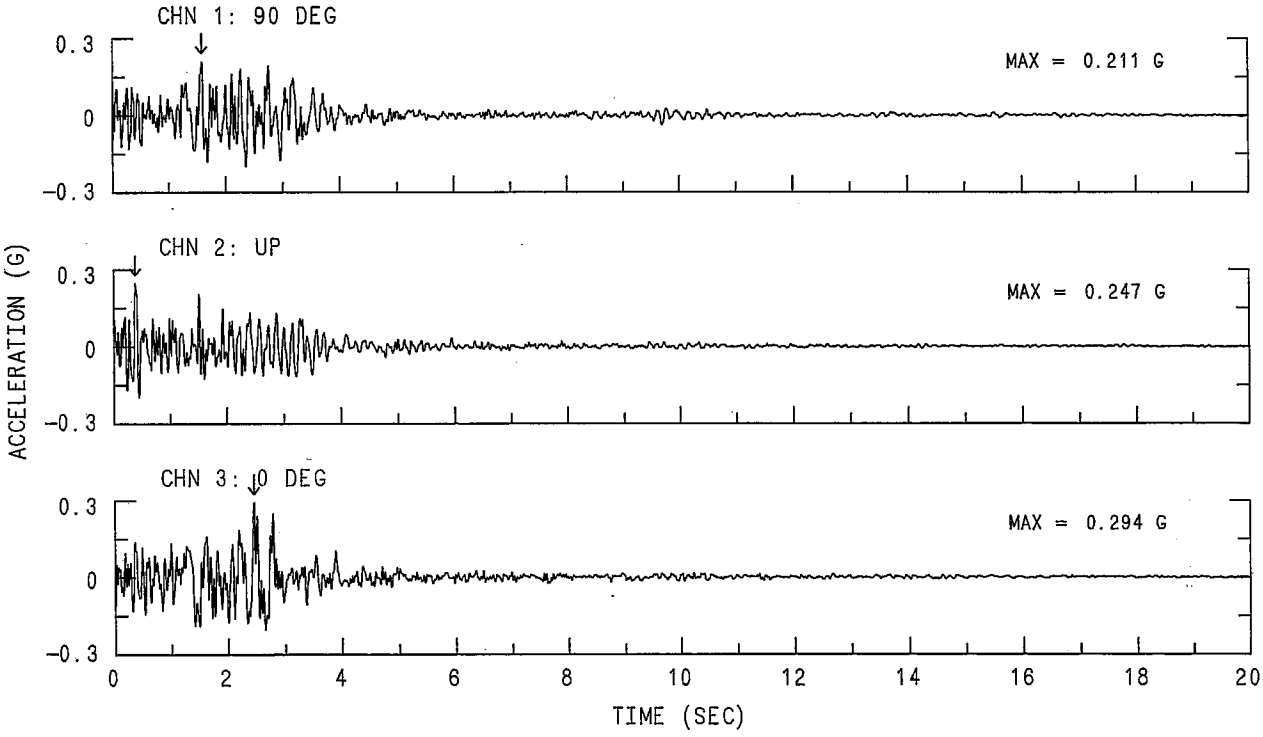
Huang, M., A. Shakal, R. Darragh, C. Ventura, T. Cao, R. Sherburne, P. Fung, J. Wampole, M. DeLisle and C. Petersen (1991). CSMIP strong-motion records from the Sierra Madre, California earthquake of 28 June 1991, Calif. Div. Mines and Geology, Office of Strong Motion Studies, Report No. OSMS 91-03, 108 p.

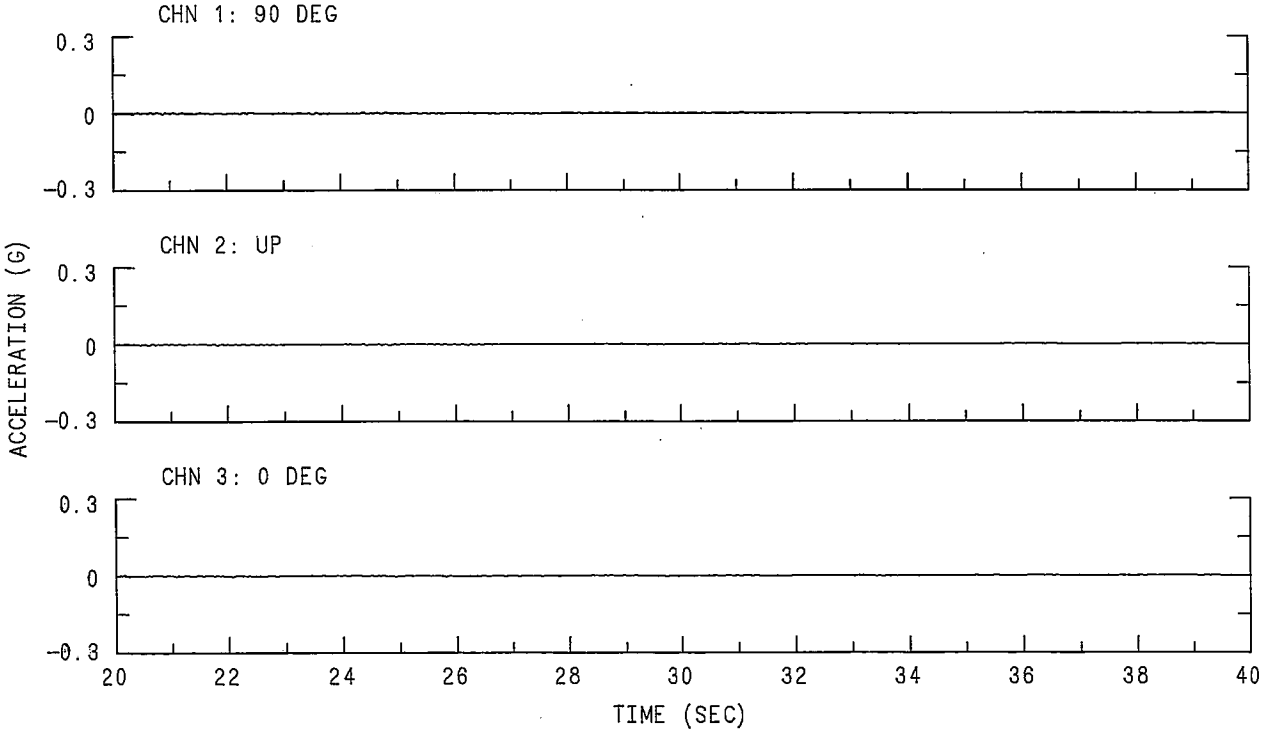
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

MT. WILSON - CALTECH SEISMIC STATION: CSMIP S/N 399

PHASE 1 ACCELERATION

RECORD ID: 24399-S0416-91180.01

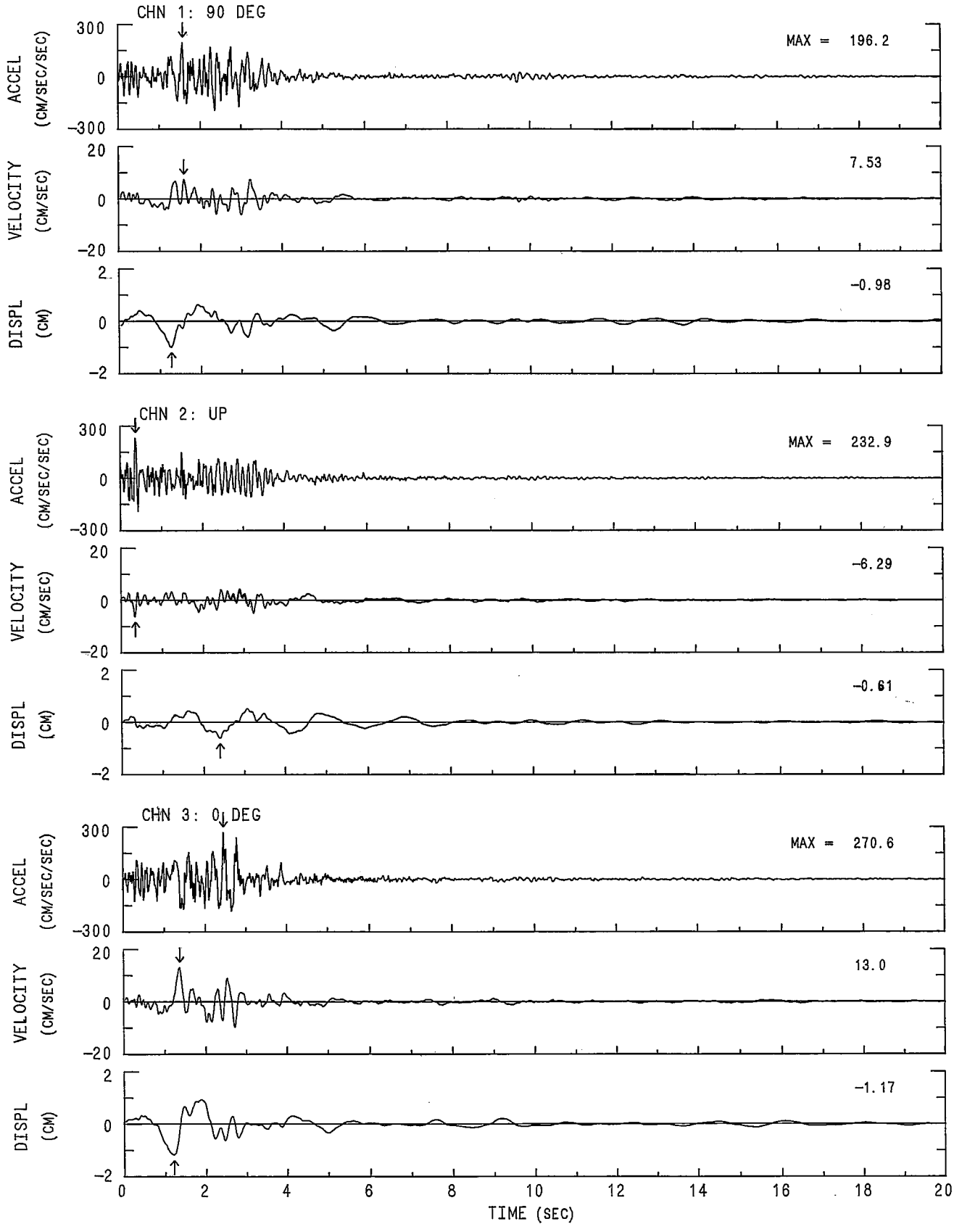




SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
MT. WILSON - CALTECH SEISMIC STATION: CSMIP S/N 399

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24399-S0416-91180.01



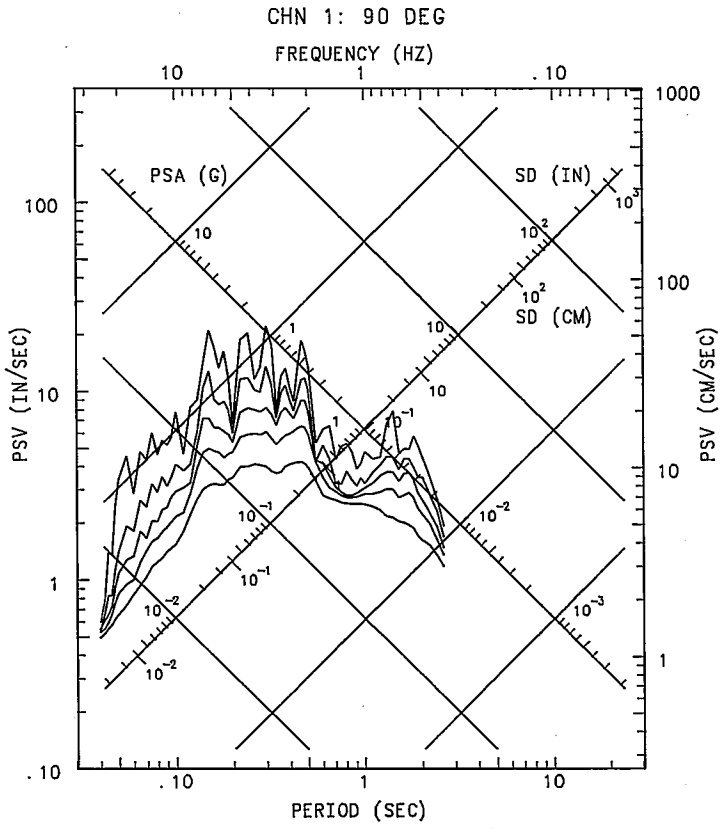
MT. WILSON - CALTECH SEISMIC STATION: CSMIP S/N 399

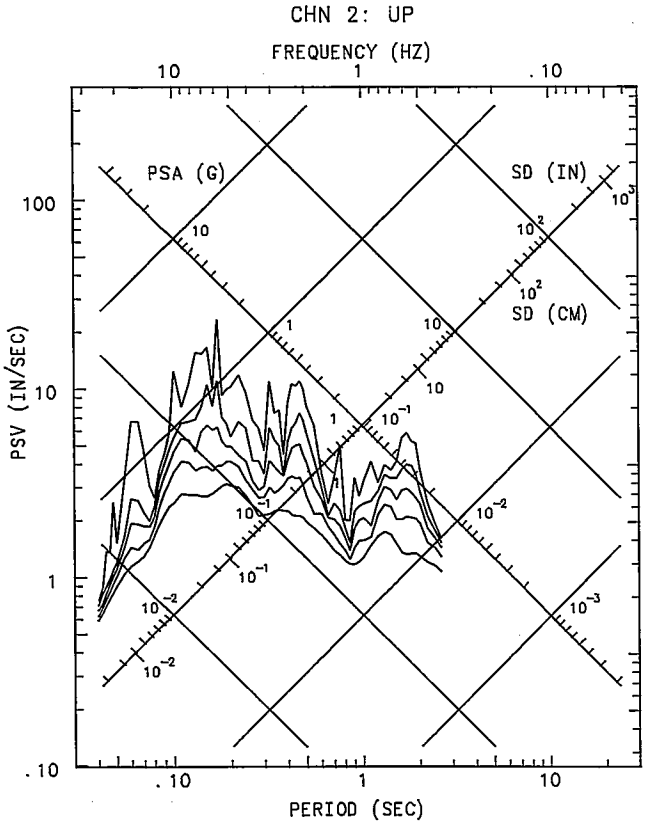
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

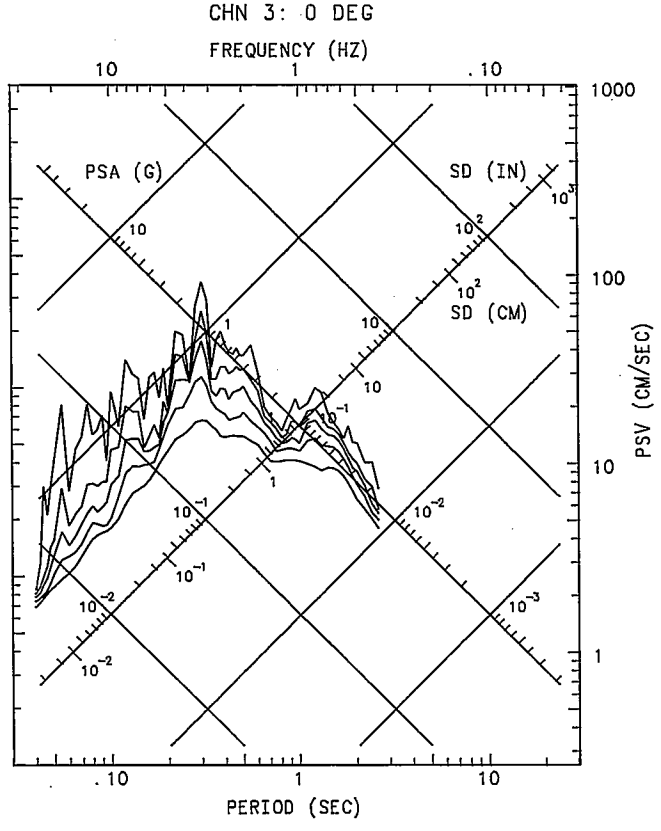
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

RECORD ID: 24399-S0416-91180.01

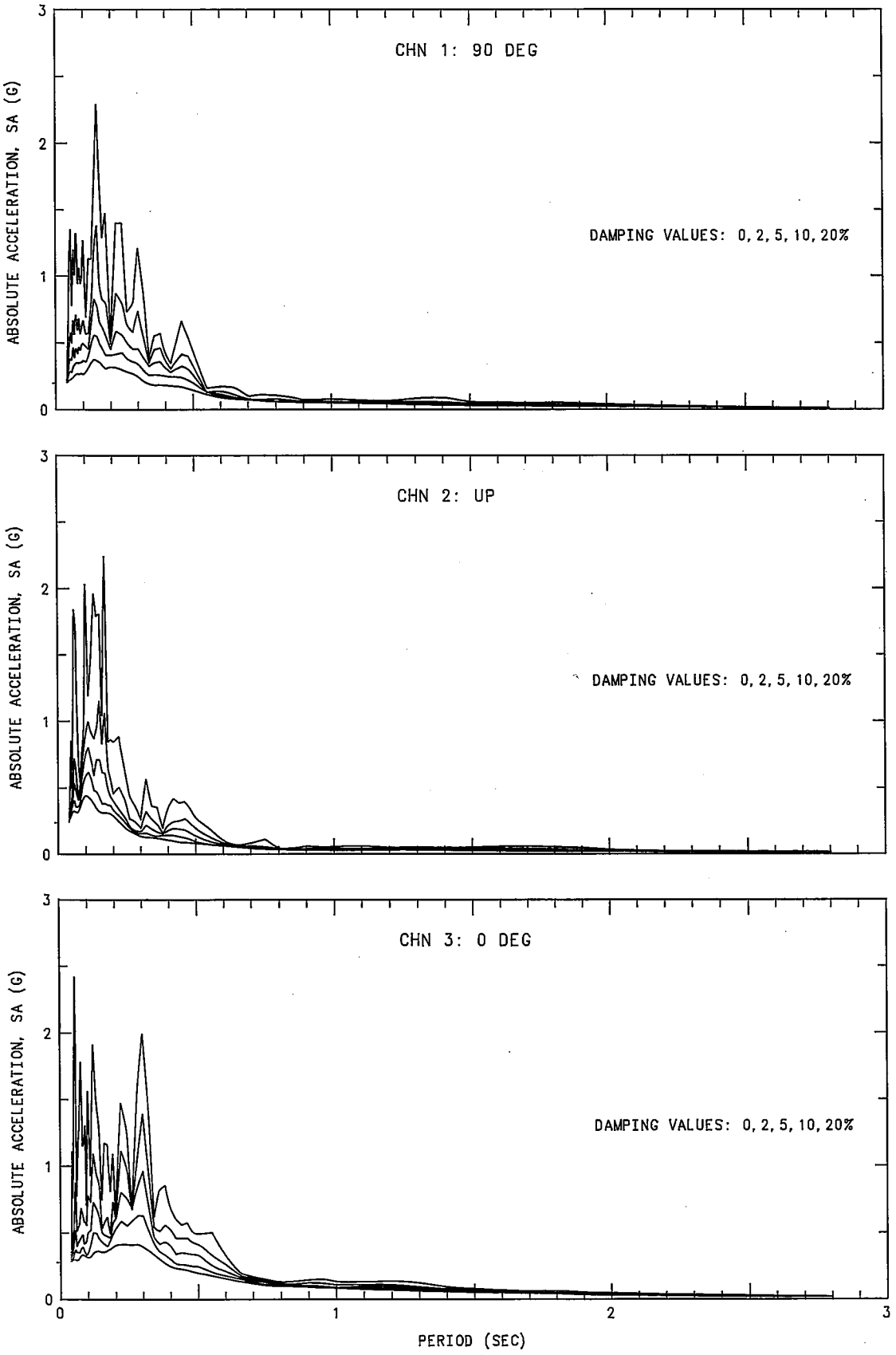
—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%







SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
MT. WILSON - CALTECH SEISMIC STATION: CSMIP S/N 399
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24399-S0416-91180.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)

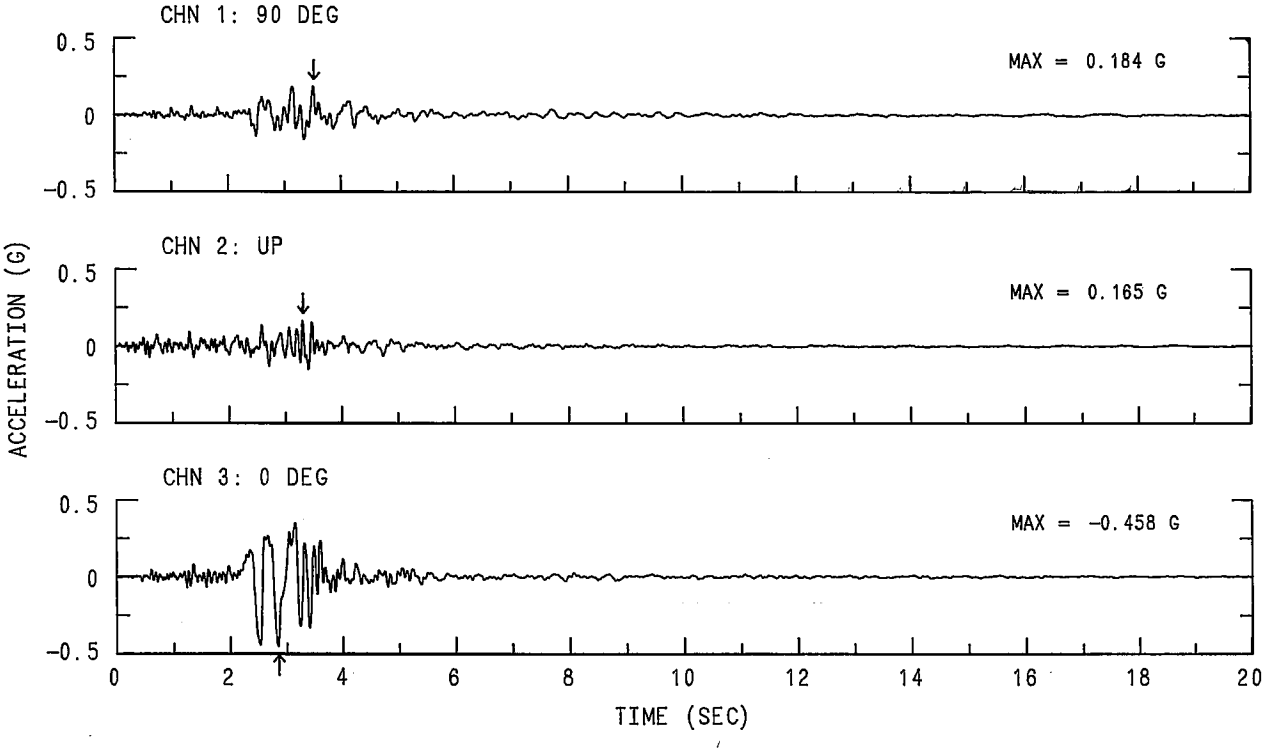


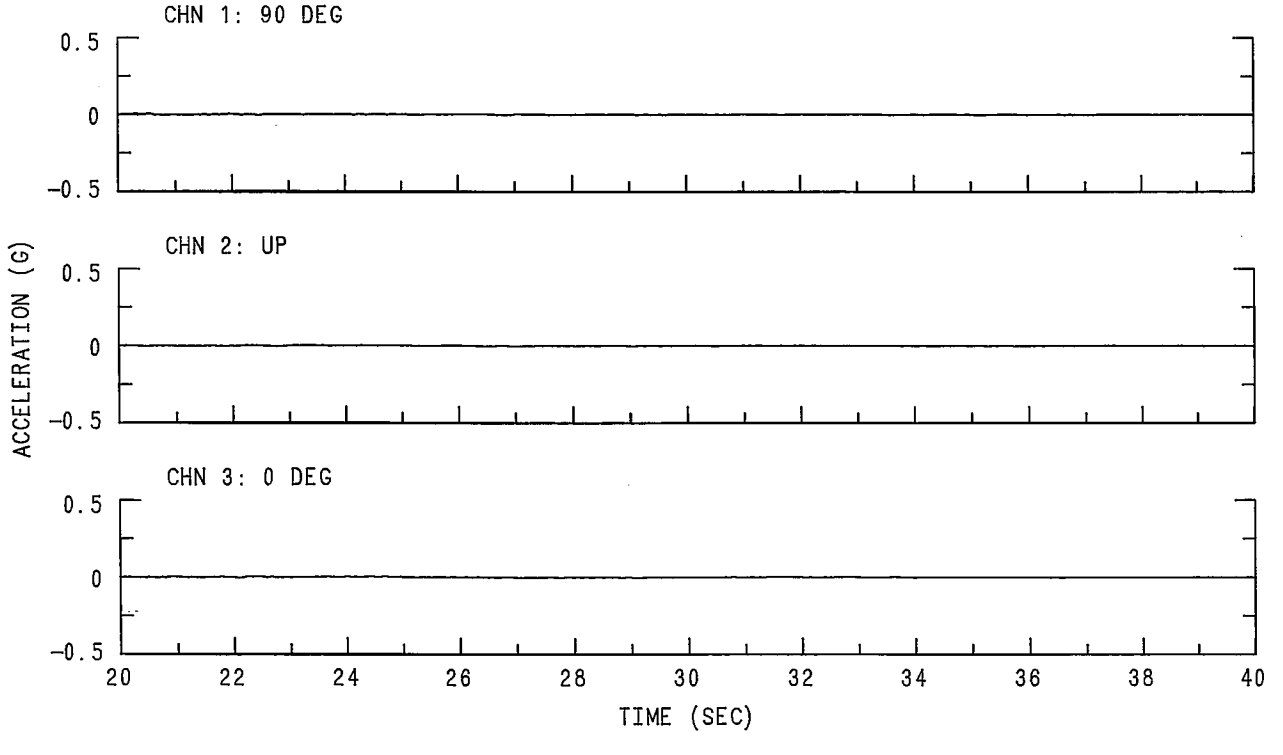
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

ALTADENA - EATON CANYON PARK: CSMIP S/N 402

PHASE 1 ACCELERATION

RECORD ID: 24402-S0758-91179.01

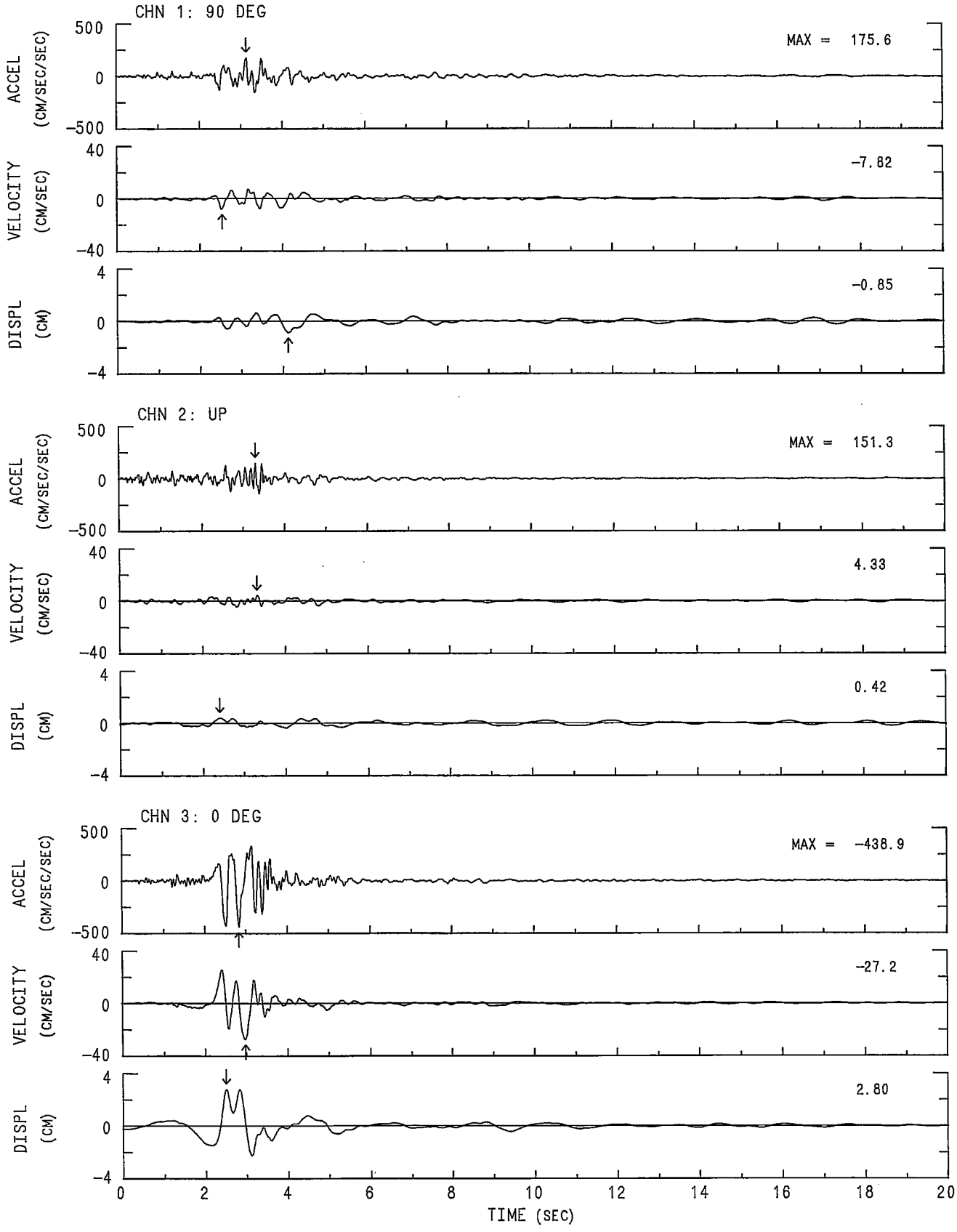




SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
ALTADENA - EATON CANYON PARK: CSMIP S/N 402

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24402-S0758-91179.01



ALTADENA - EATON CANYON PARK: CSMIP S/N 402

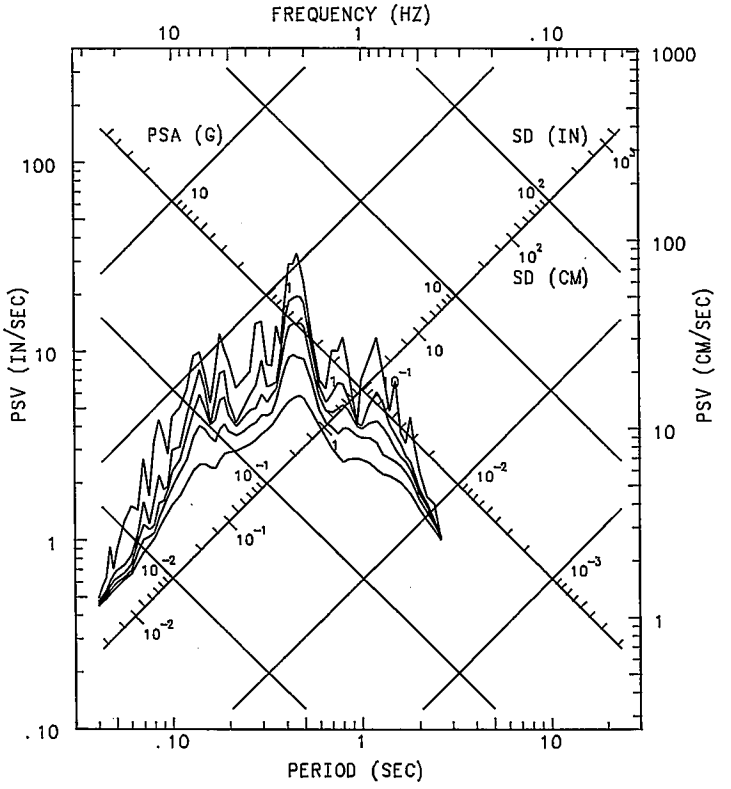
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

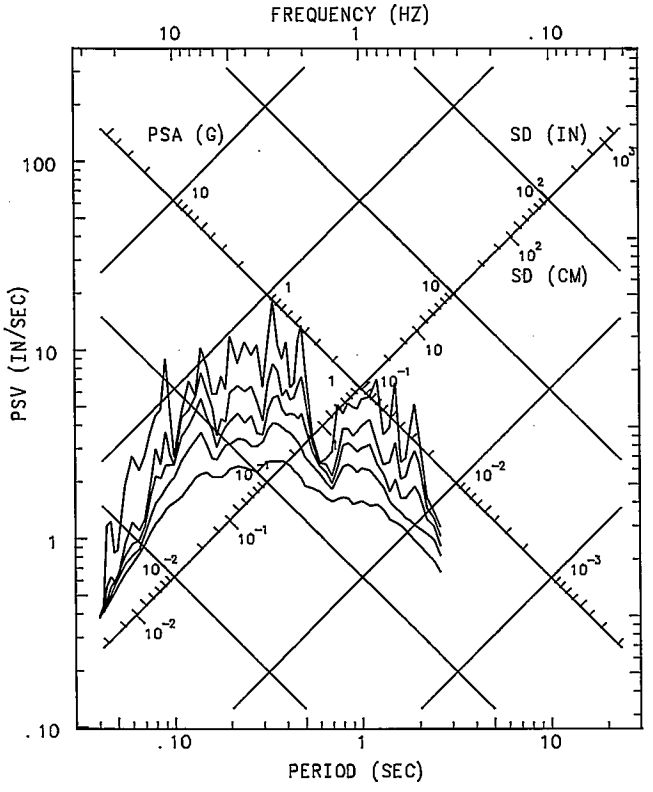
RECORD ID: 24402-S0758-91179.01

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

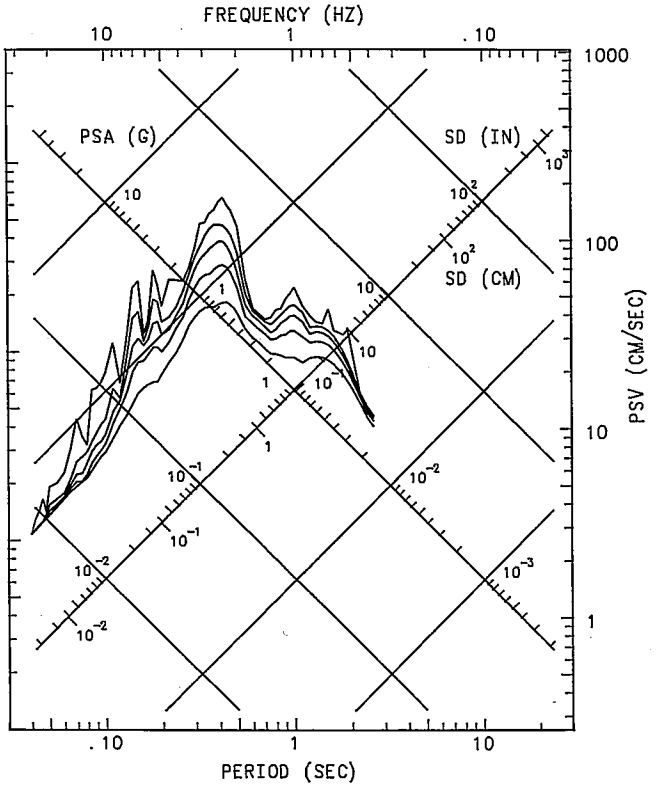
CHN 1: 90 DEG



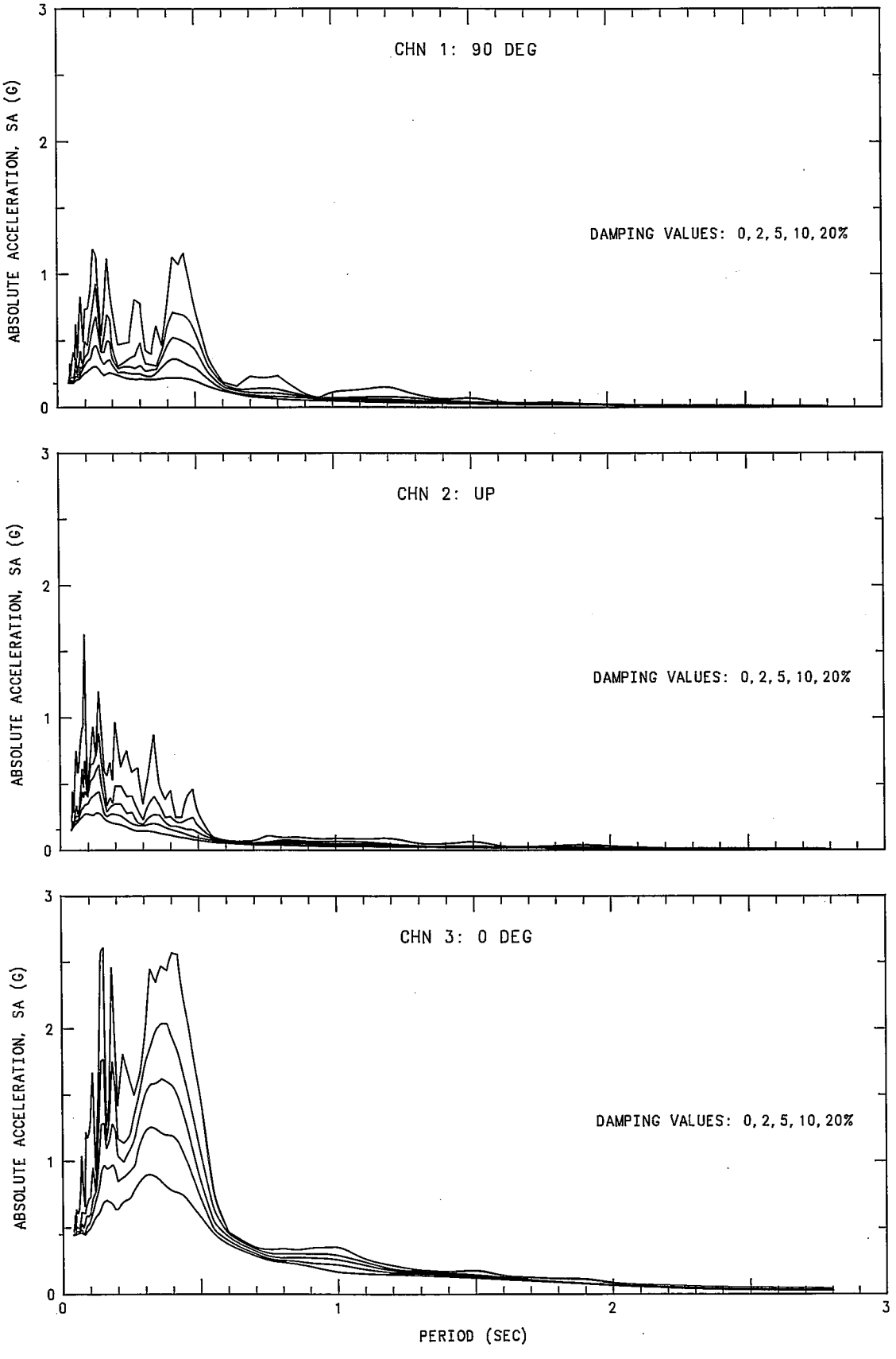
CHN 2: UP



CHN 3: 0 DEG



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
ALTADENA - EATON CANYON PARK: CSMIP S/N 402
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24402-S0758-91179.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)

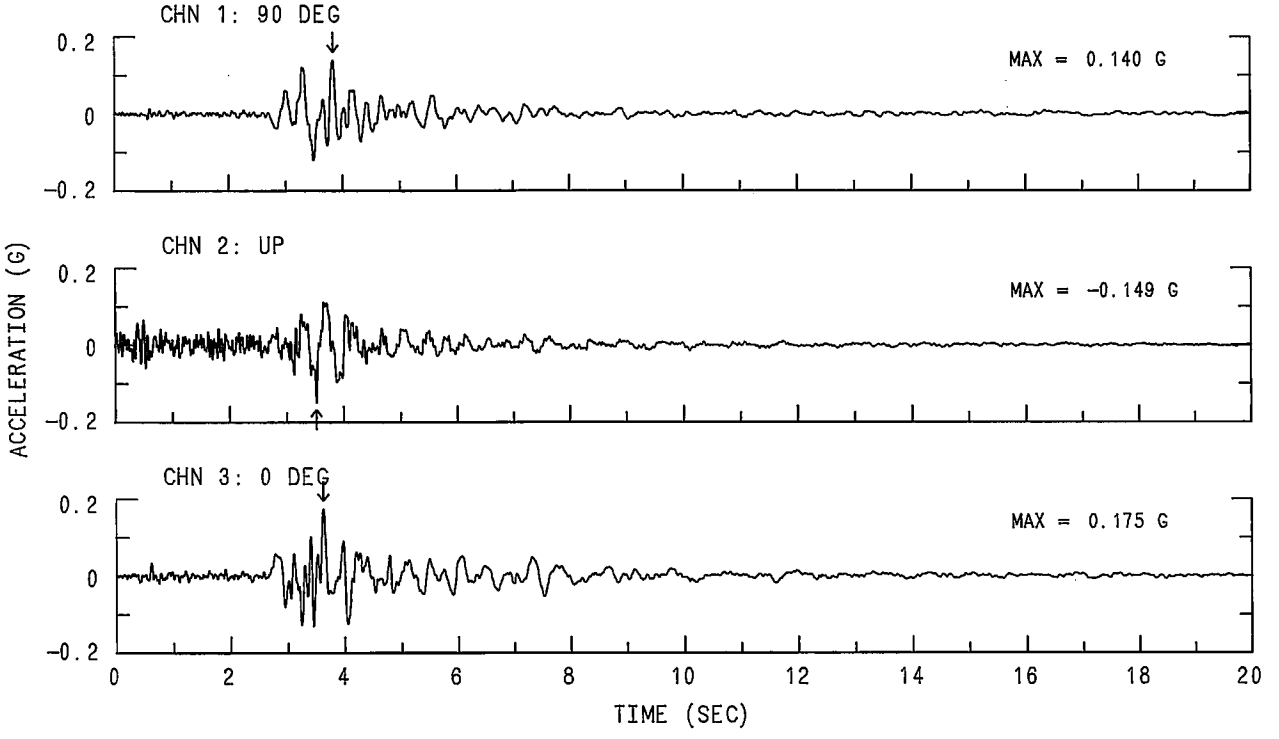


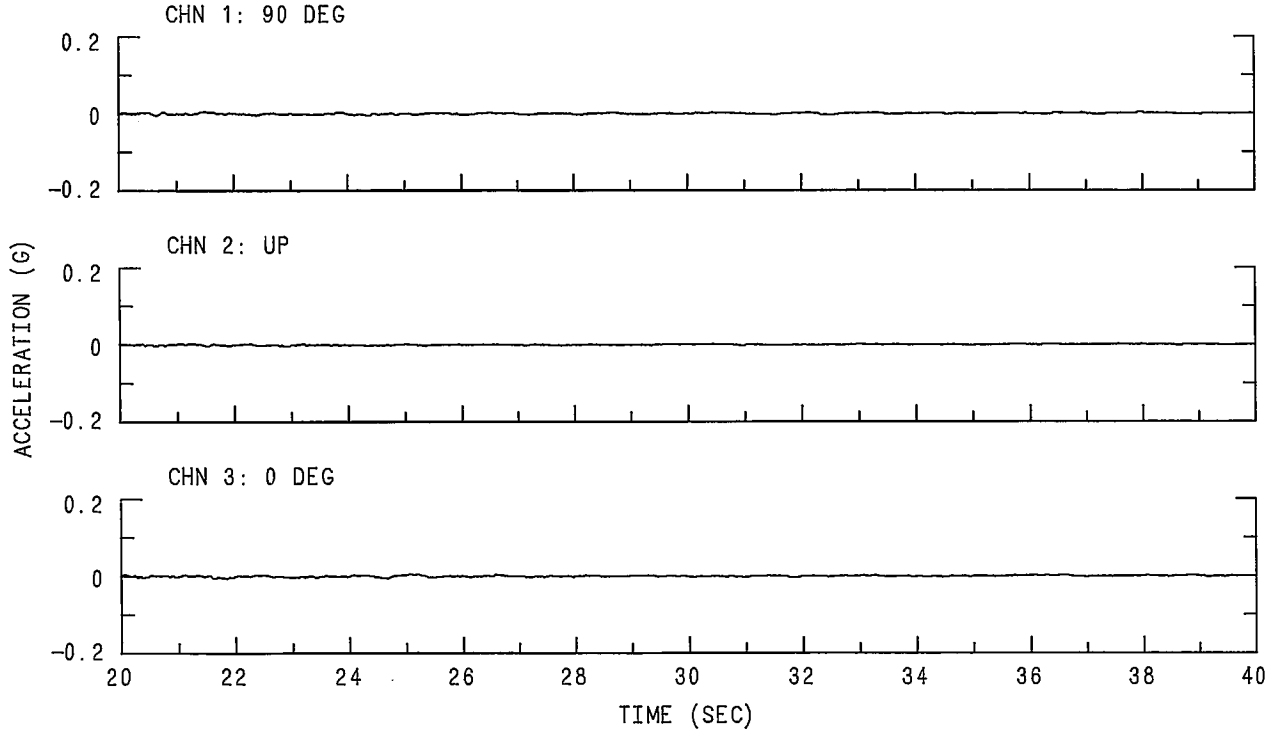
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

SAN MARINO - SOUTHWESTERN ACADEMY: CSMIP S/N 401

PHASE 1 ACCELERATION

RECORD ID: 24401-S0760-91179.01

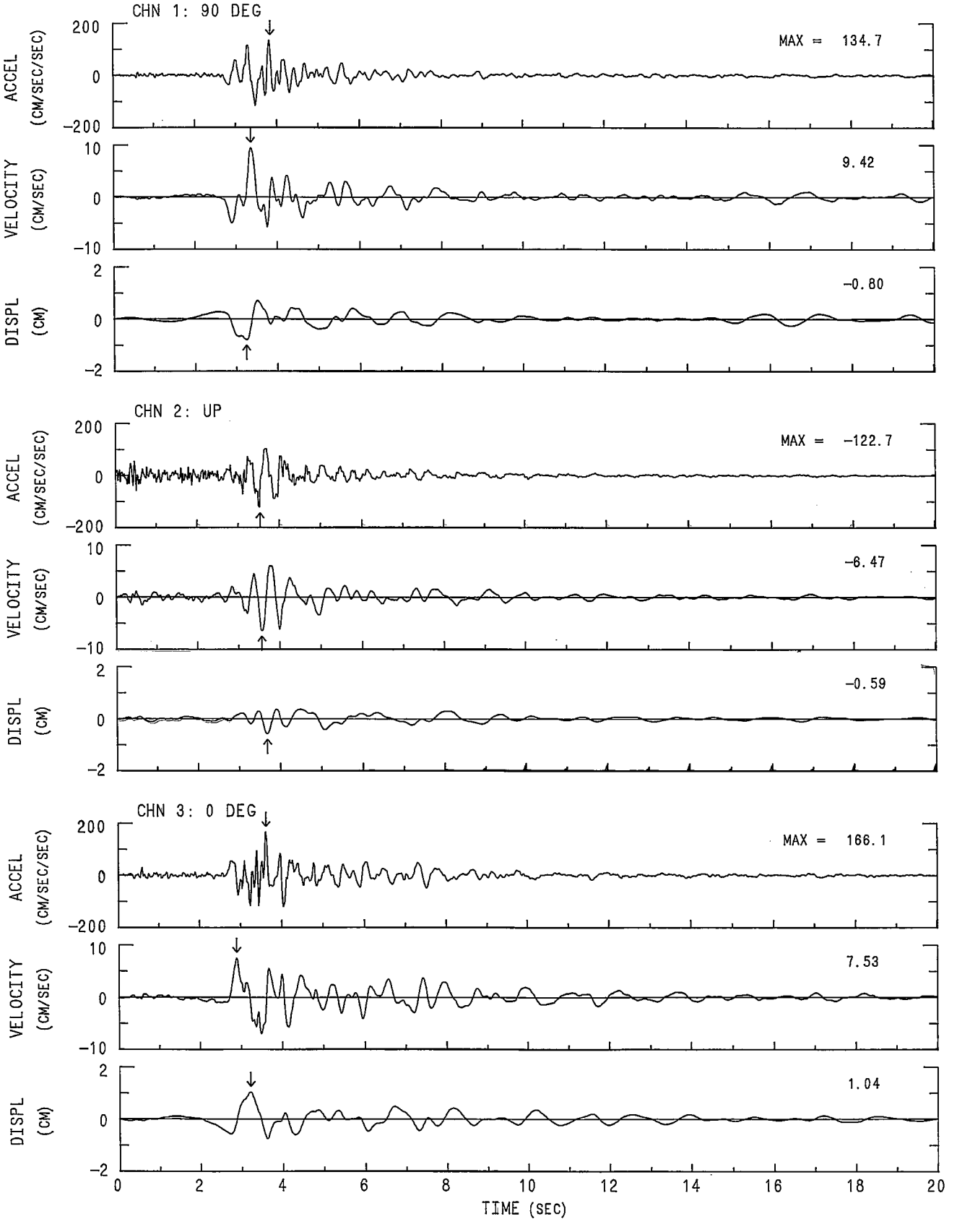




SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
SAN MARINO - SOUTHWESTERN ACADEMY: CSMIP S/N 401

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24401-S0760-91179.01



SAN MARINO – SOUTHWESTERN ACADEMY: CSMIP S/N 401

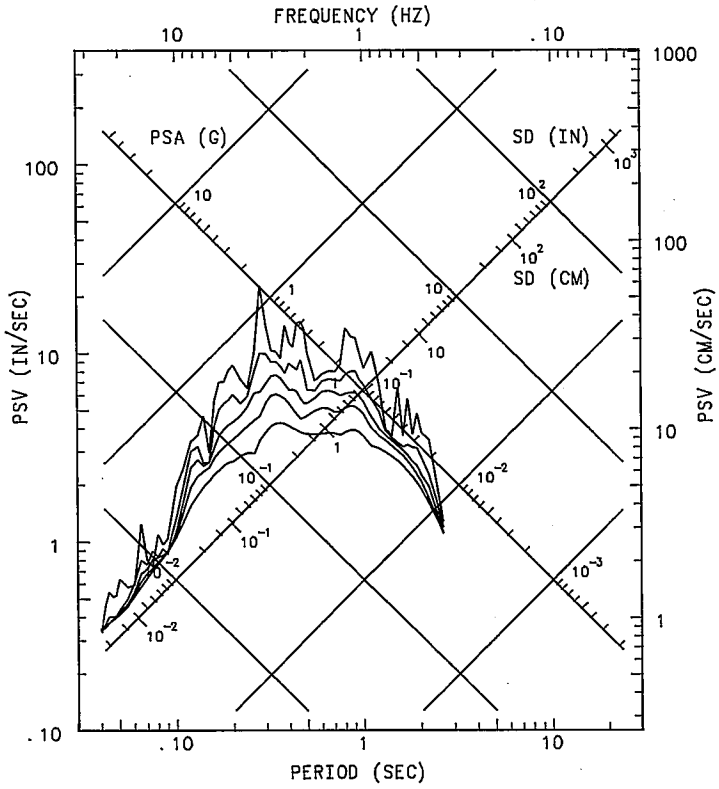
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

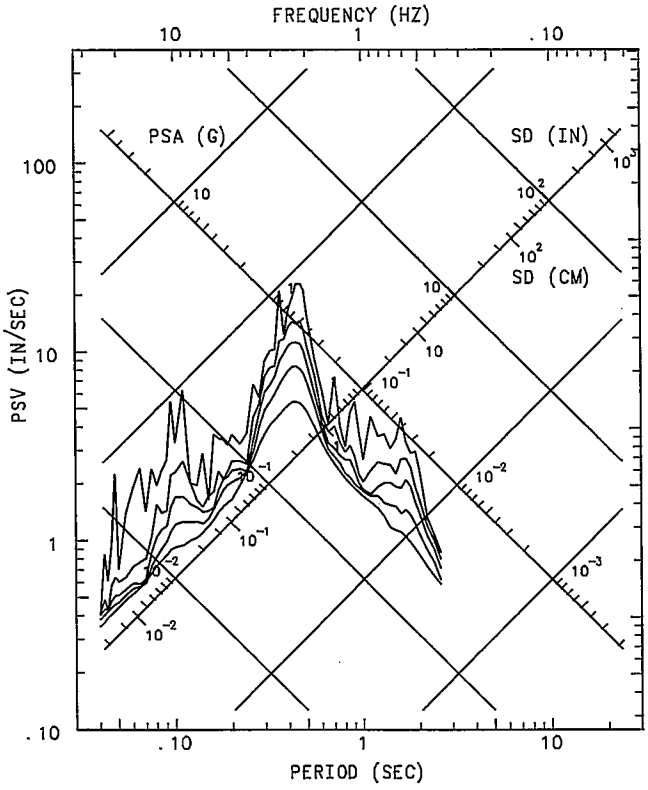
RECORD ID: 24401-S0760-91179.01

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

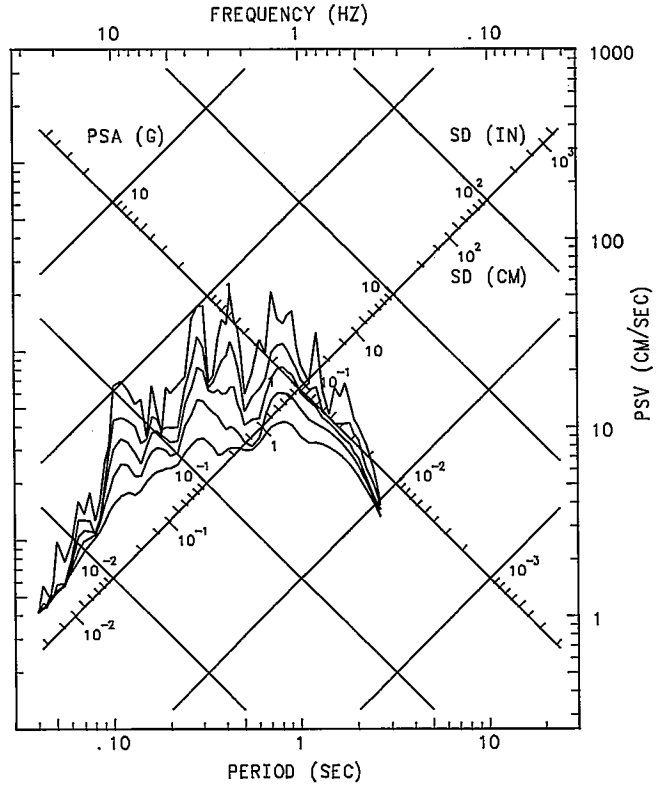
CHN 1: 90 DEG



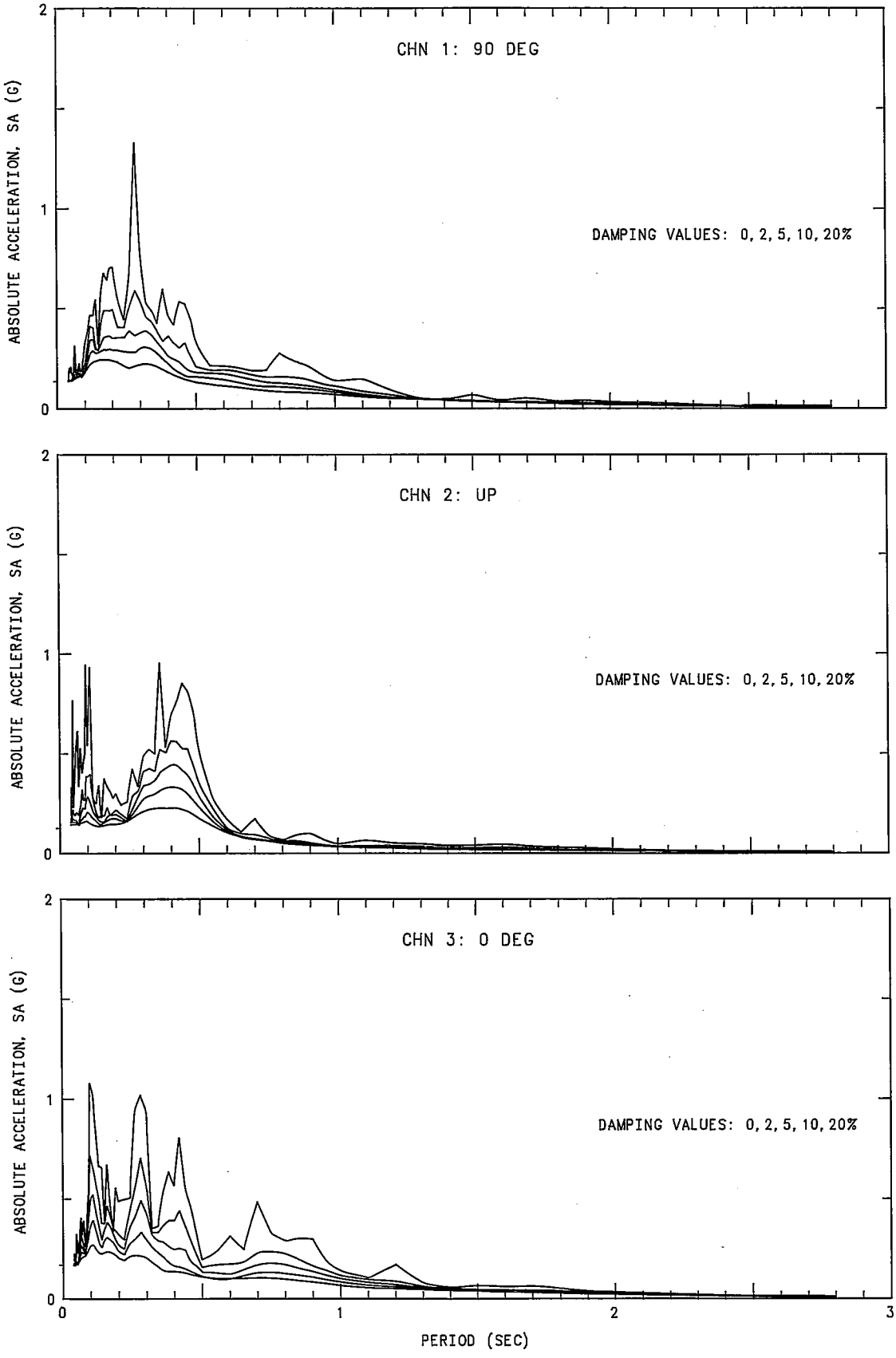
CHN 2: UP



CHN 3: 0 DEG



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
SAN MARINO - SOUTHWESTERN ACADEMY: CSMIP S/N 401
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24401-S0760-91179.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)

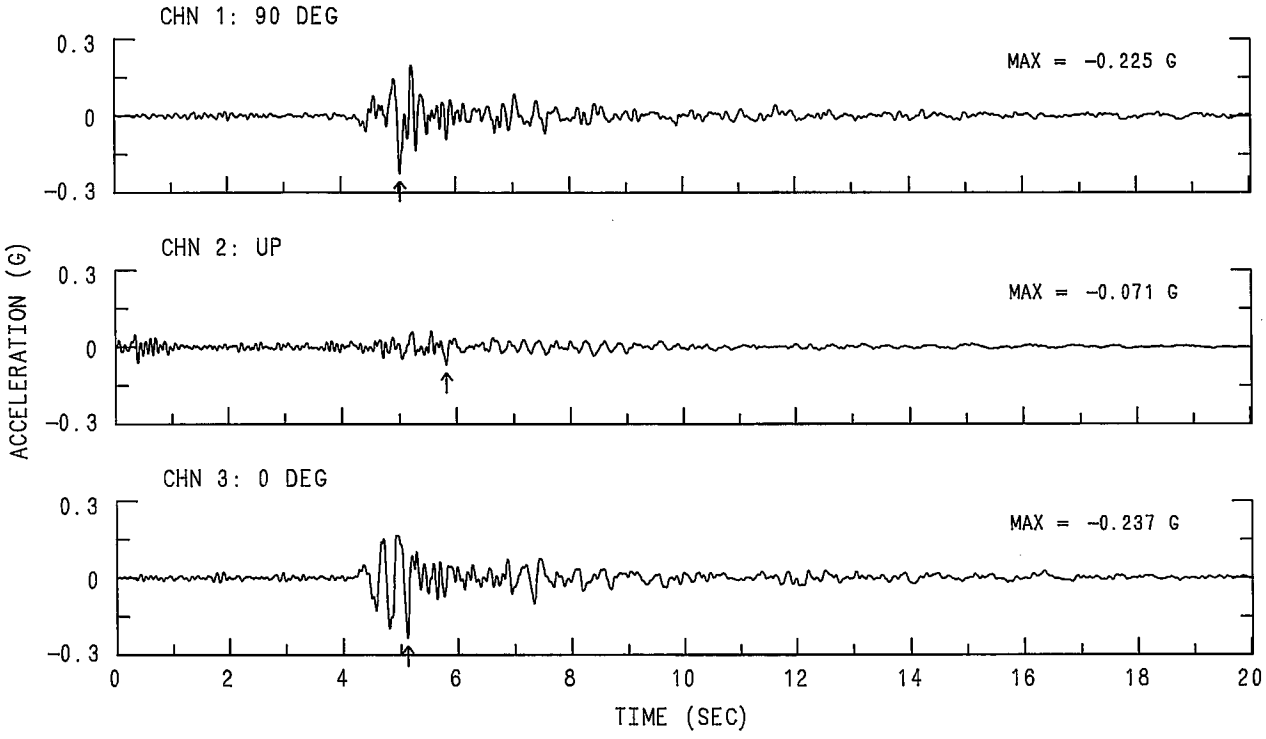


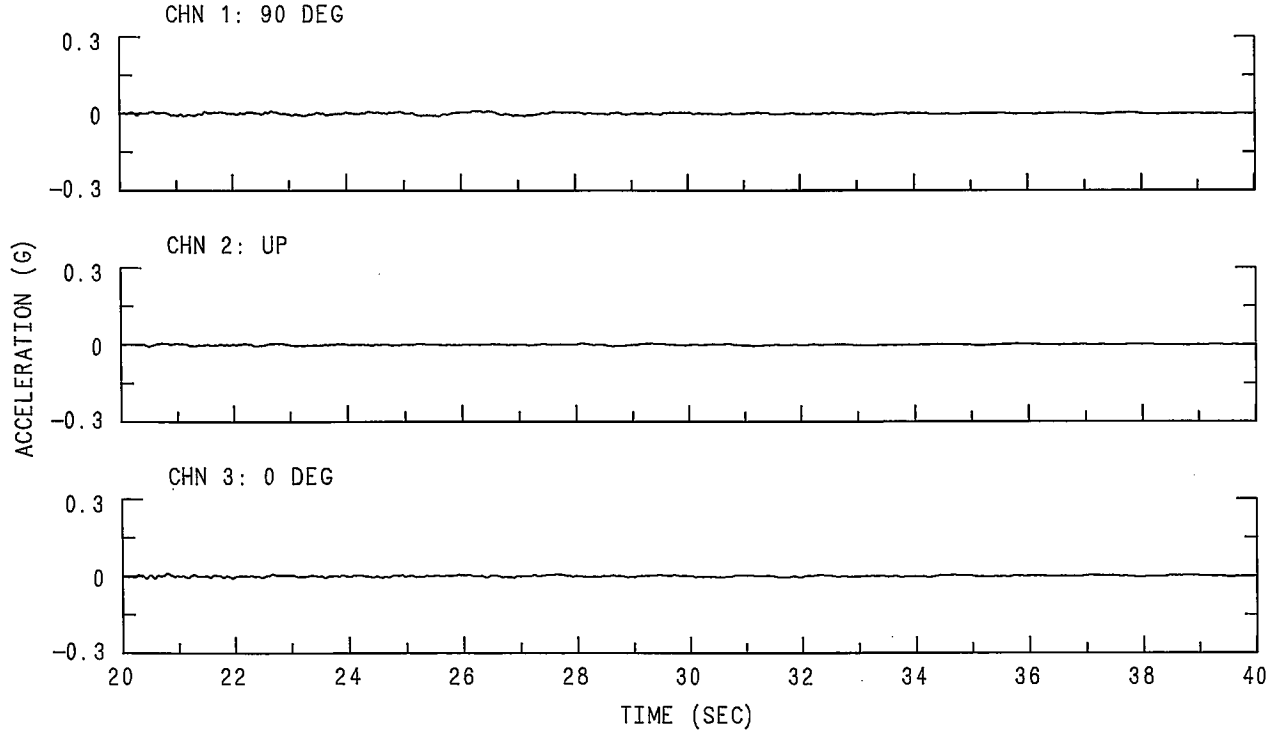
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

LOS ANGELES - OBREGON PARK: CSMIP S/N 400

PHASE 1 ACCELERATION

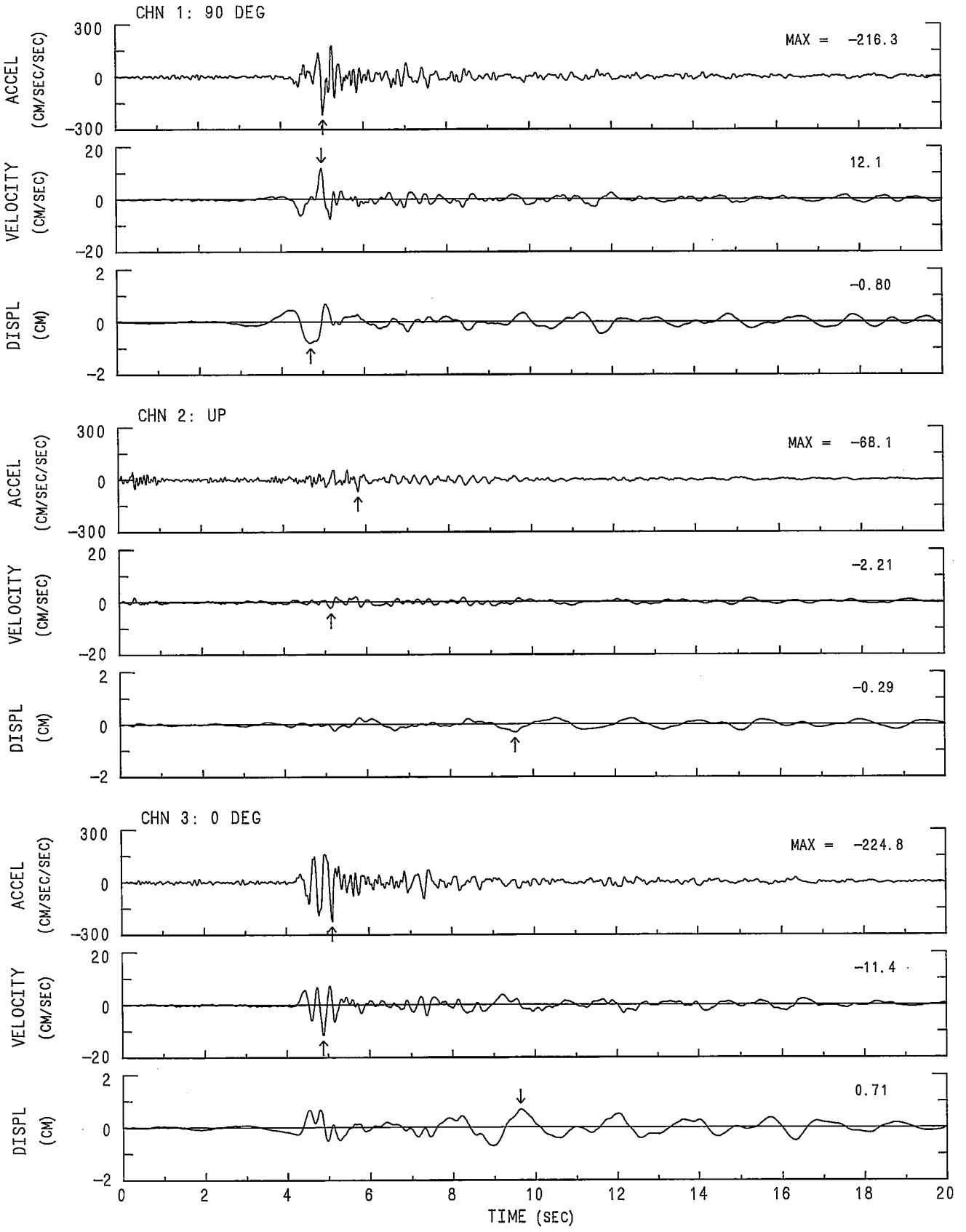
RECORD ID: 24400-S1606-91182.01





SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
LOS ANGELES - OBREGON PARK: CSMIP S/N 400

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24400-S1606-91182.01



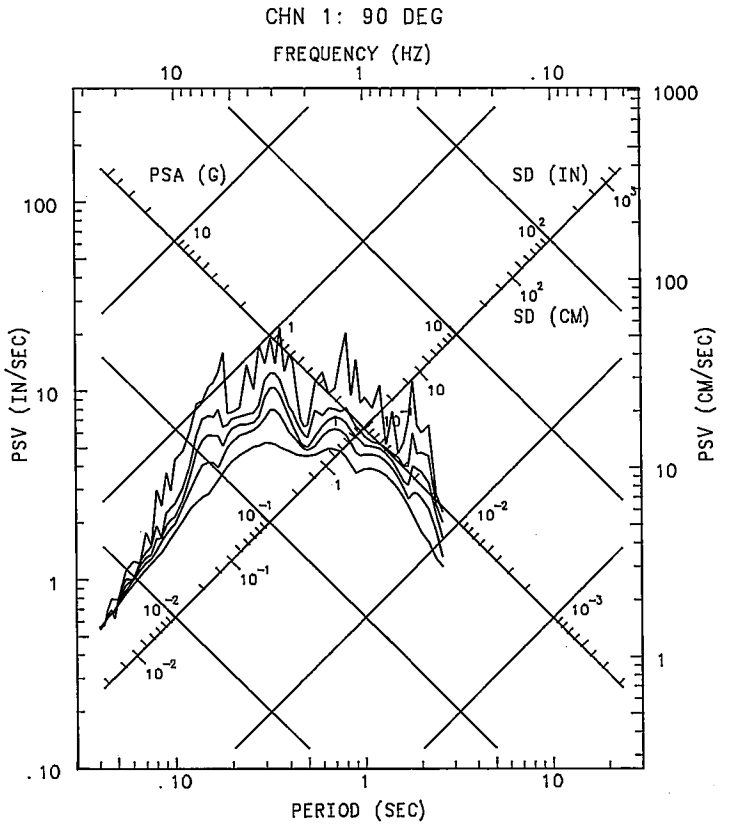
LOS ANGELES - OBREGON PARK: CSMIP S/N 400

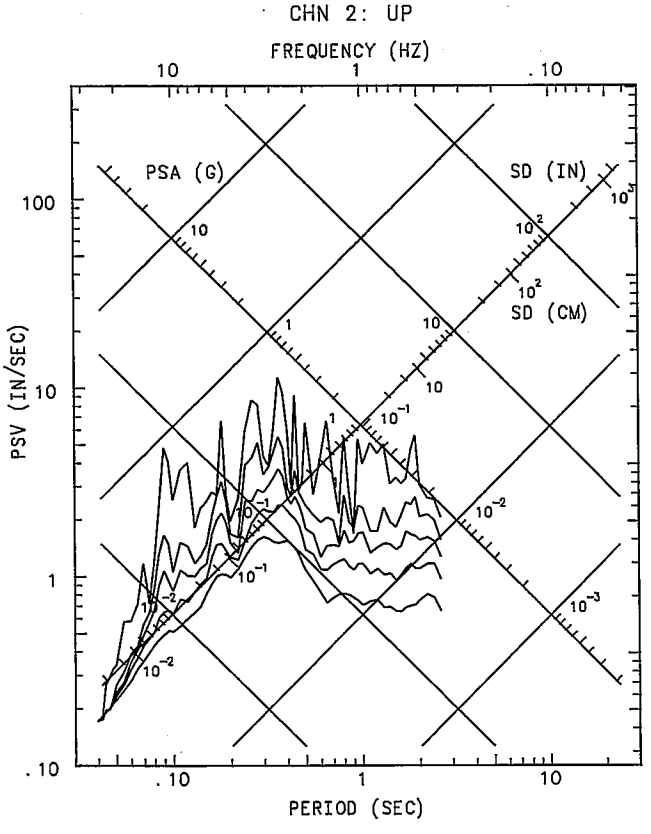
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

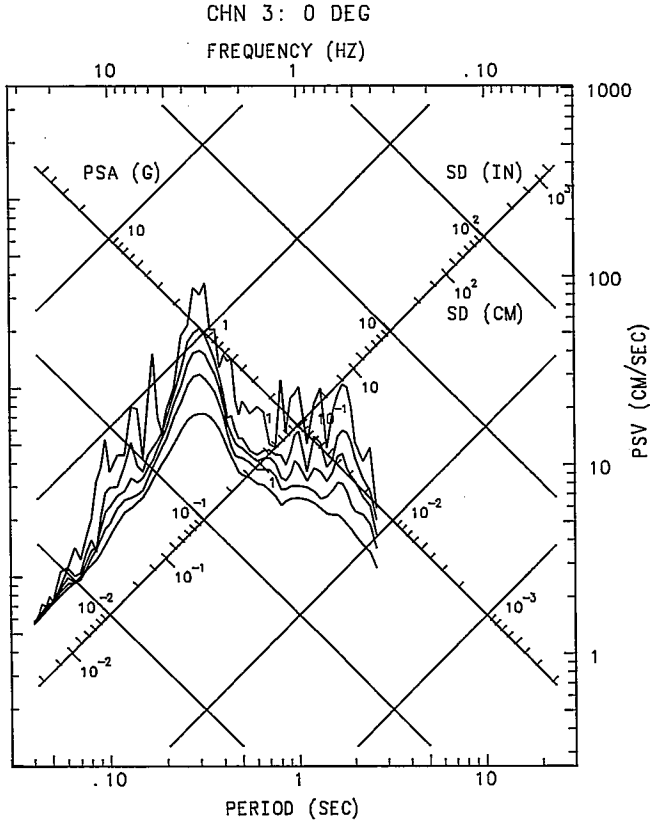
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

RECORD ID: 24400-S1606-91182.01

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







SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
LOS ANGELES - OBREGON PARK: CSMIP S/N 400
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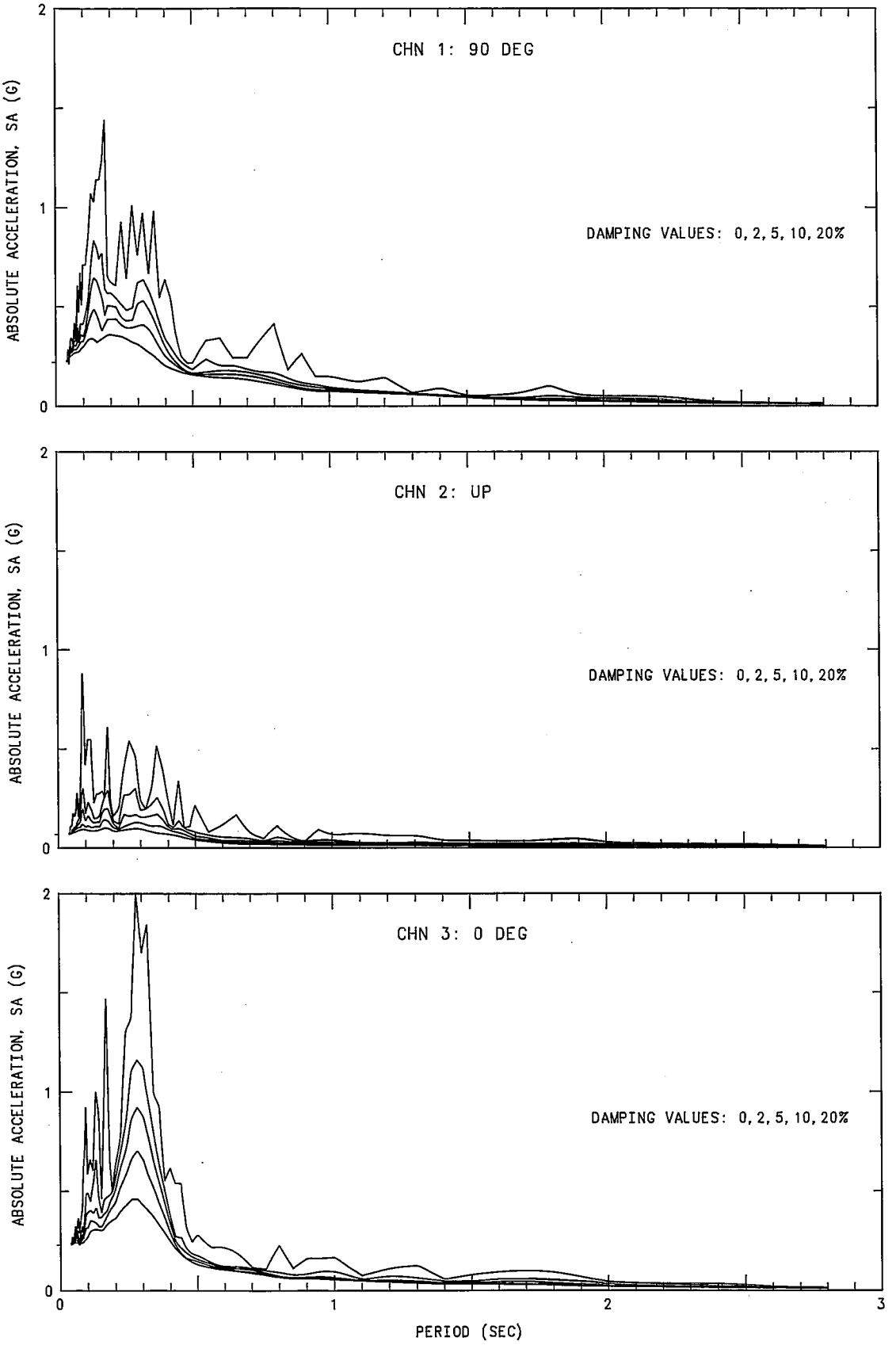
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)

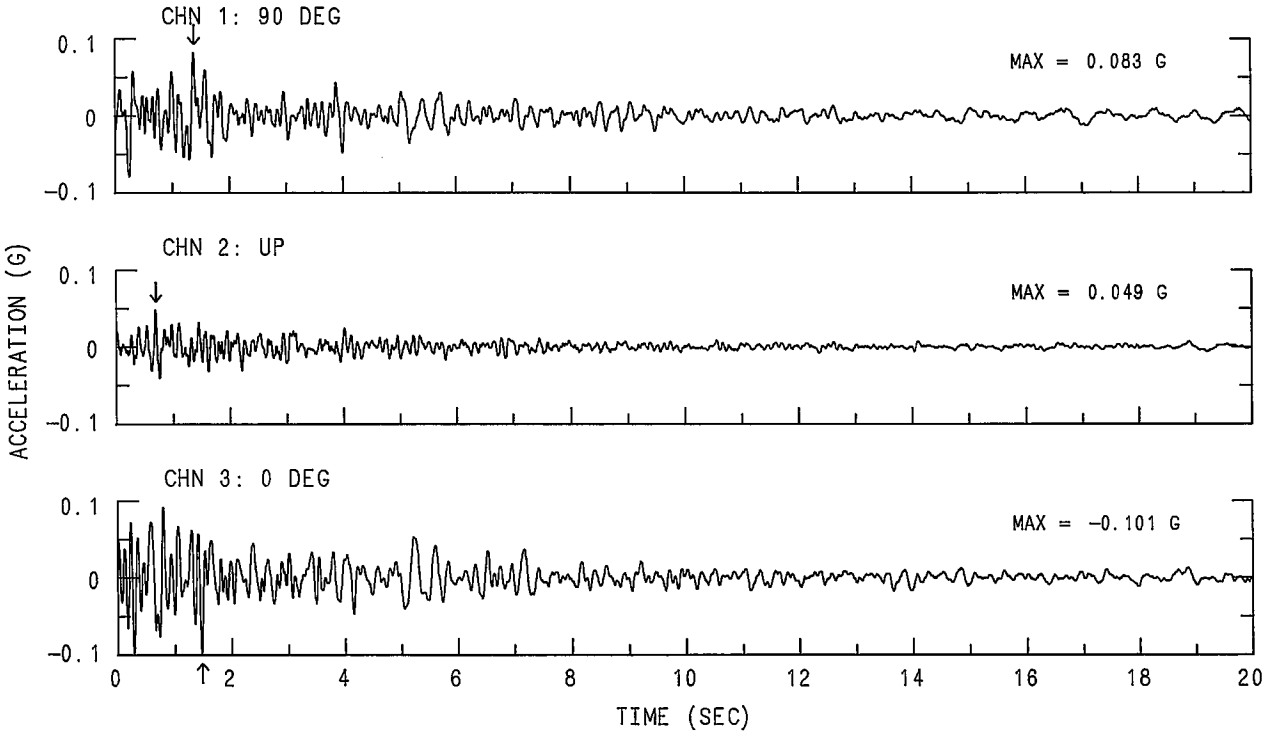


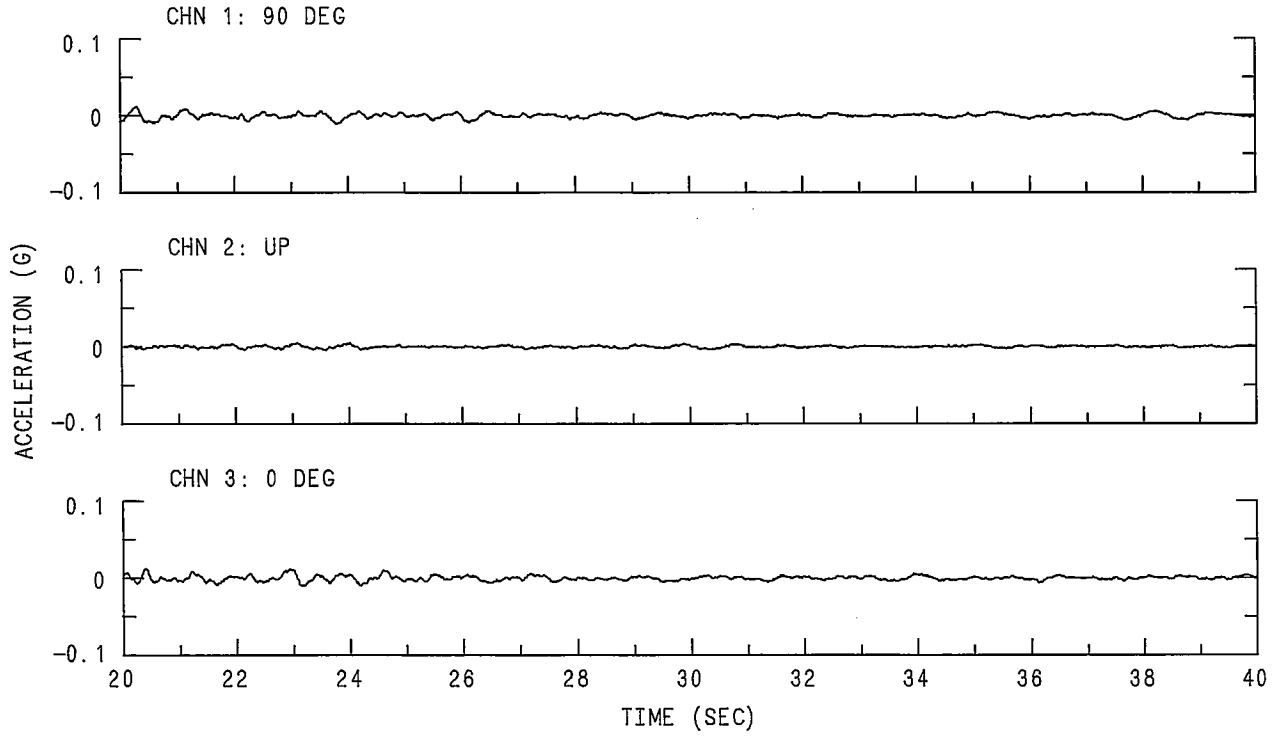
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

TARZANA - CEDAR HILL NURSERY: CSMIP S/N 436

PHASE 1 ACCELERATION

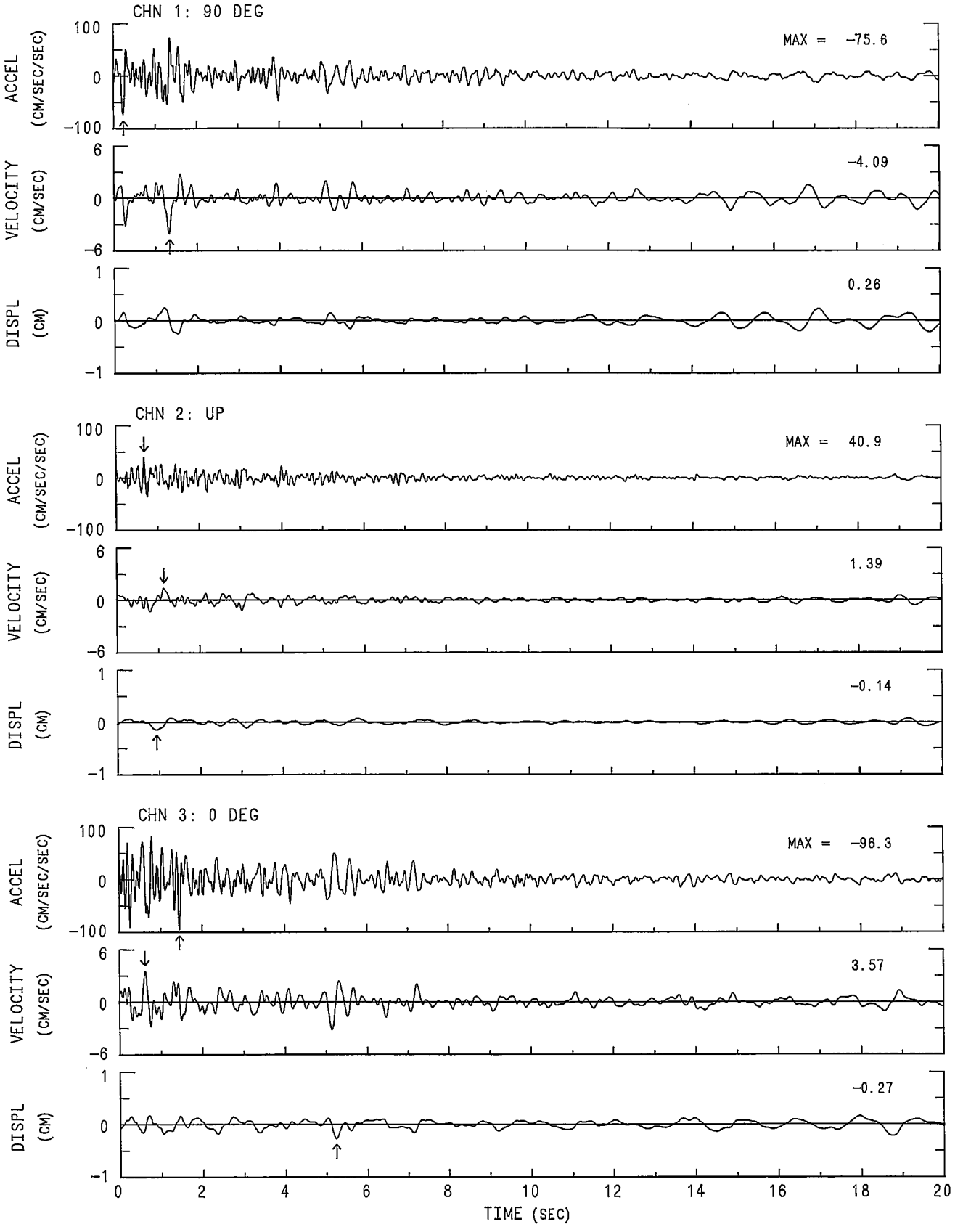
RECORD ID: 24436-S1614-91180.01





SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
TARZANA - CEDAR HILL NURSERY: CSMIP S/N 436

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.51 TO 23.6 HZ (0.04 TO 1.96 SEC) RECORD ID: 24436-S1614-91180.01



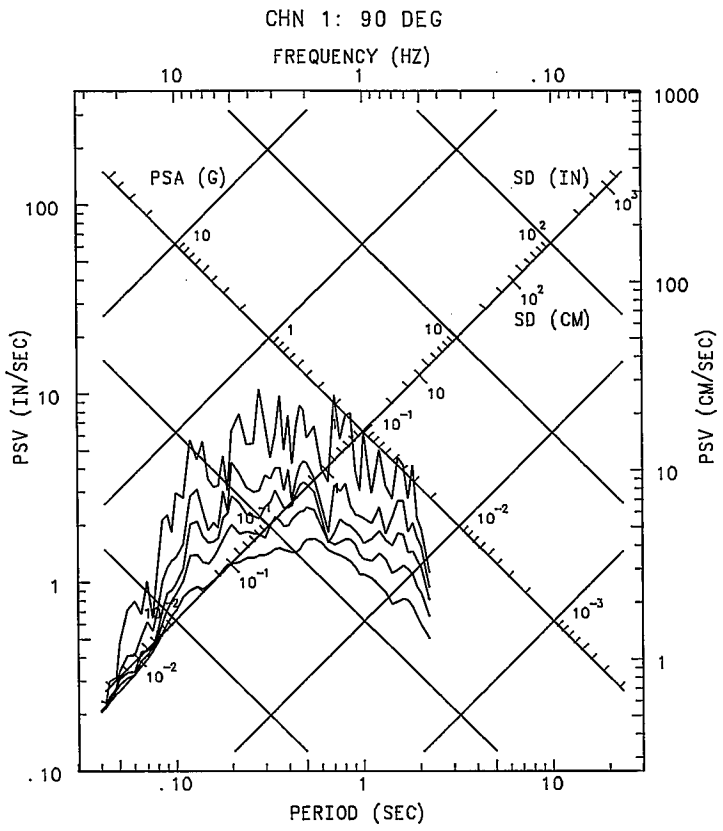
TARZANA - CEDAR HILL NURSERY: CSMIP S/N 436

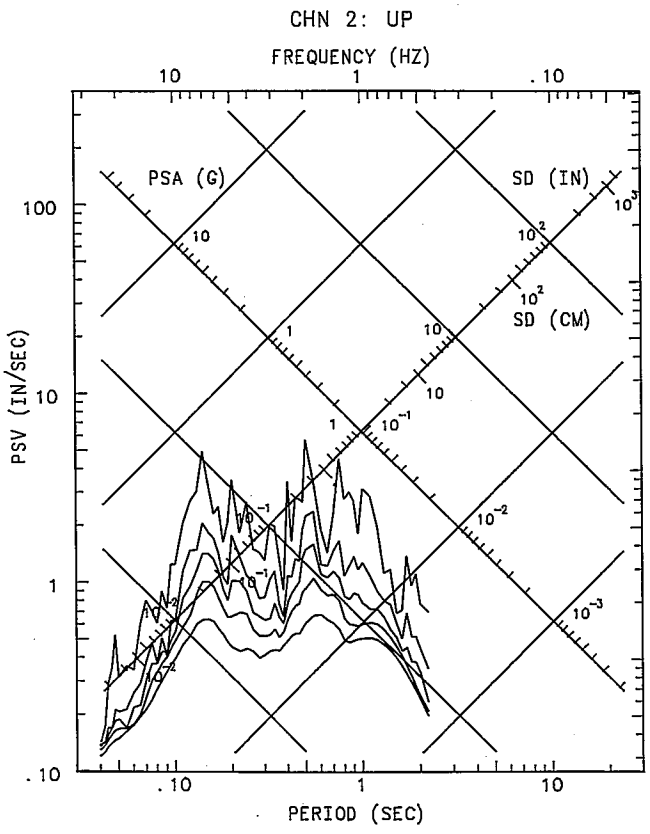
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

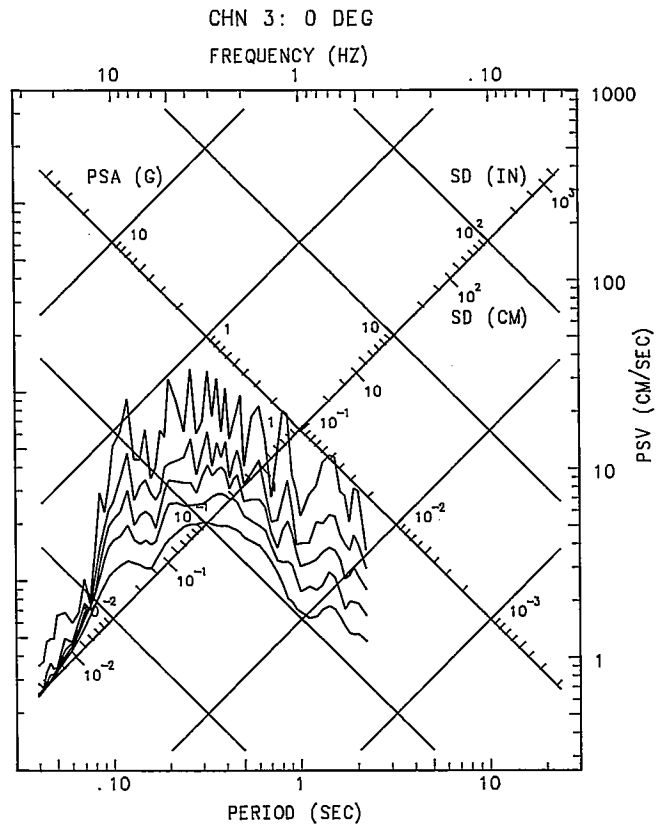
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.51 TO 23.6 HZ
(0.04 TO 1.96 SEC)

RECORD ID: 24436-S1614-91180.01

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

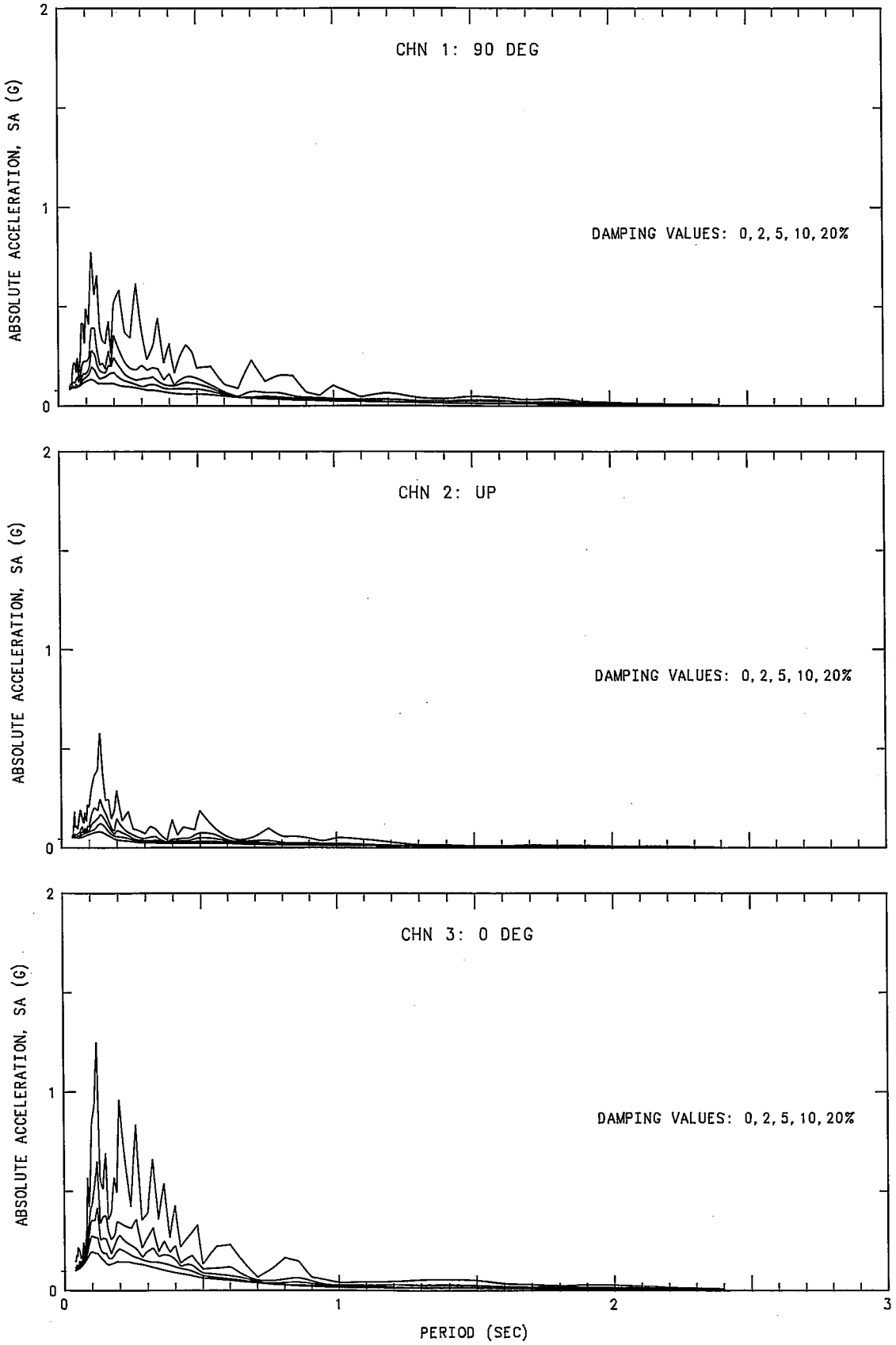






SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
TARZANA - CEDAR HILL NURSERY: CSMIP S/N 436

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24436-S1614-91180.01
USABLE DATA BANDWIDTH: 0.51 TO 23.6 HZ (0.04 TO 1.96 SEC)

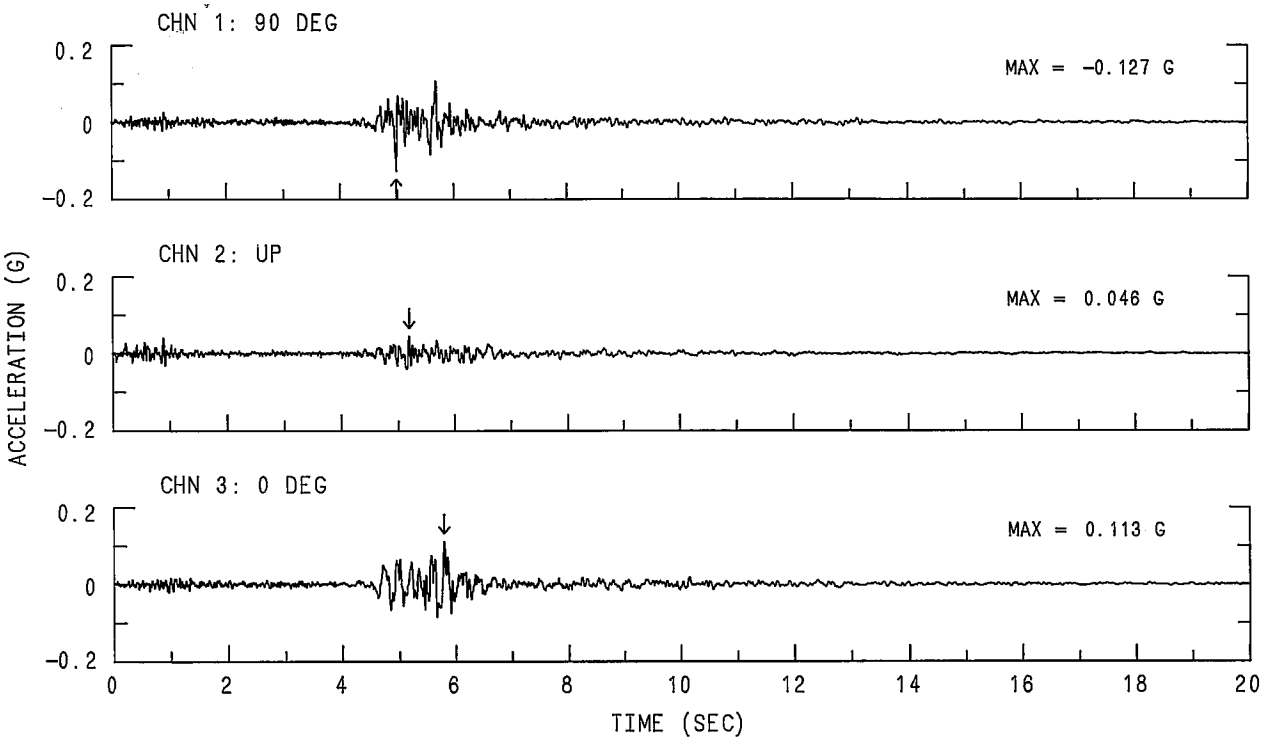


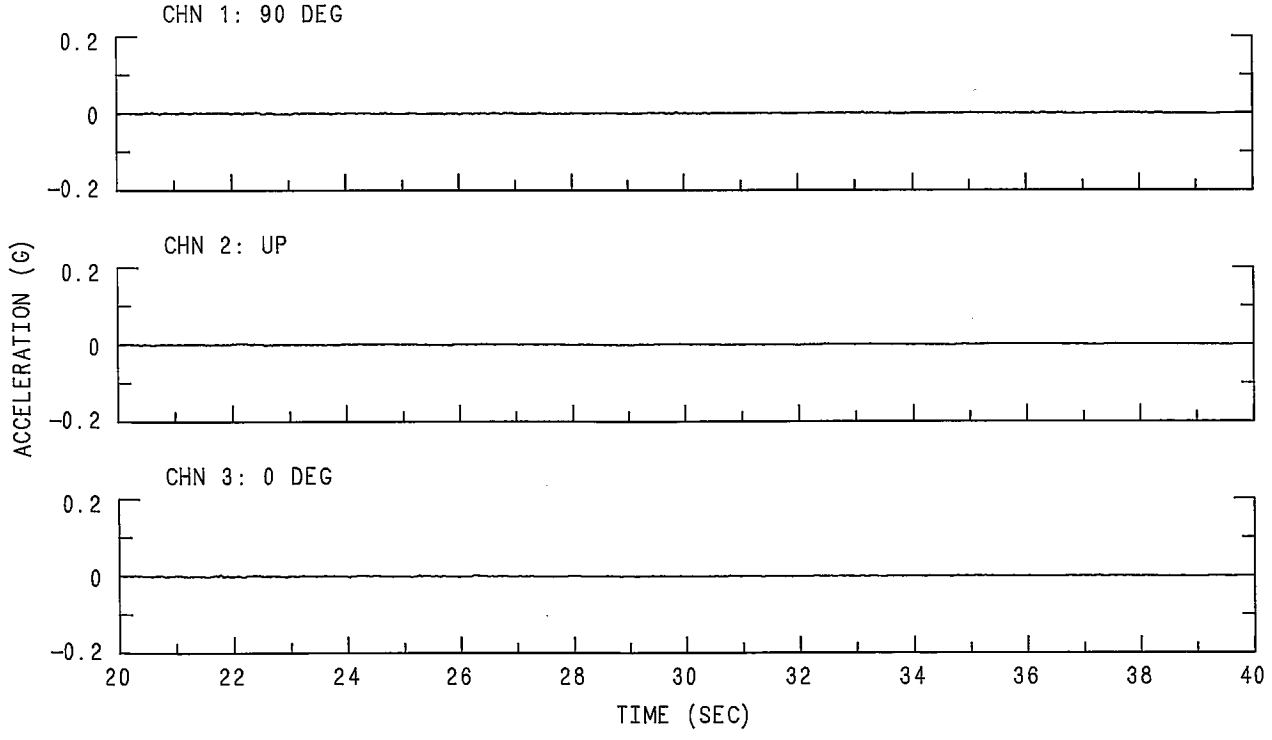
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

VASQUEZ ROCKS PARK: CSMIP S/N 047

PHASE 1 ACCELERATION

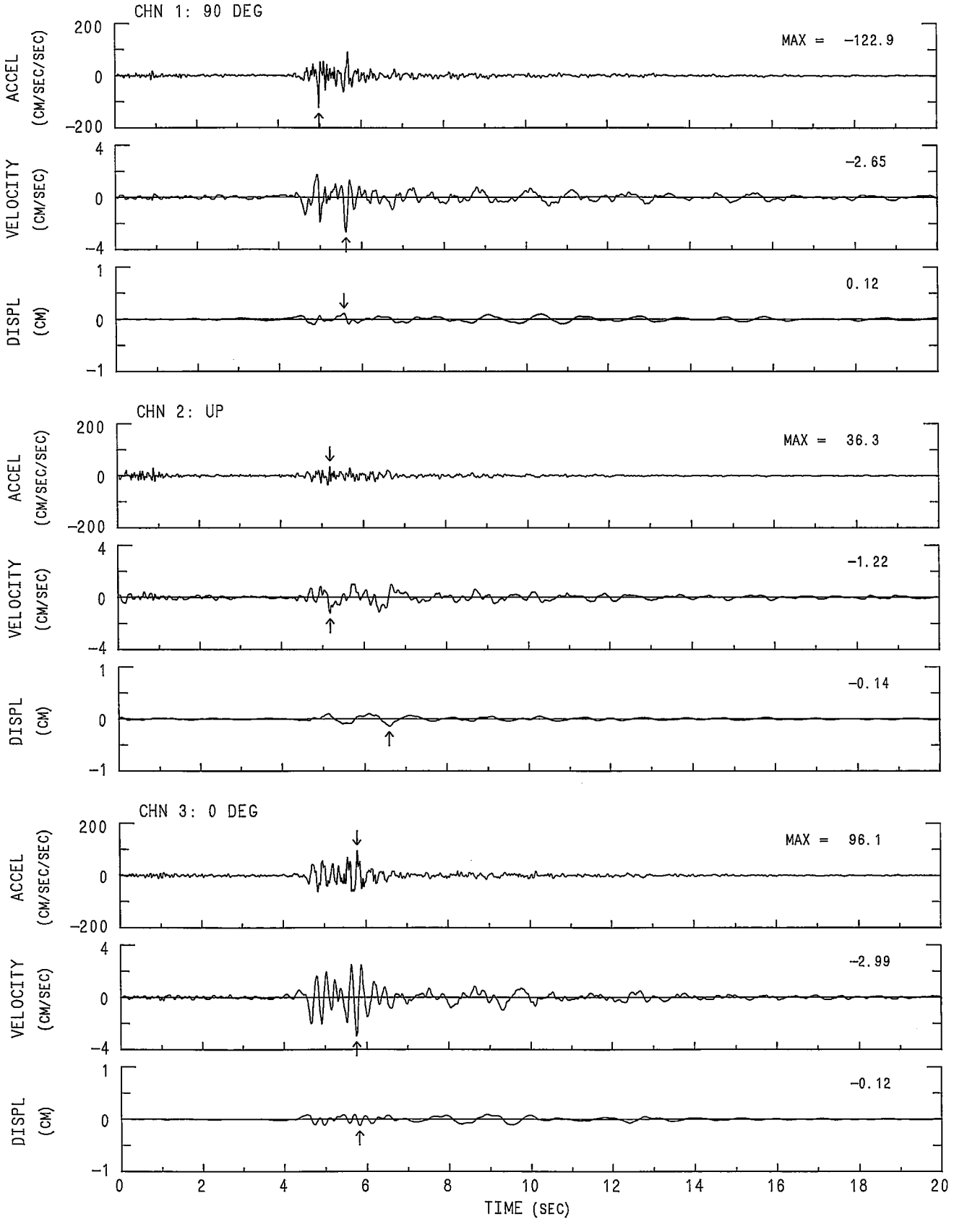
RECORD ID: 24047-S1820-91190.01





SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
VASQUEZ ROCKS PARK: CSMIP S/N 047

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.68 TO 23.6 HZ (0.04 TO 1.47 SEC) RECORD ID: 24047-S1820-91190.01



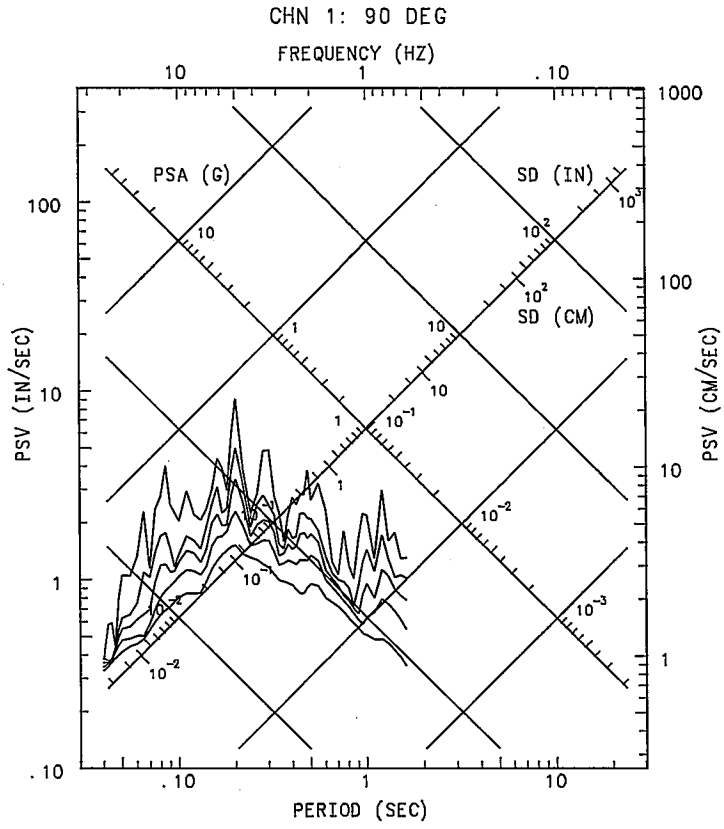
VASQUEZ ROCKS PARK: CSMIP S/N 047

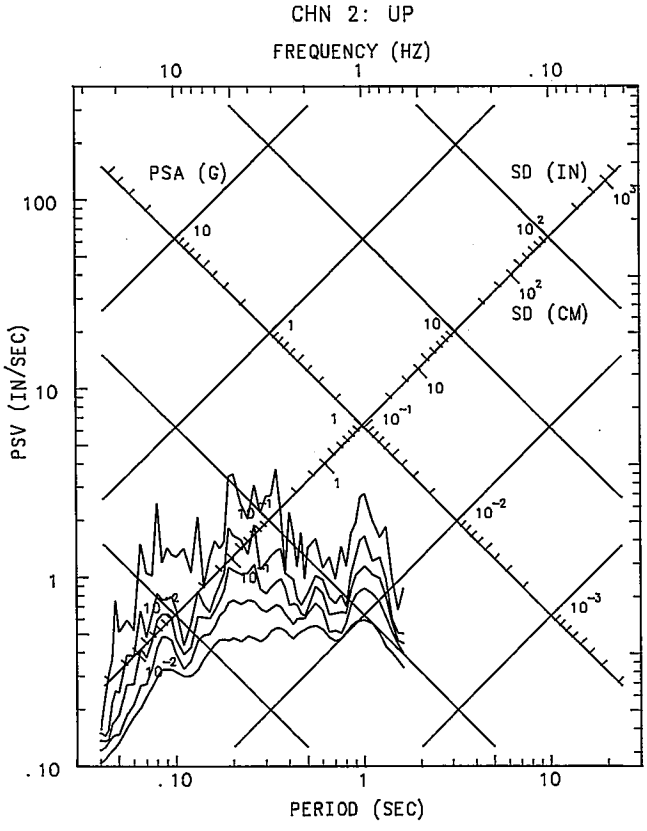
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

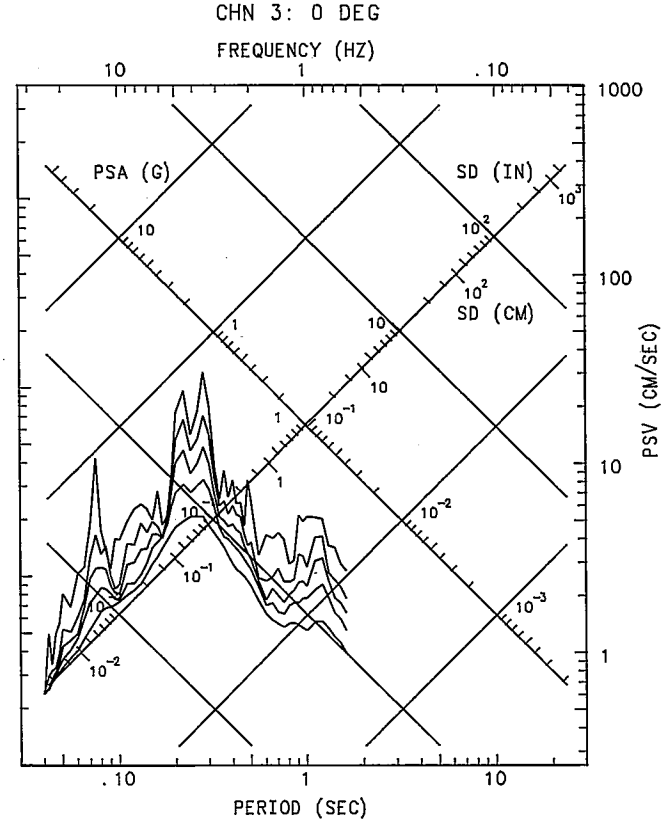
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.68 TO 23.6 HZ
(0.04 TO 1.47 SEC)

RECORD ID: 24047-S1820-91190.01

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

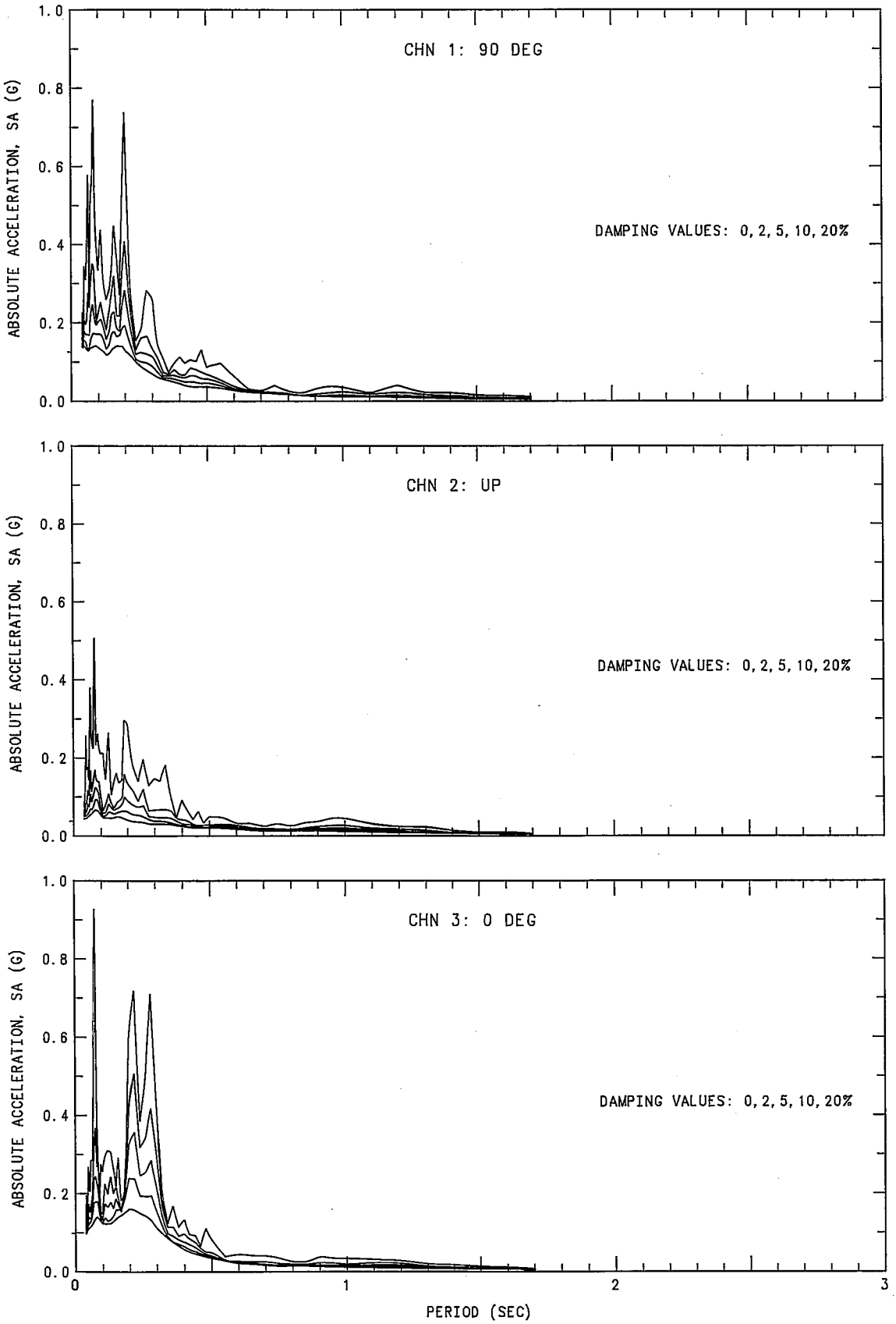






SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
VASQUEZ ROCKS PARK: CSMIP S/N 047

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24047-S1820-91190.01
USABLE DATA BANDWIDTH: 0.68 TO 23.6 HZ (0.04 TO 1.47 SEC)

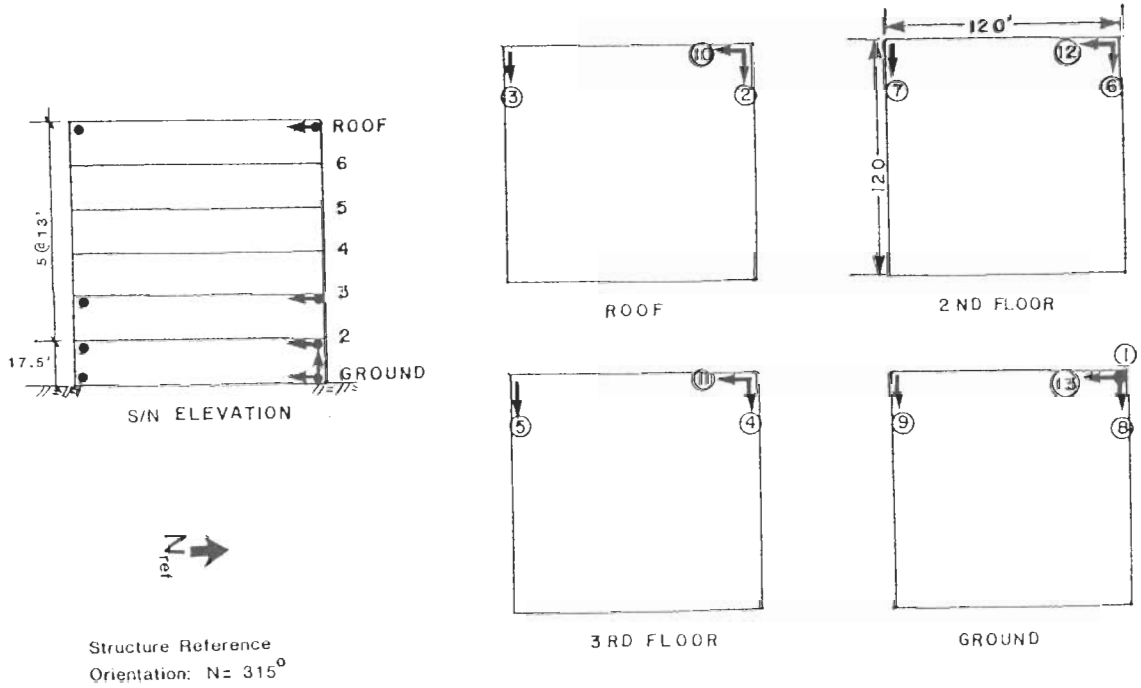


Burbank - 6-story Office Bldg.
(CSMIP Station No. 24370)

No. of Stories above/below ground: 6/0
Plan Shape: Rectangular
Base Dimensions: 120' x 120'
Typical Floor Dimensions: 120' x 120'
Design Date: 1976
Construction Date: 1977

Vertical Load Carrying System:
3" concrete slabs over metal deck supported by steel frames.
Lateral Force Resisting System:
Perimeter moment resisting steel frames.
Foundation Type:
Concrete caissons (approx. 32' deep)

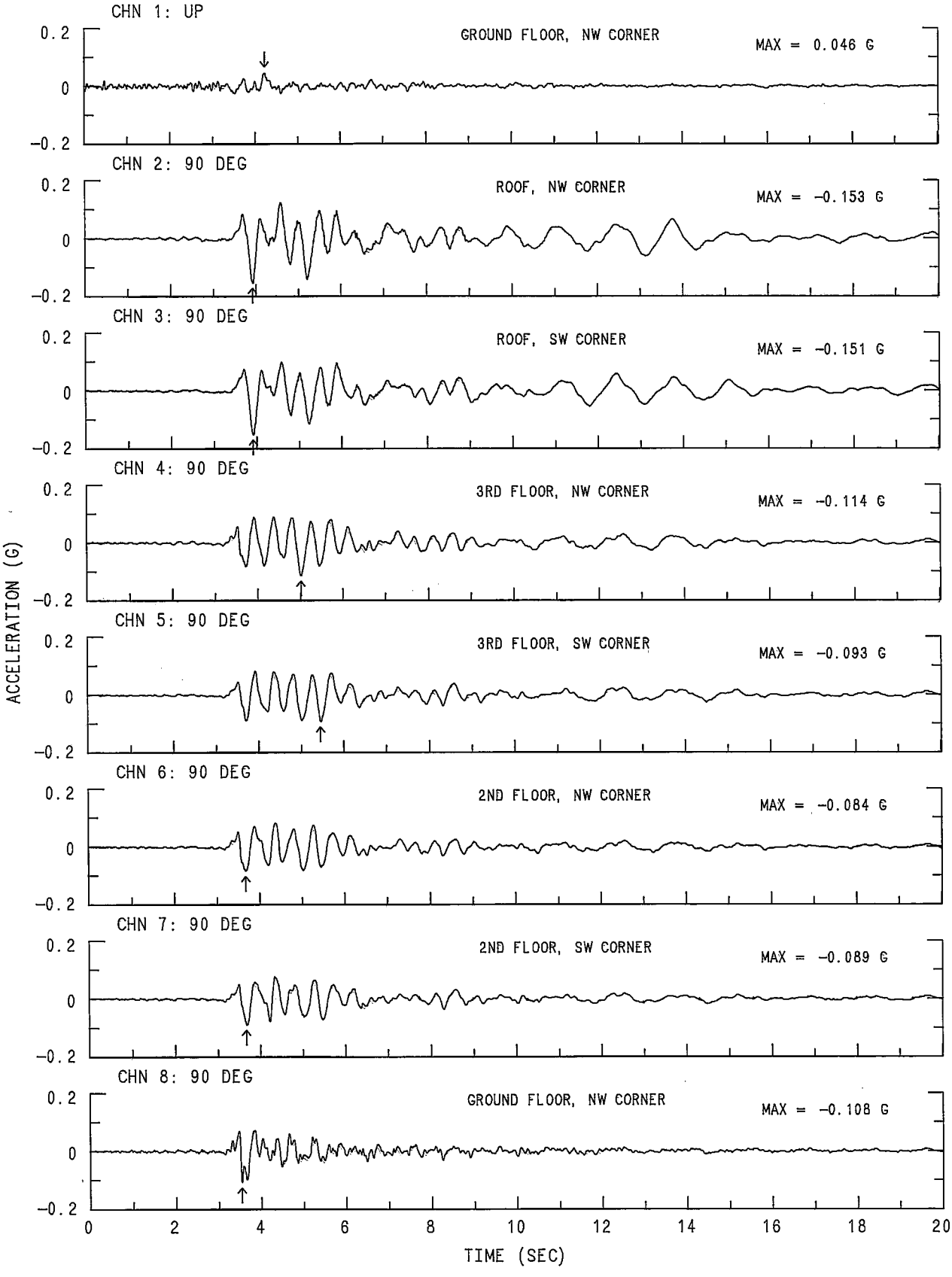
SENSOR LOCATIONS



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

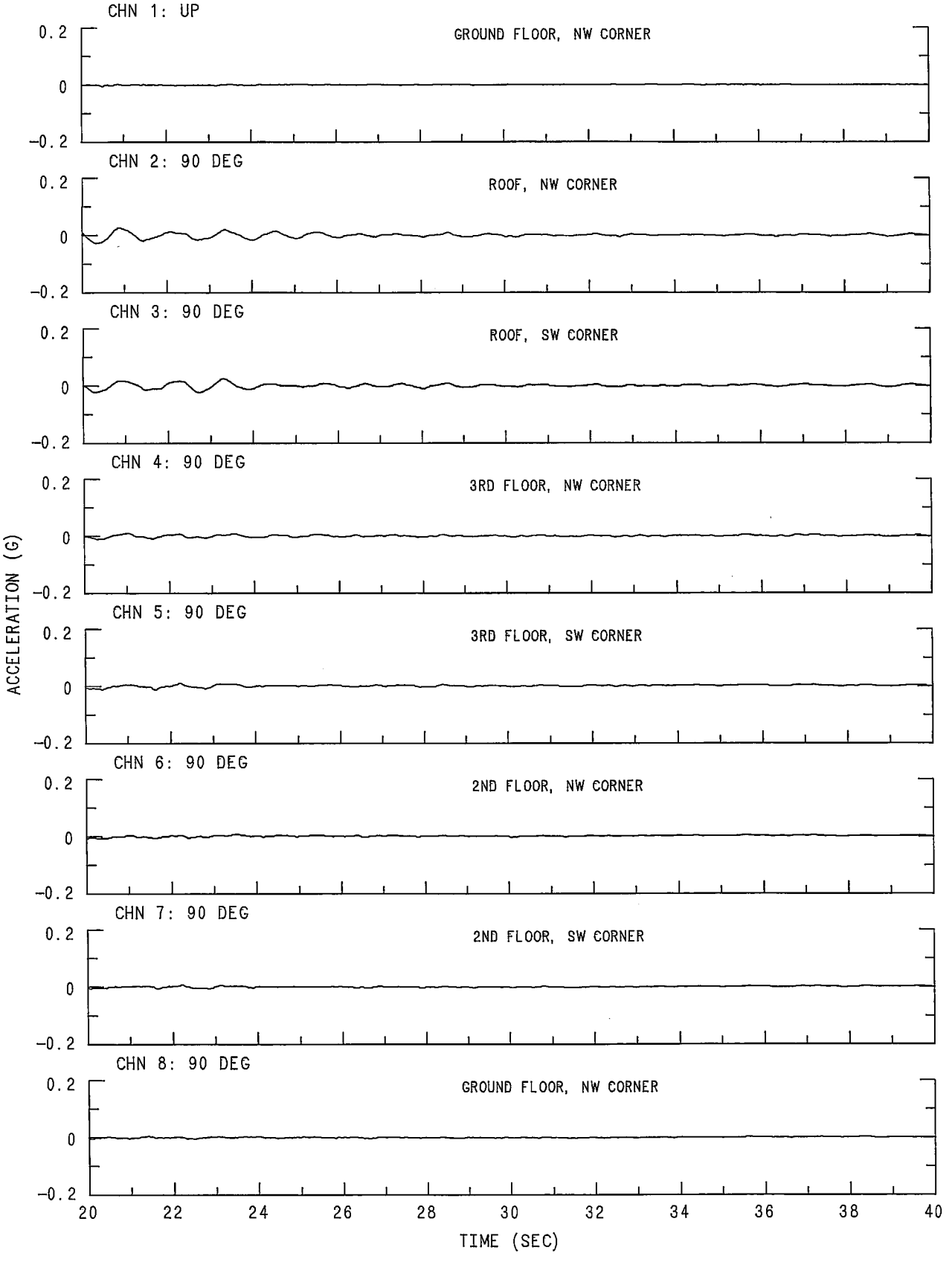
PHASE 1 ACCELERATION. RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

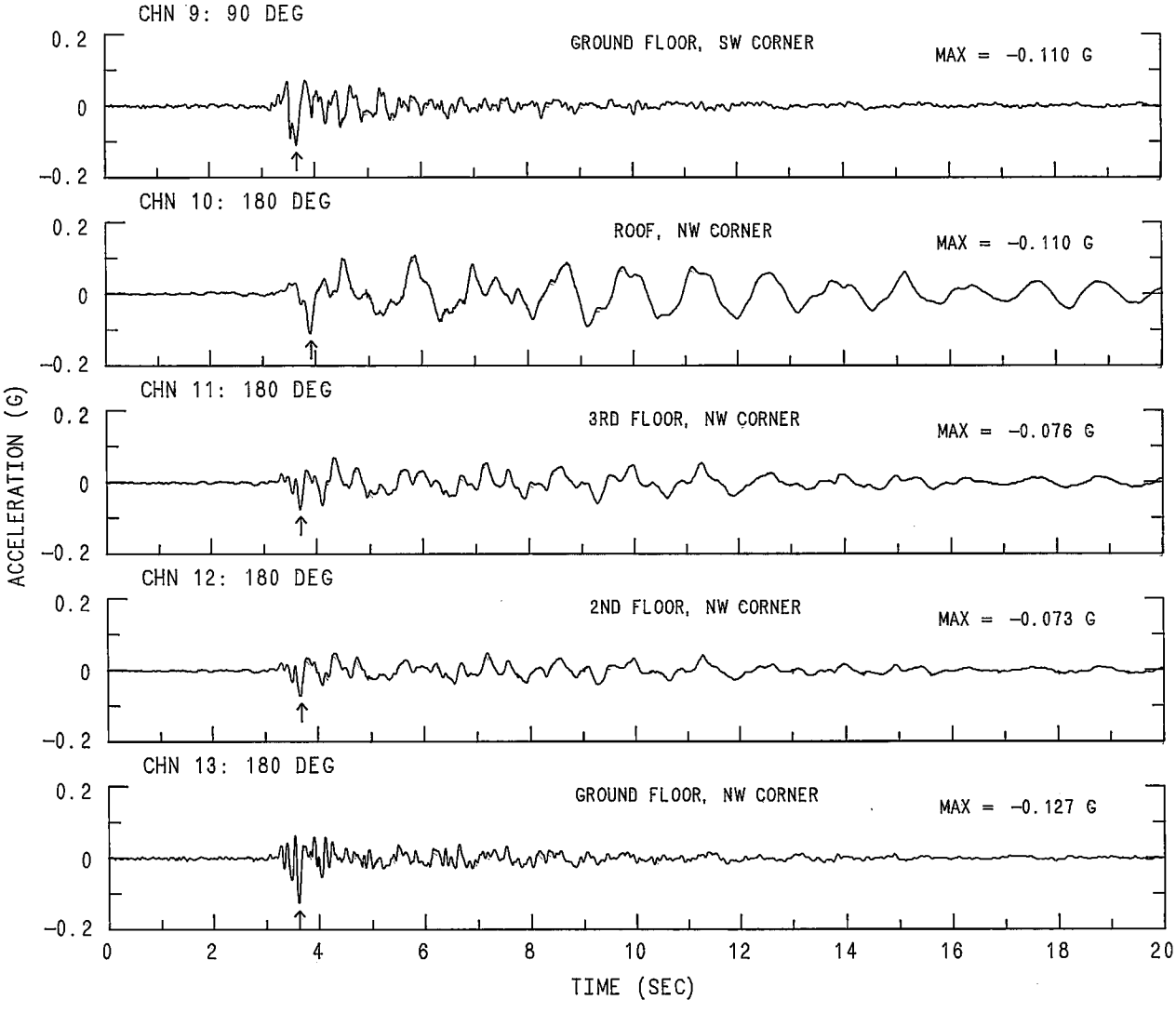
PHASE 1 ACCELERATION. RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

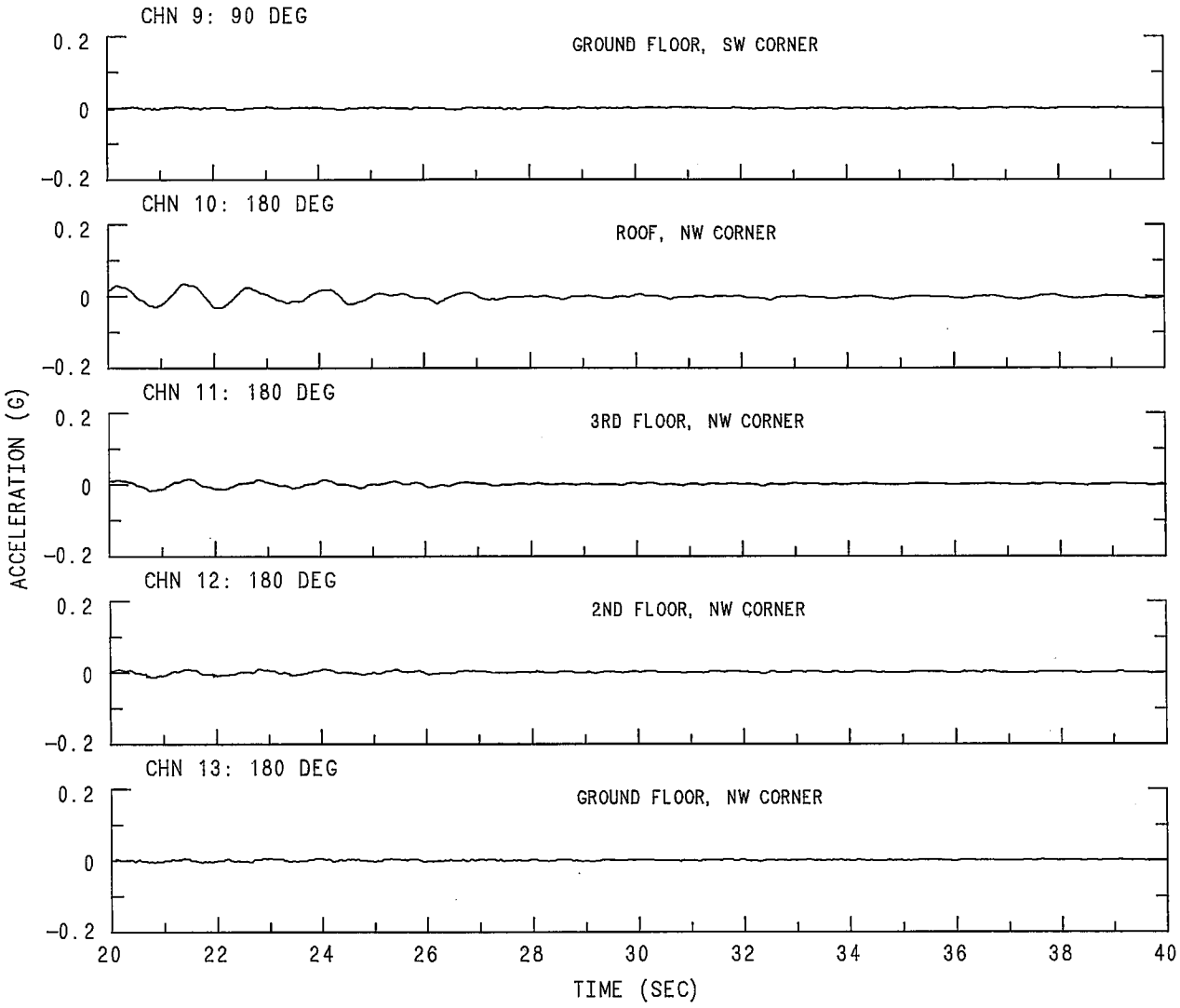
PHASE 1 ACCELERATION. RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

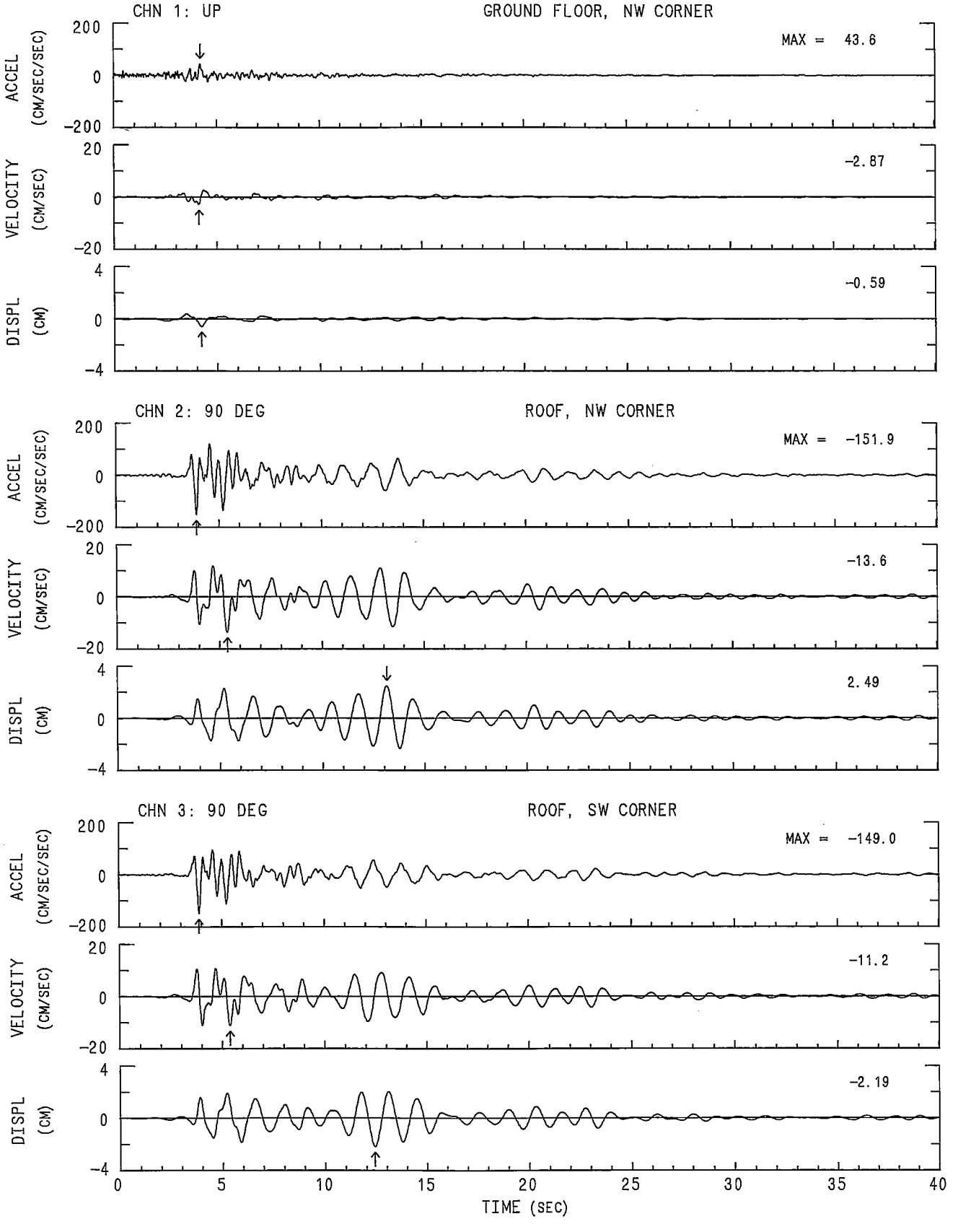
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

PHASE 1 ACCELERATION. RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

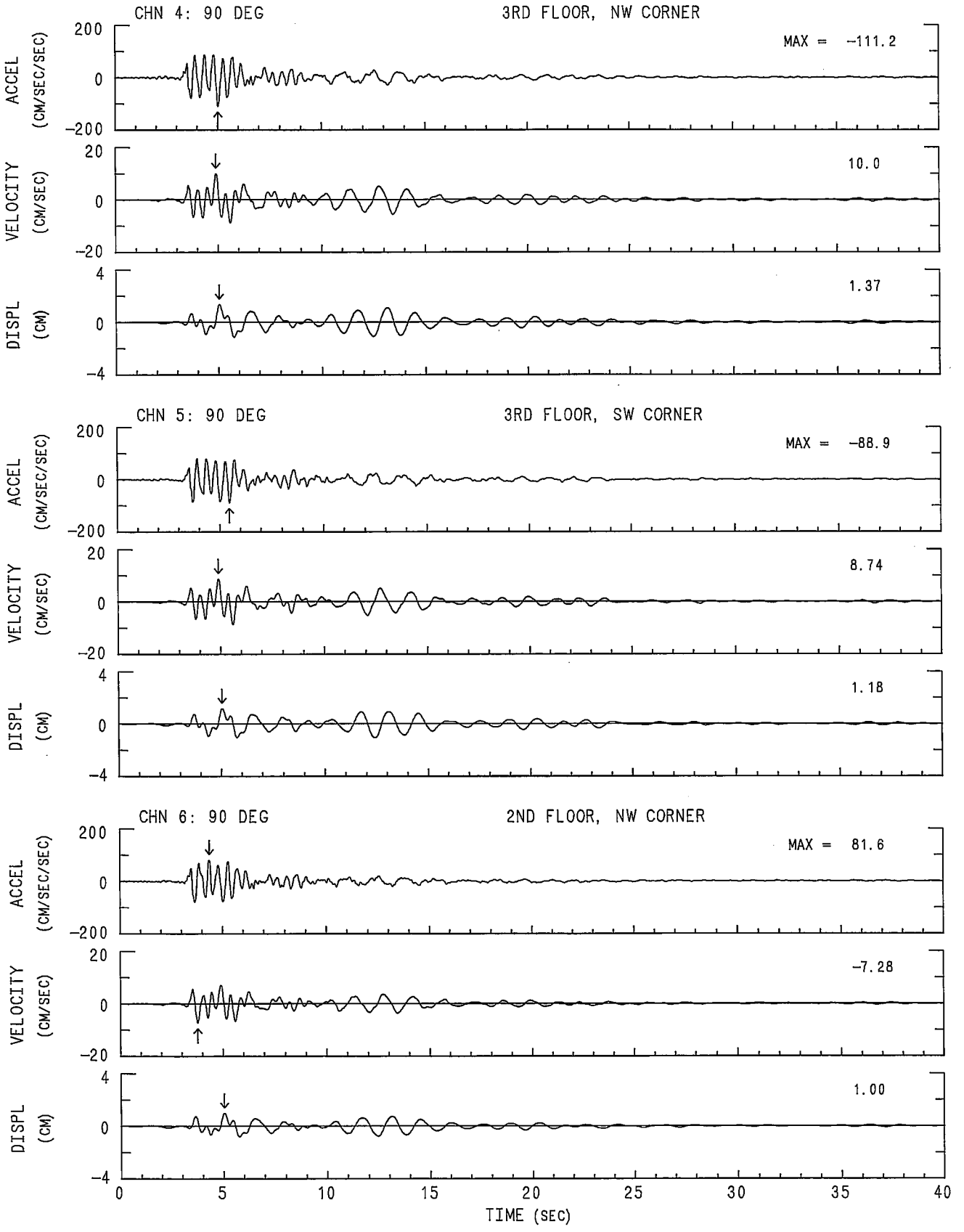
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

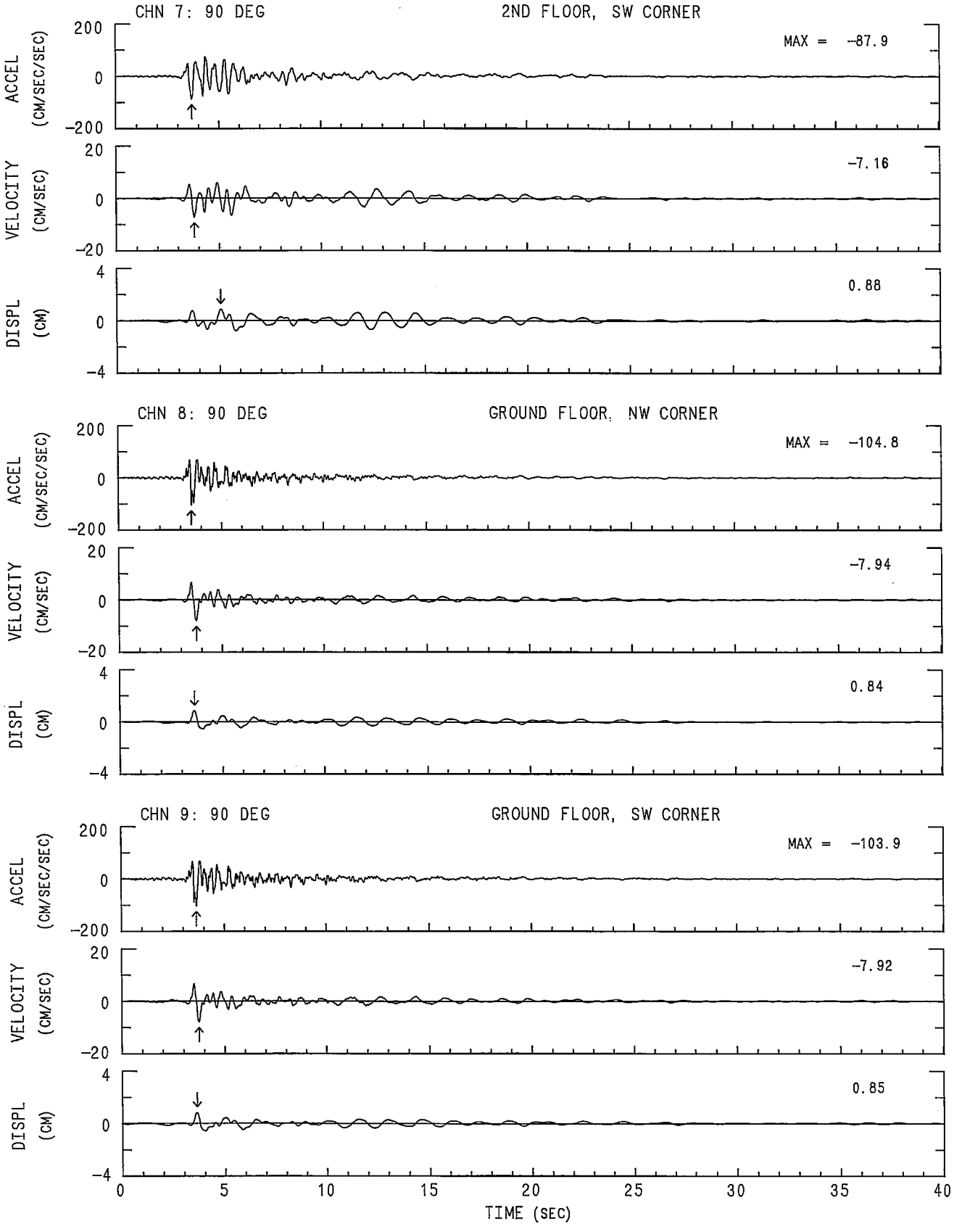
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

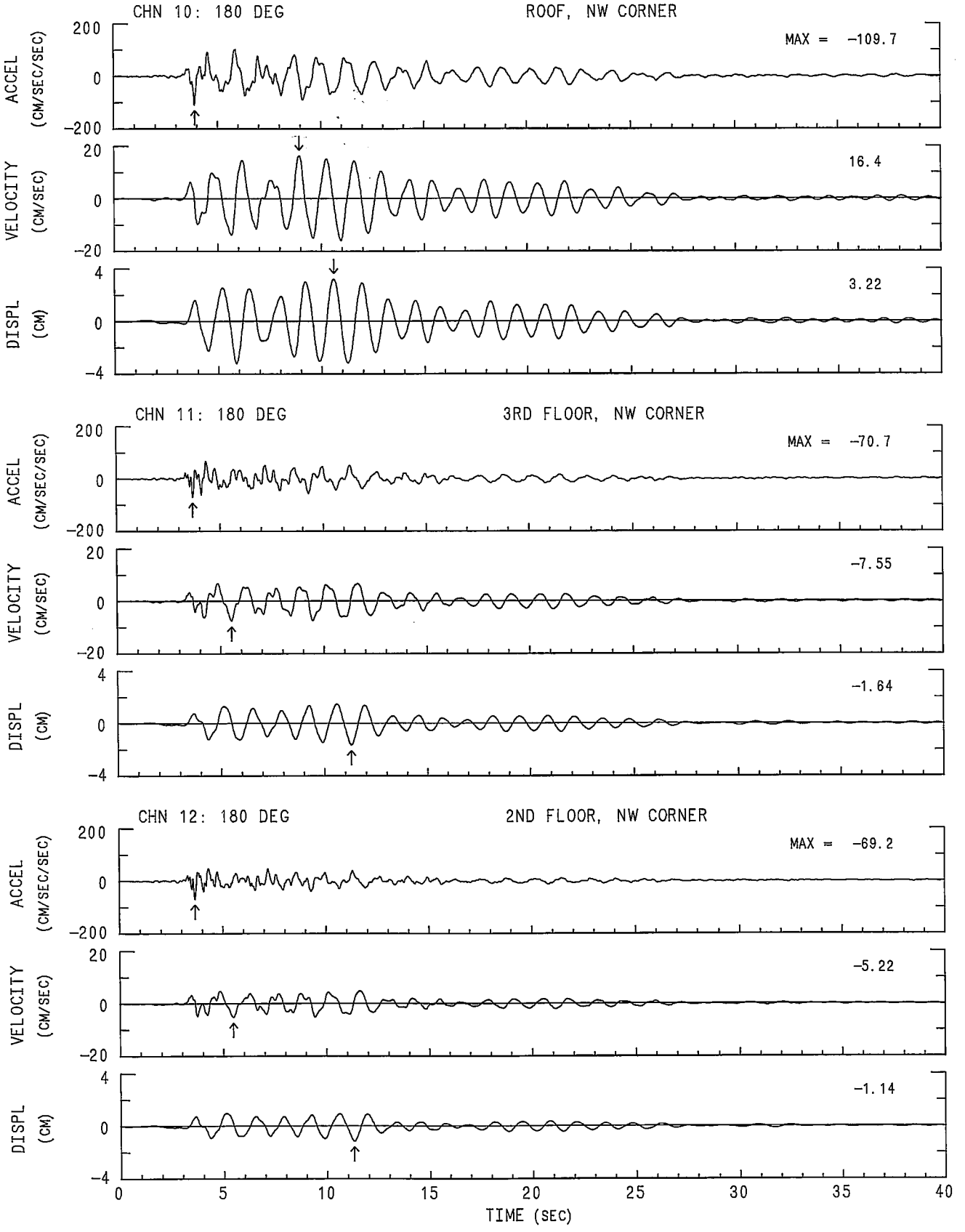
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

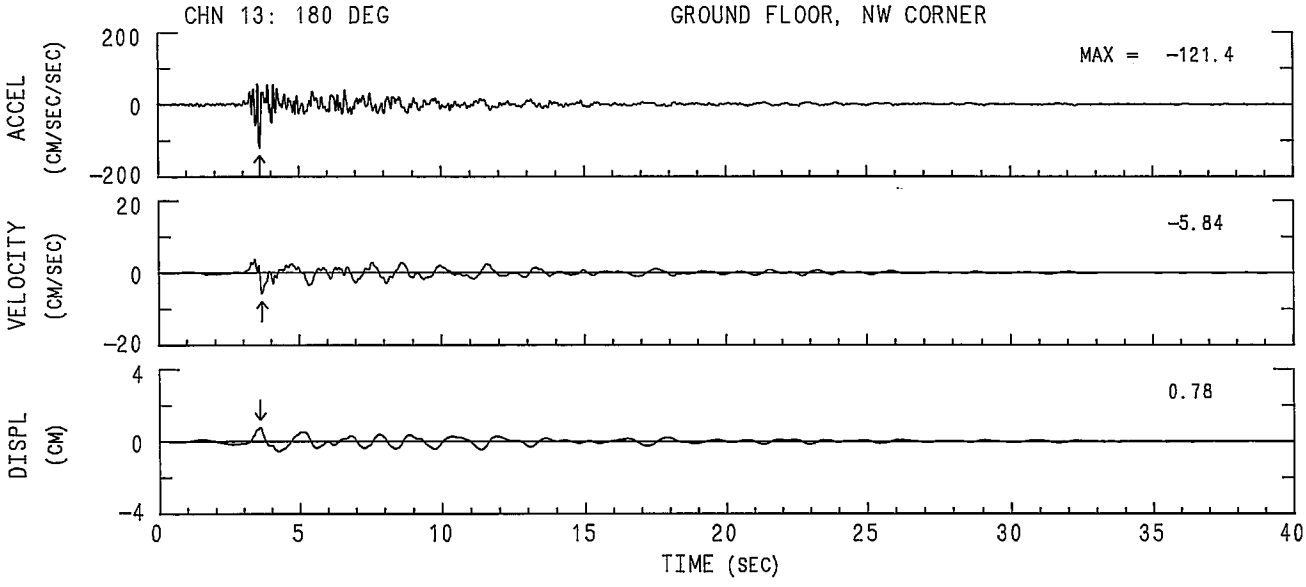
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24370-C0196-91182.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24370-C0196-91182.01



BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

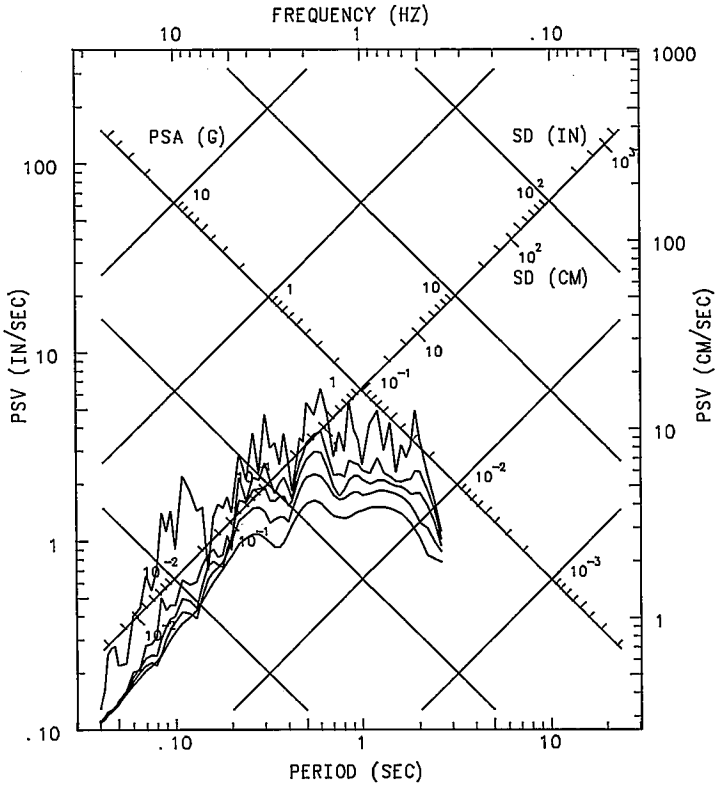
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

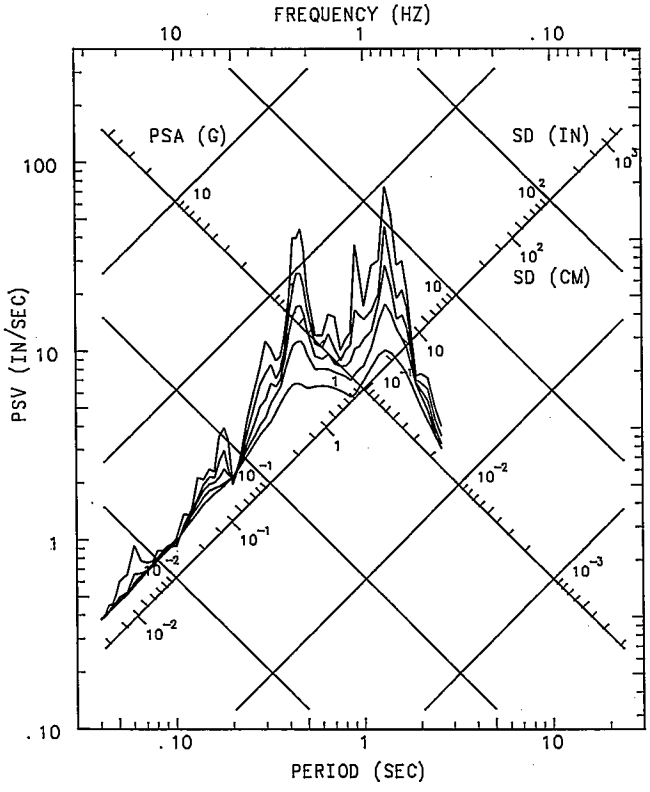
RECORD ID: 24370-C0196-91182.01

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

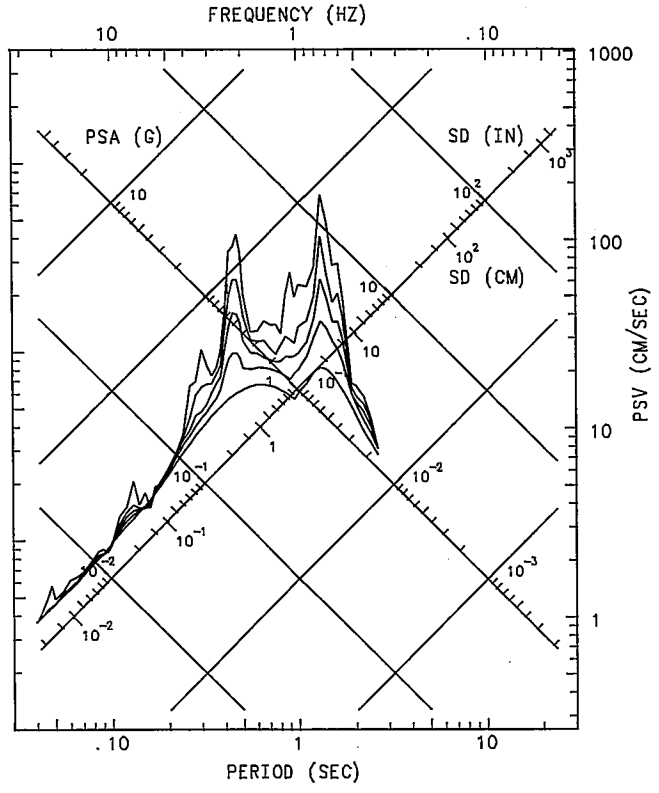
CHN 1: UP
GROUND FLOOR, NW CORNER



CHN 2: 90 DEG
ROOF, NW CORNER



CHN 3: 90 DEG
ROOF, SW CORNER



BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

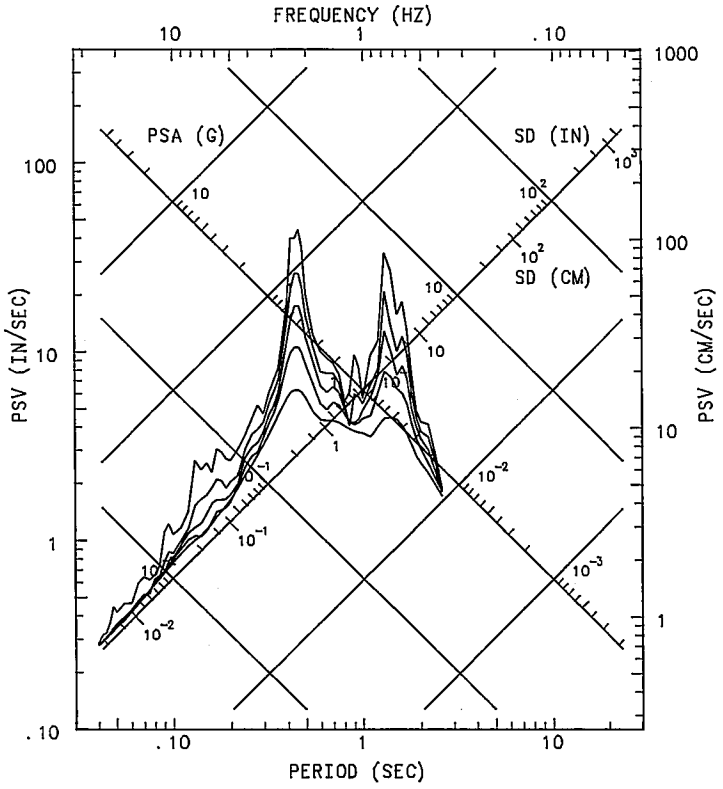
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

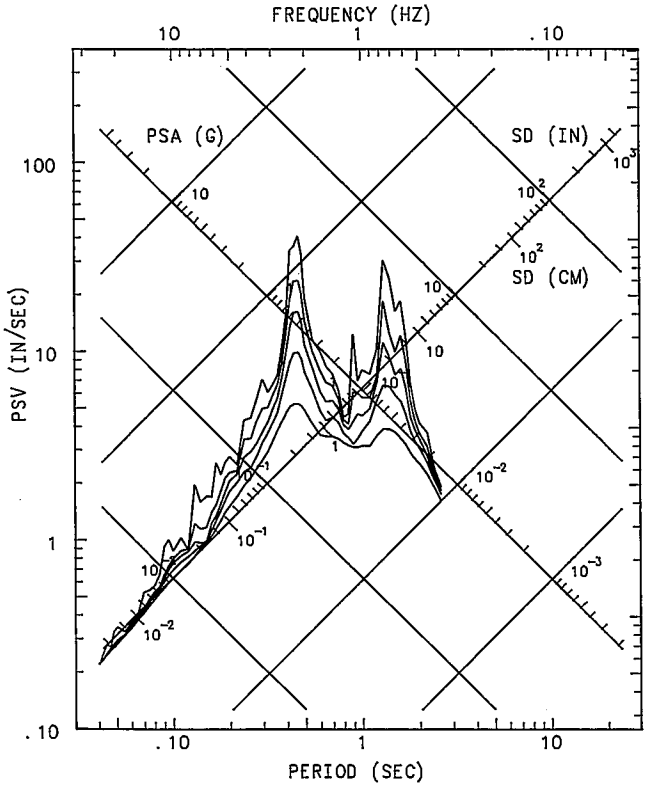
RECORD ID: 24370-C0196-91182.01

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

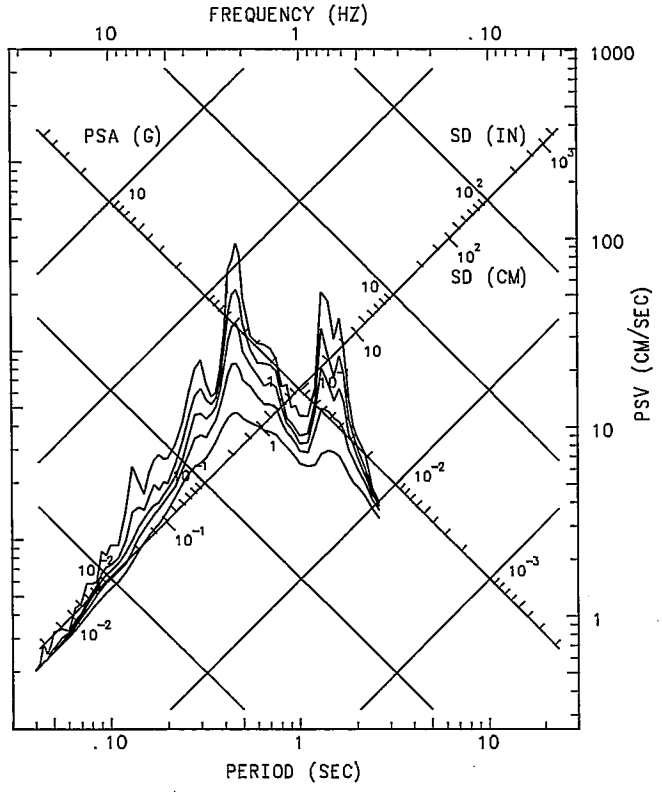
CHN 4: 90 DEG
3RD FLOOR, NW CORNER



CHN 5: 90 DEG
3RD FLOOR, SW CORNER



CHN 6: 90 DEG
2ND FLOOR, NW CORNER



BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

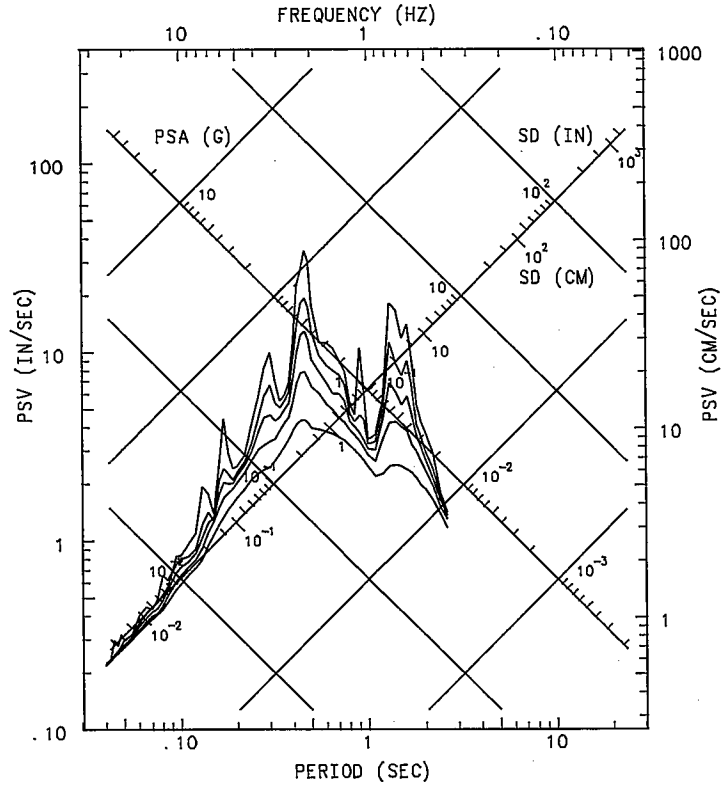
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

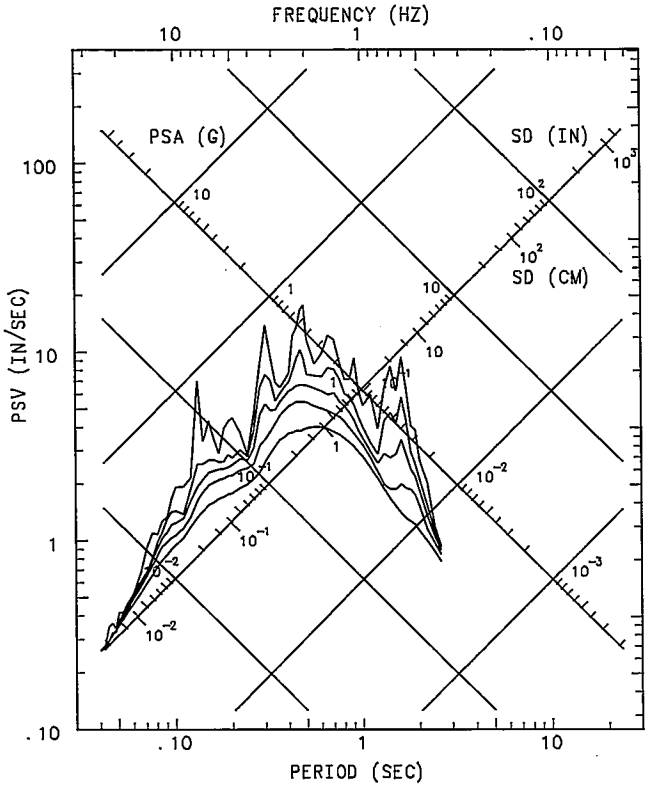
RECORD ID: 24370-C0196-91182.01

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

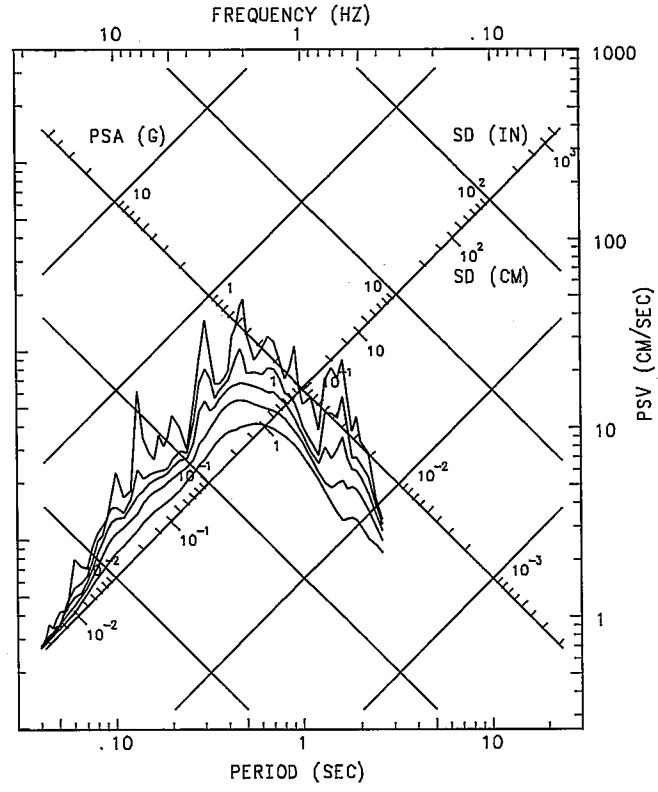
CHN 7: 90 DEG
2ND FLOOR, SW CORNER



CHN 8: 90 DEG
GROUND FLOOR, NW CORNER



CHN 9: 90 DEG
GROUND FLOOR, SW CORNER



BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

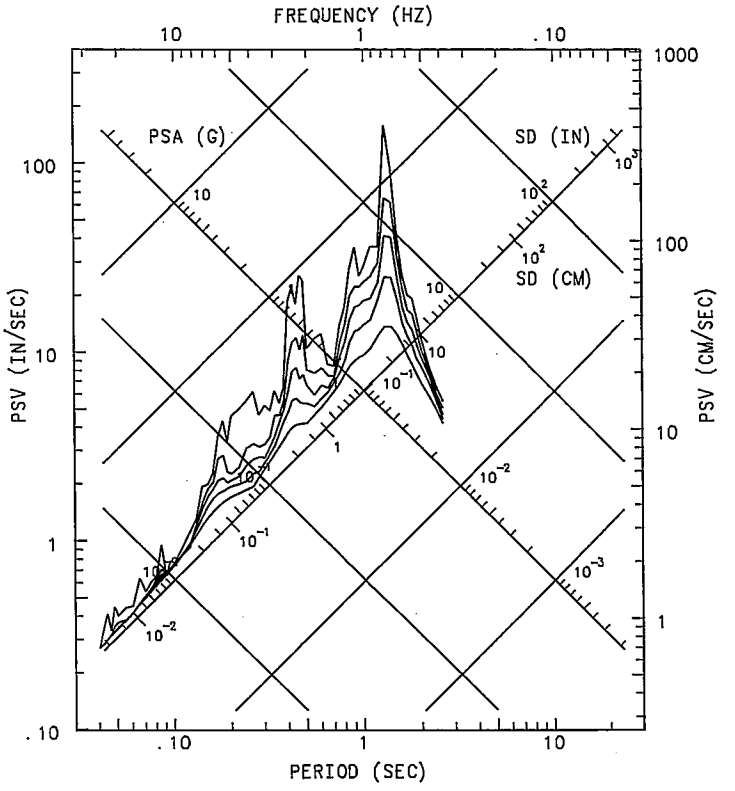
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

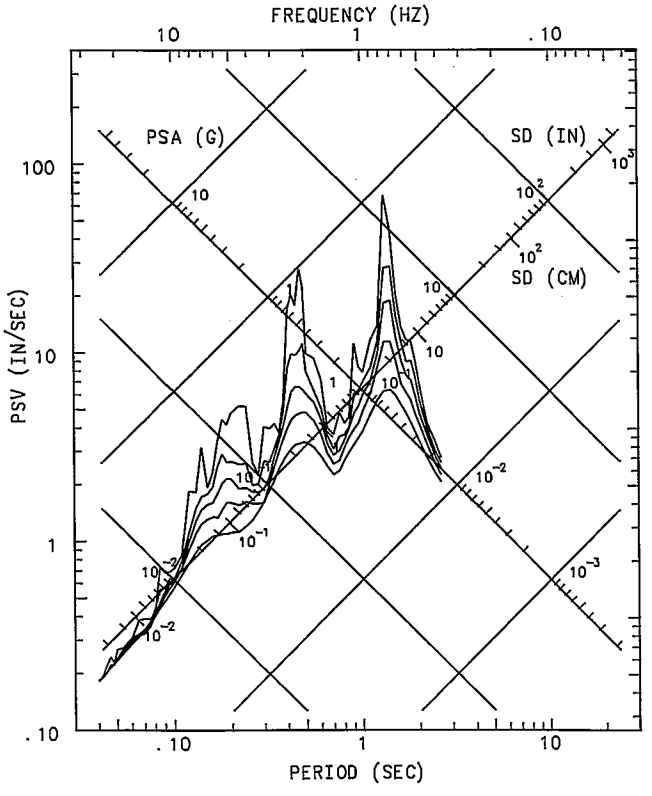
RECORD ID: 24370-C0196-91182.01

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

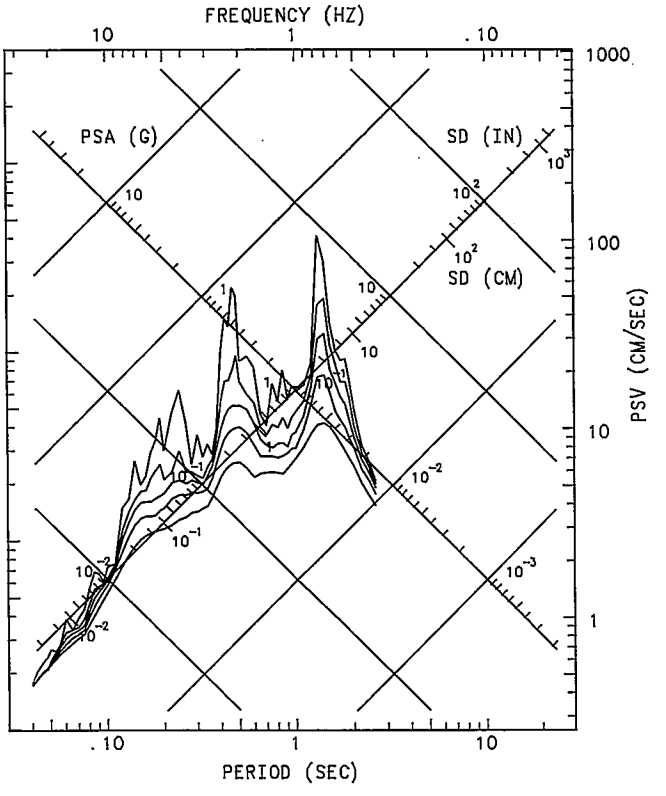
CHN 10: 180 DEG
ROOF, NW CORNER



CHN 11: 180 DEG
3RD FLOOR, NW CORNER



CHN 12: 180 DEG
2ND FLOOR, NW CORNER



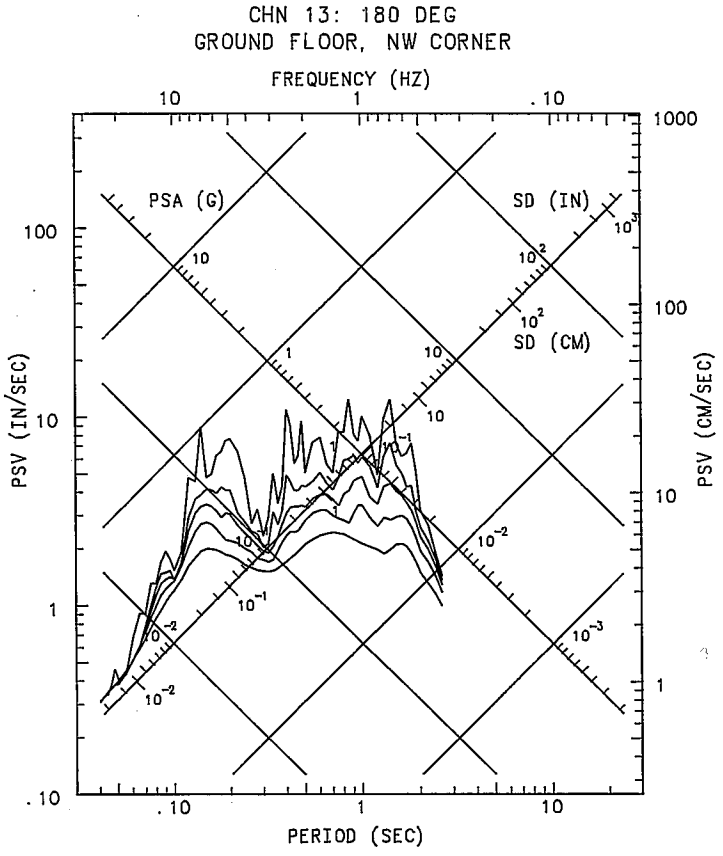
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370

SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

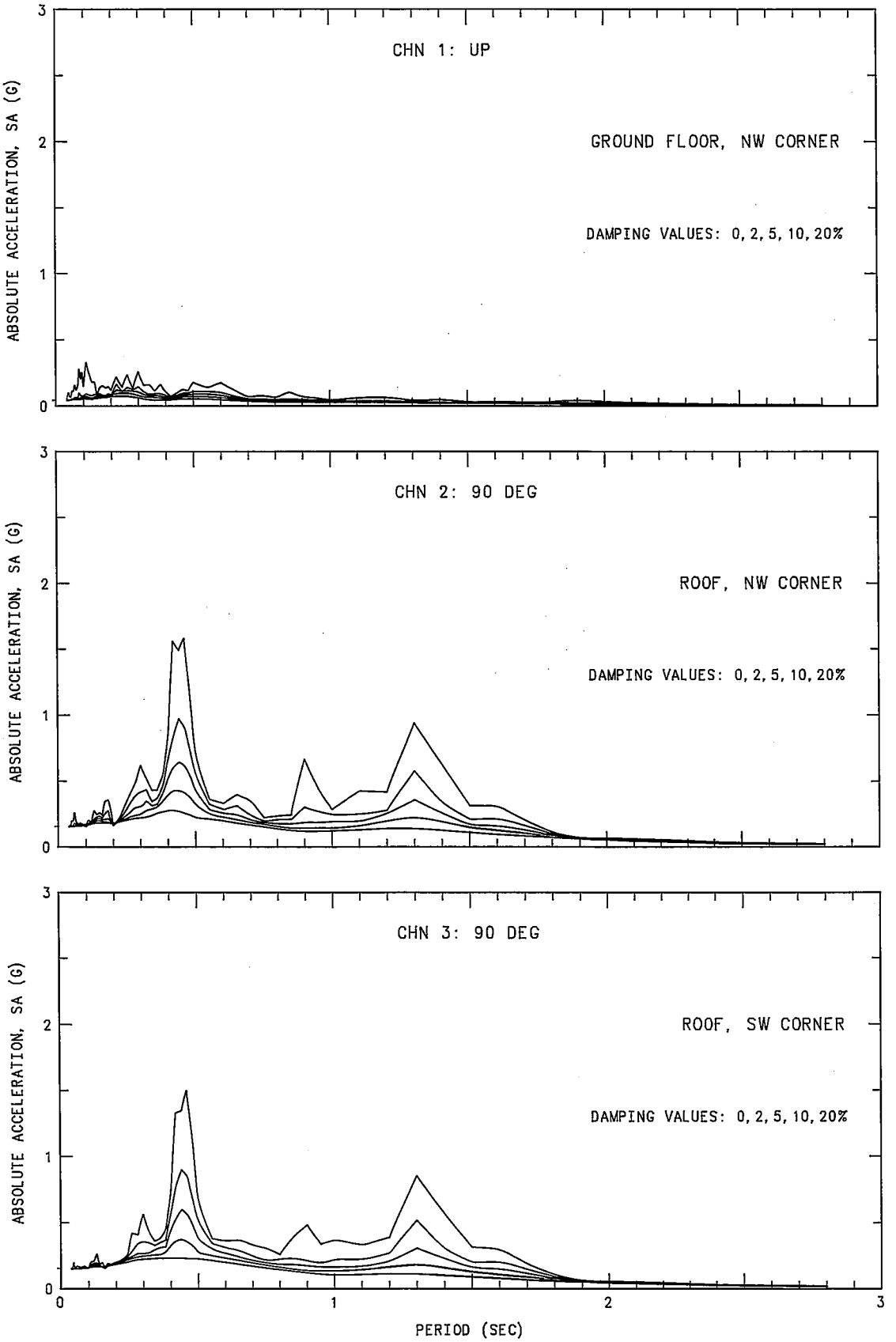
PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

RECORD ID: 24370-C0196-91182.01

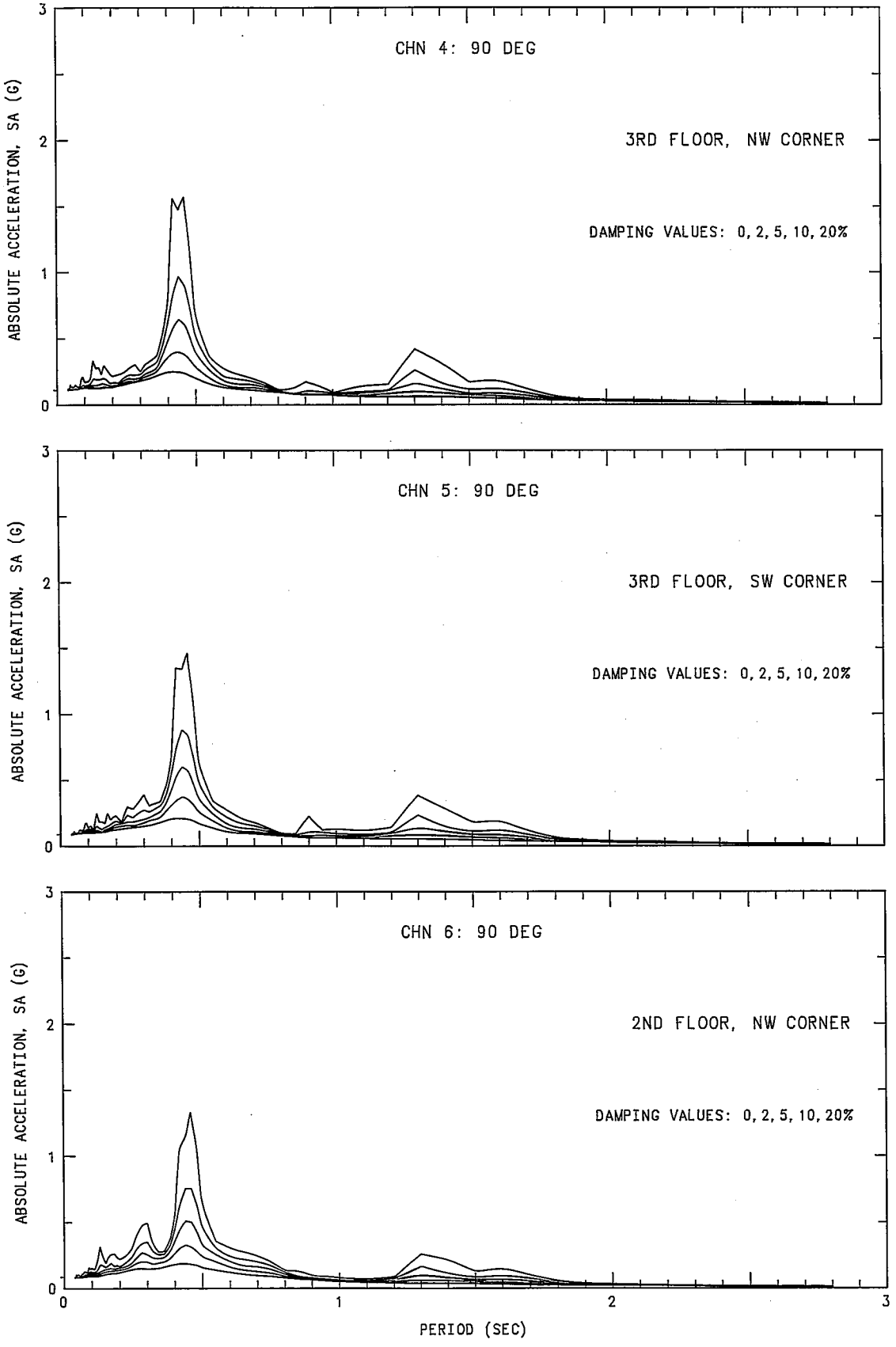
—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%



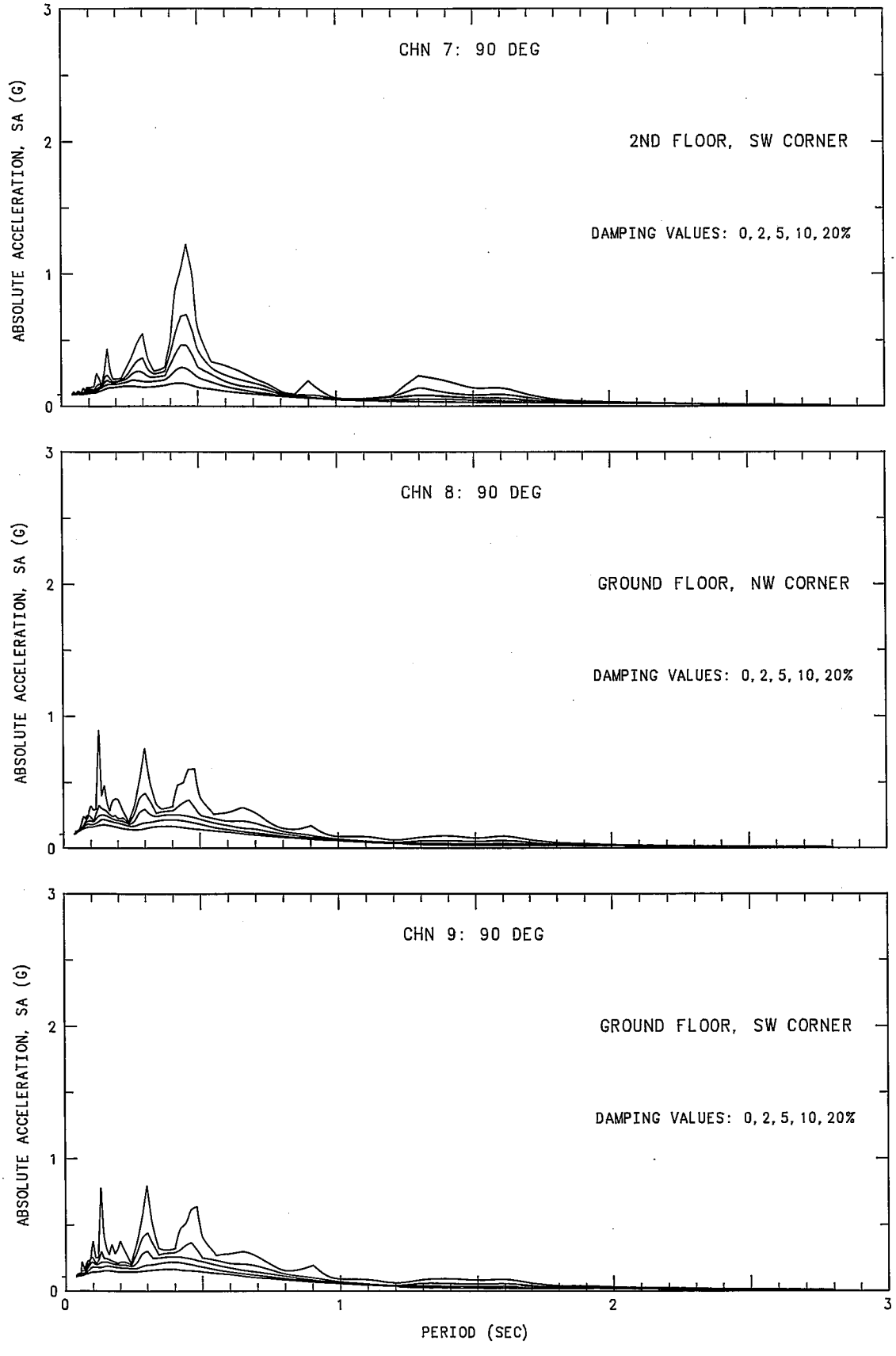
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24370-C0196-91182.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



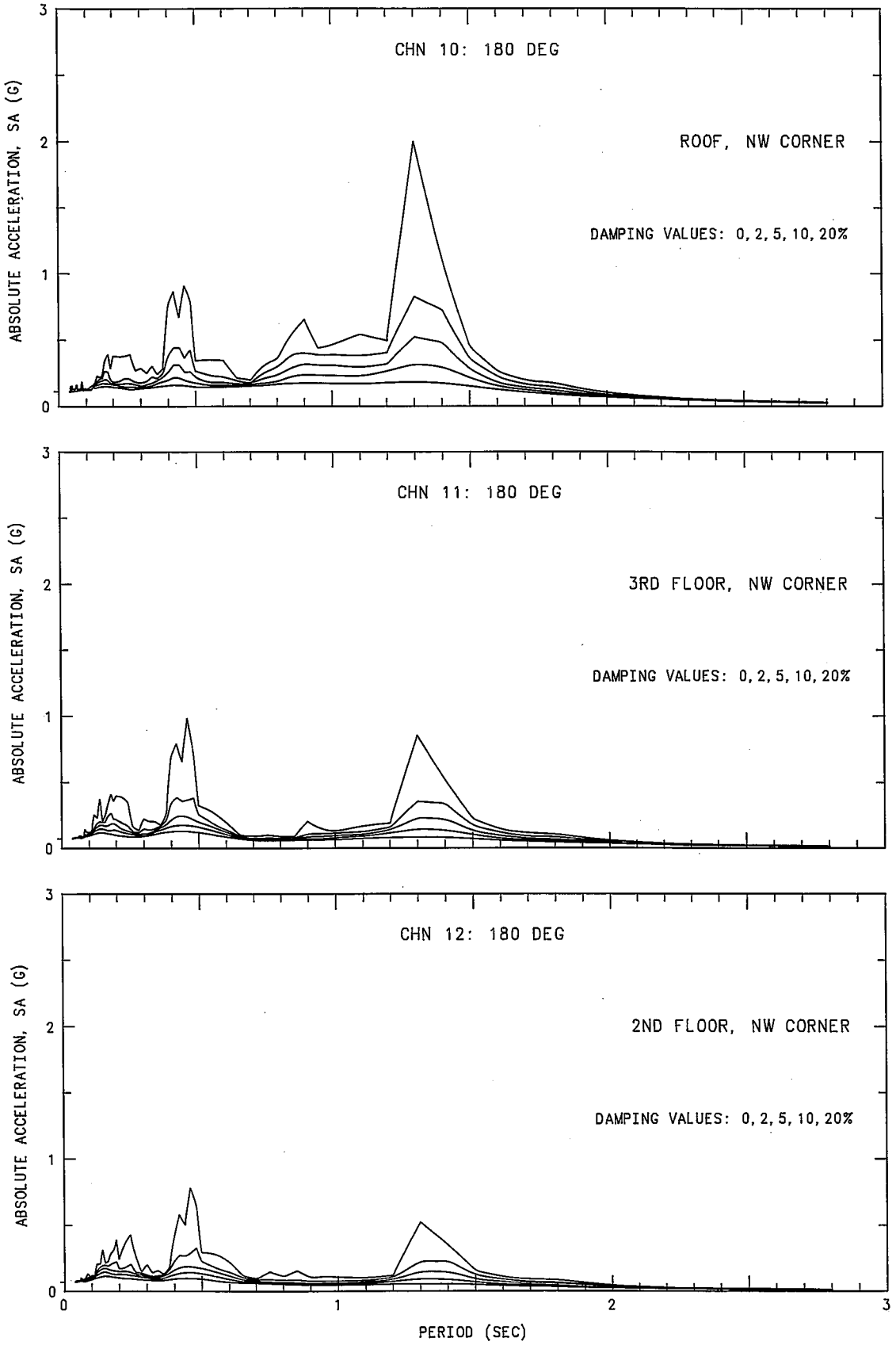
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24370-C0196-91182.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



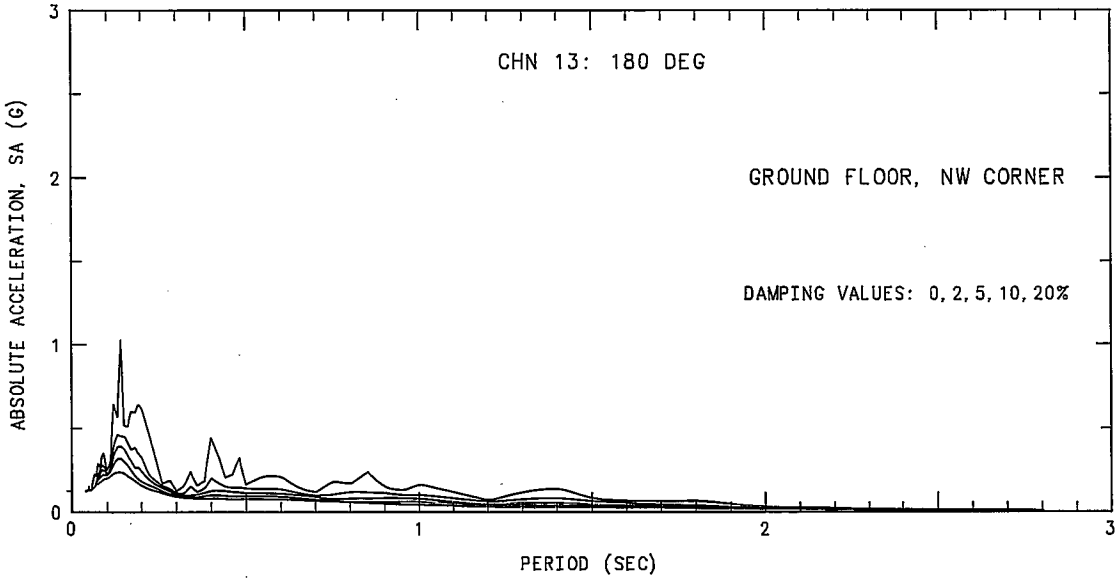
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24370-C0196-91182.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24370-C0196-91182.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 6-STORY COMMERCIAL BLDG.: CSMIP S/N 370
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24370-C0196-91182.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)

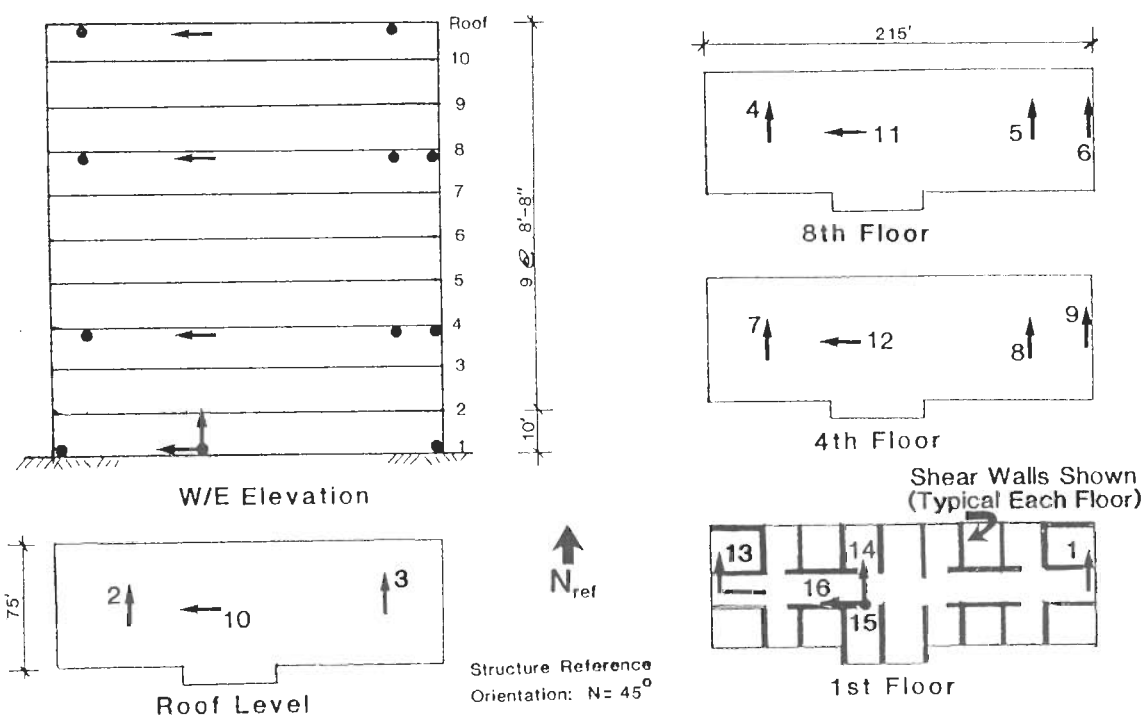


Burbank - 10-story Residential Bldg.
(CSMIP Station No. 24385)

No. of Stories above/below ground: 10/0
Plan Shape: Rectangular
Base Dimensions: 215' x 75'
Typical Floor Dimensions: 215' x 75'
Design Date: 1974
Construction Date: 1974

Vertical Load Carrying System:
Precast and poured-in-place concrete slabs supported by precast concrete bearing walls.
Lateral Force Resisting System:
Precast concrete shear walls in both directions.
Foundation Type:
Concrete caissons (25' to 35' deep).

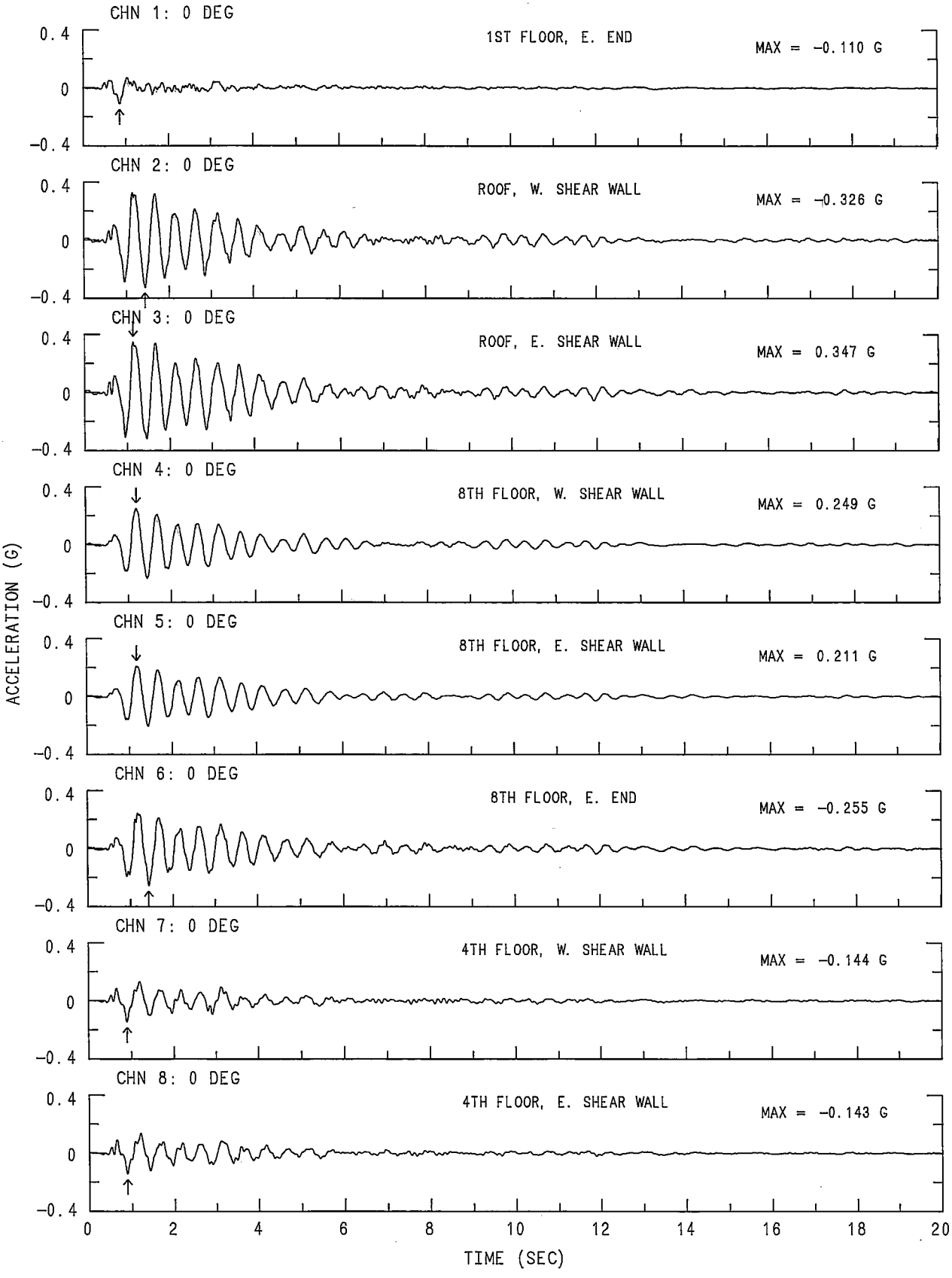
SENSOR LOCATIONS



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

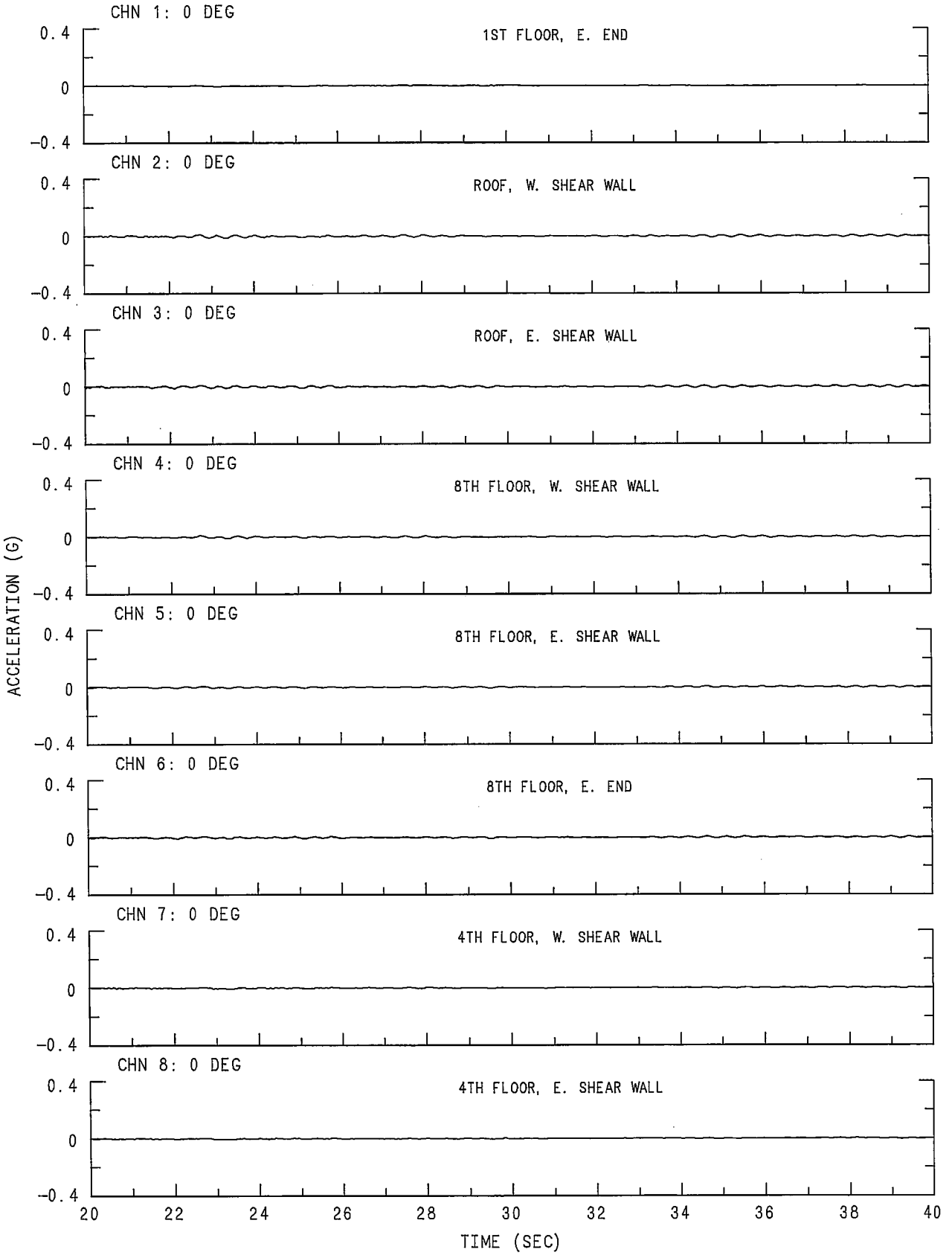
PHASE 1 ACCELERATION. RECORD ID: 24385-C0193-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

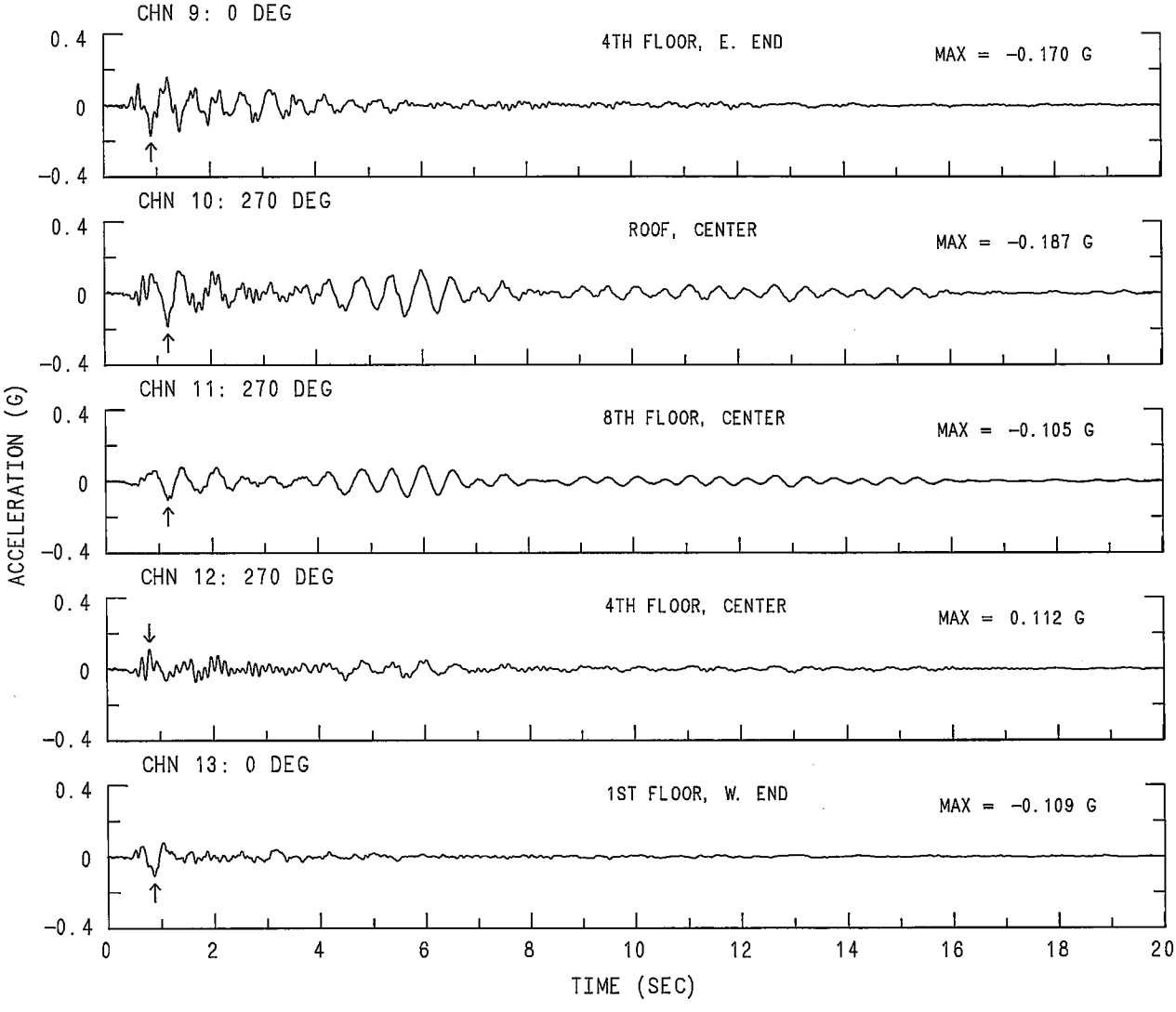
PHASE 1 ACCELERATION. RECORD ID: 24385-C0193-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

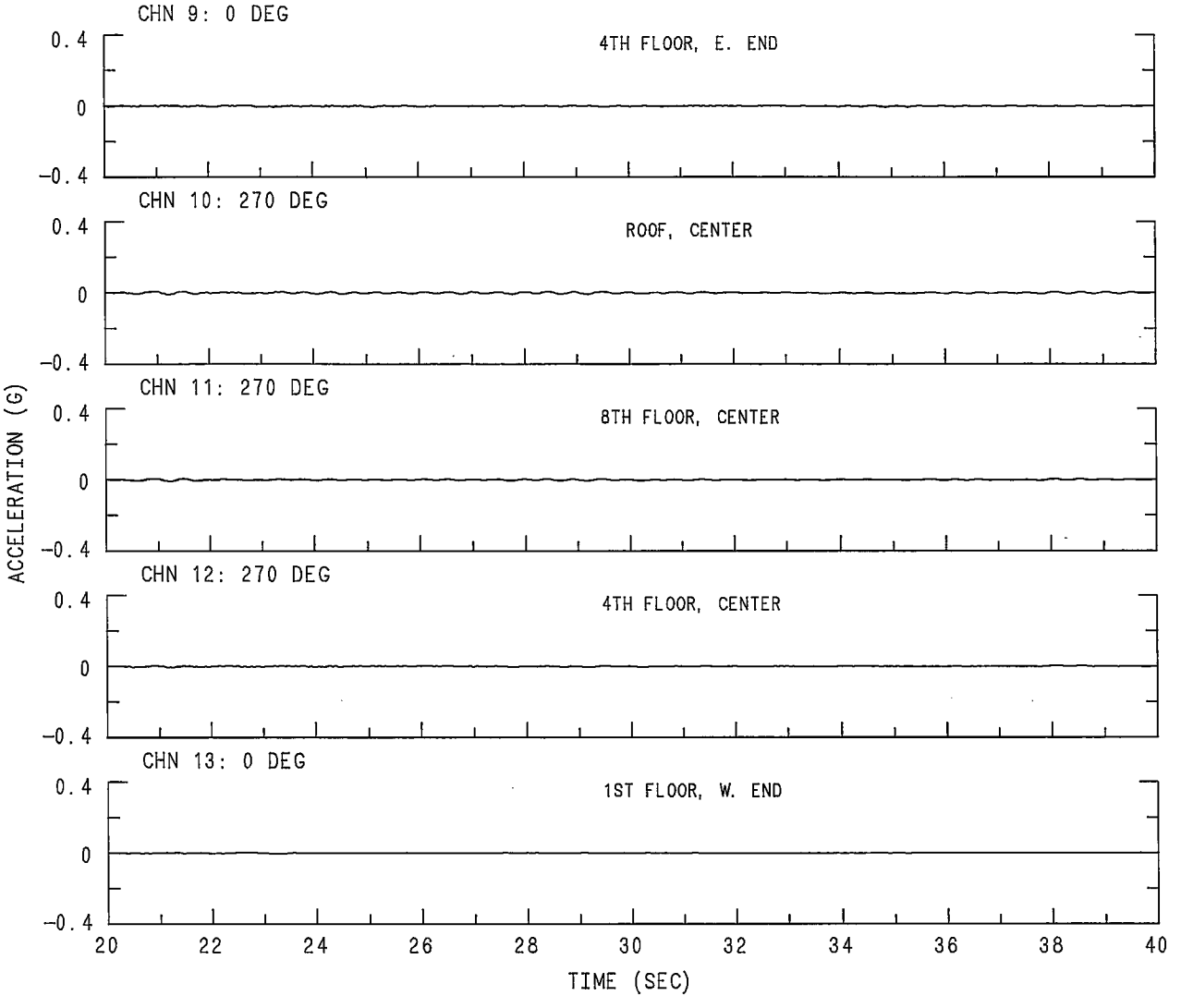
PHASE 1 ACCELERATION. RECORD ID: 24385-C0193-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 1 ACCELERATION. RECORD ID: 24385-C0193-91179.01

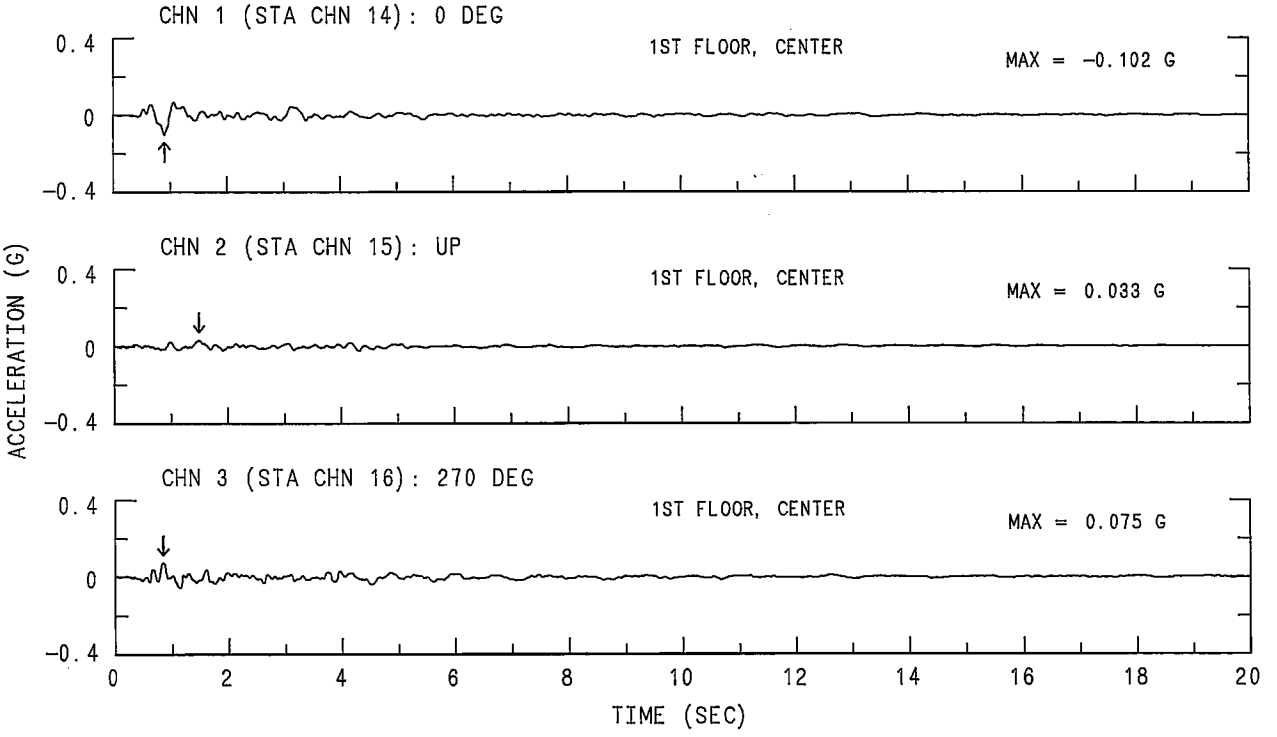


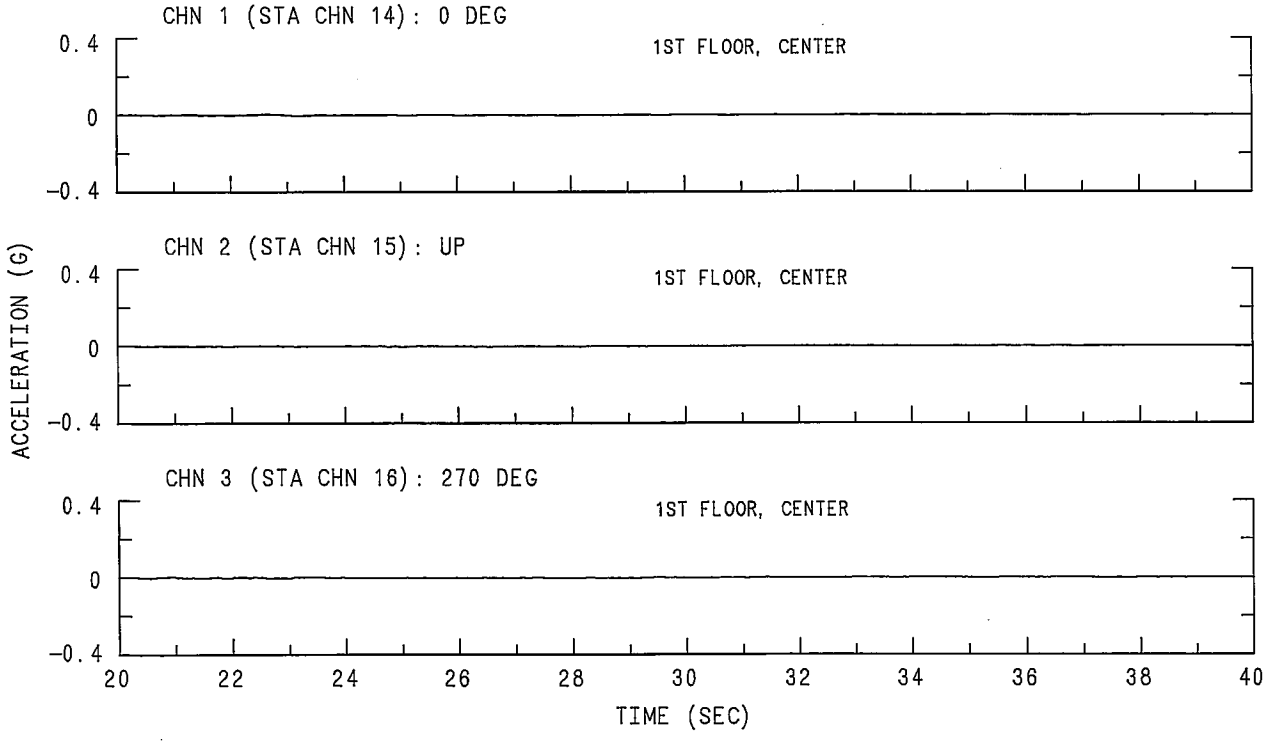
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 1 ACCELERATION

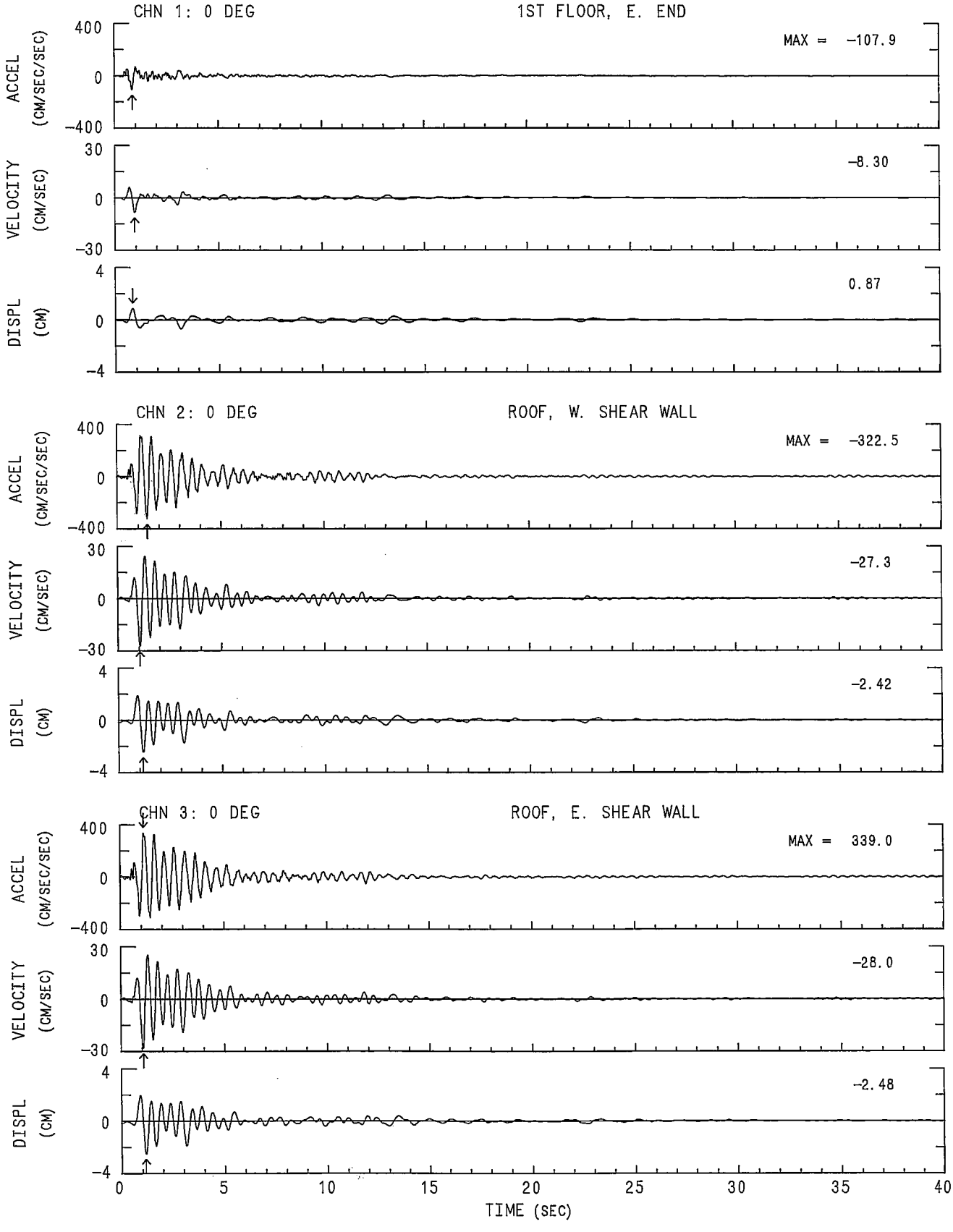
RECORD ID: 24385-S3486-91180.01





SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24385-C0193-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

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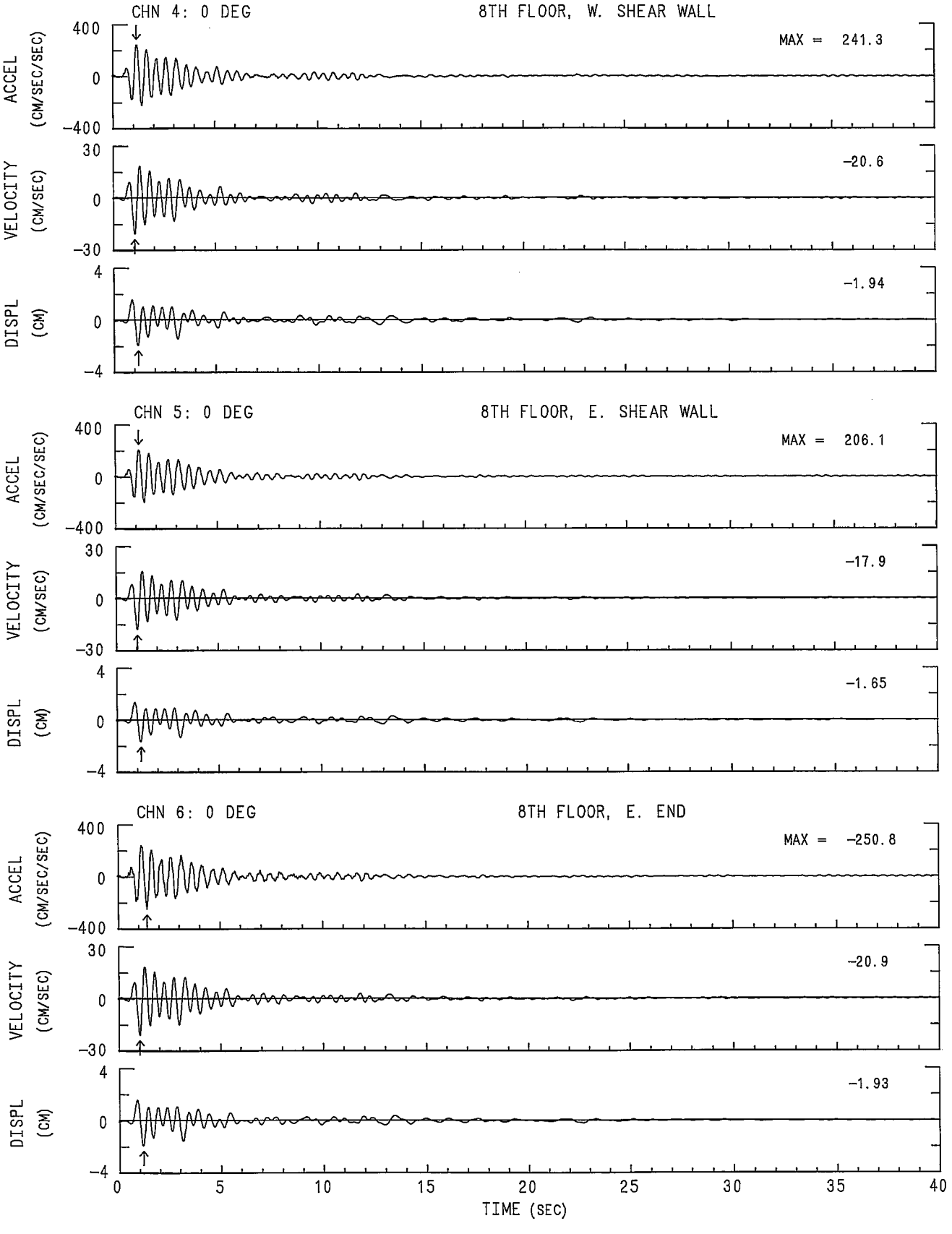

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
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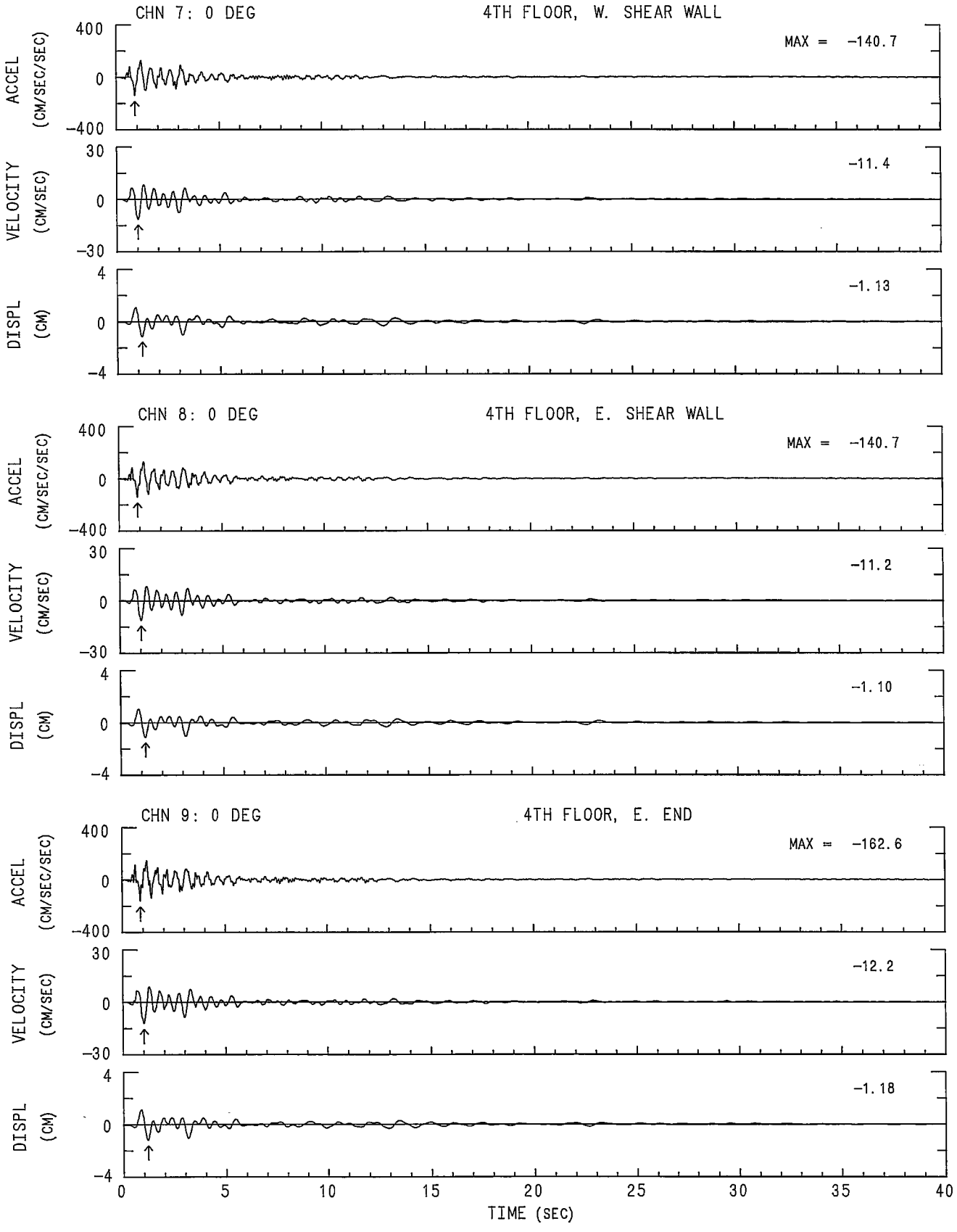

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

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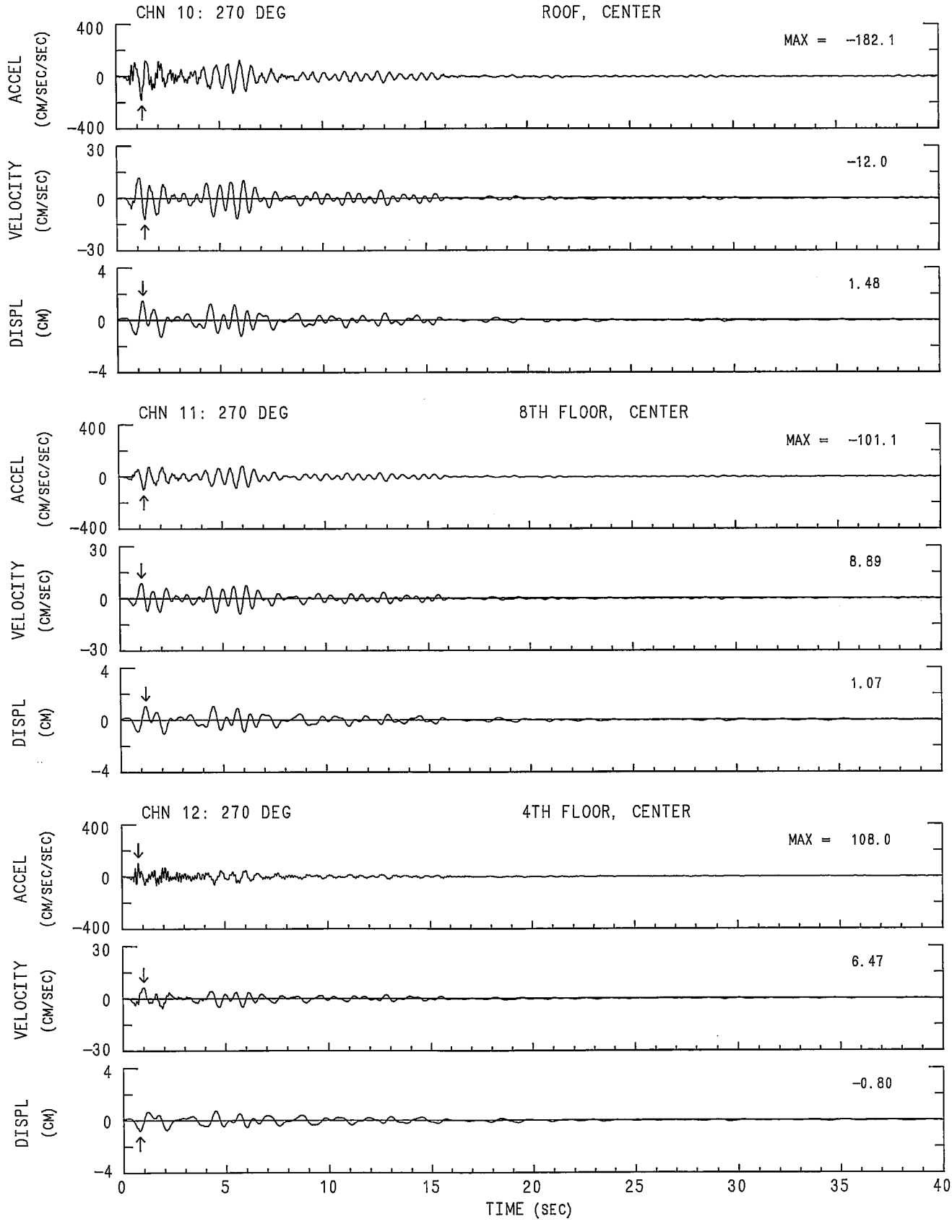
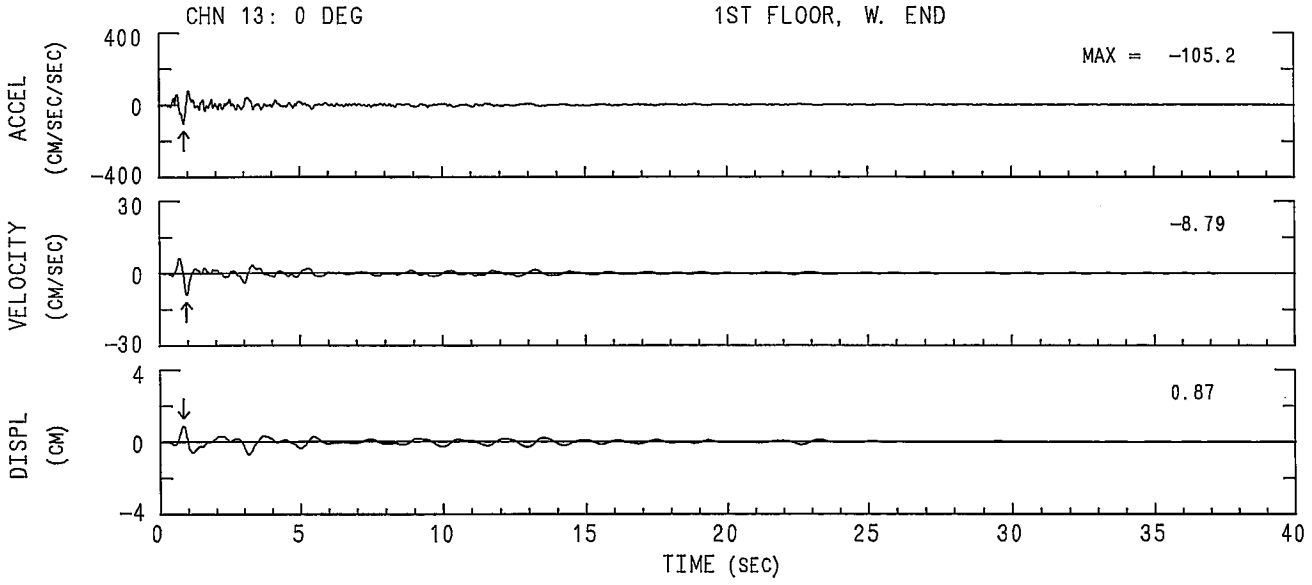


SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

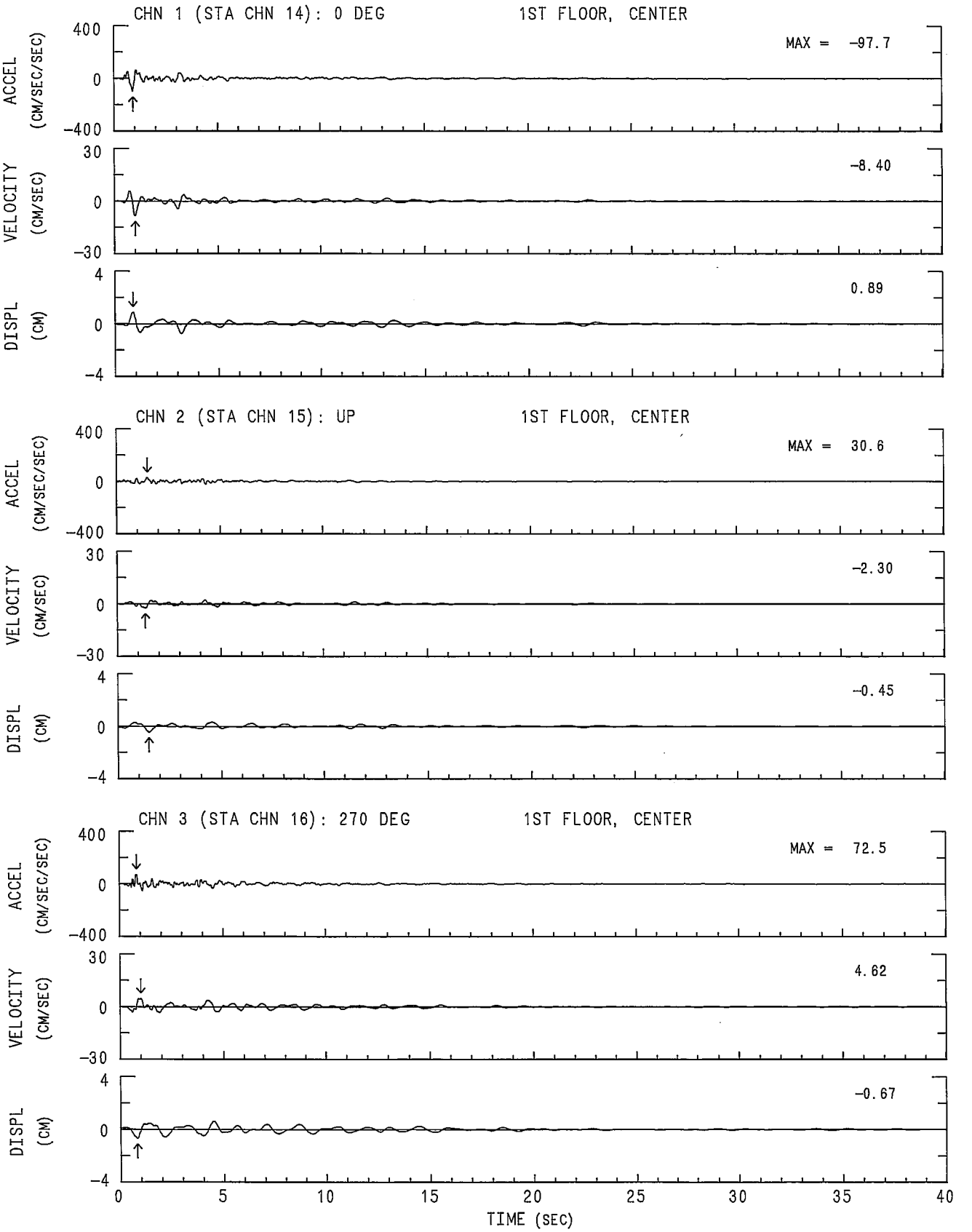
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24385-C0193-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 24385-S3486-91180.01



BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

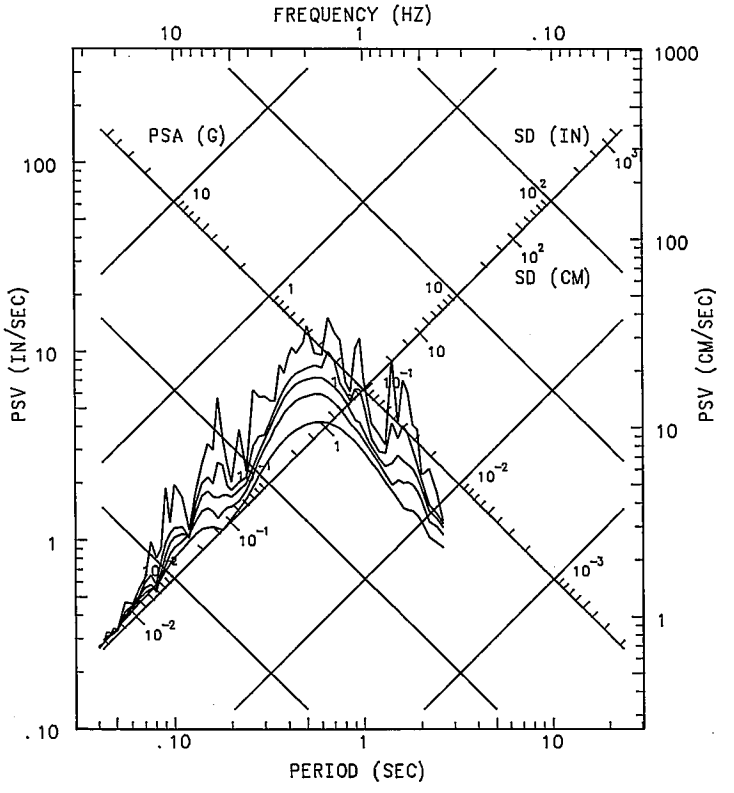
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

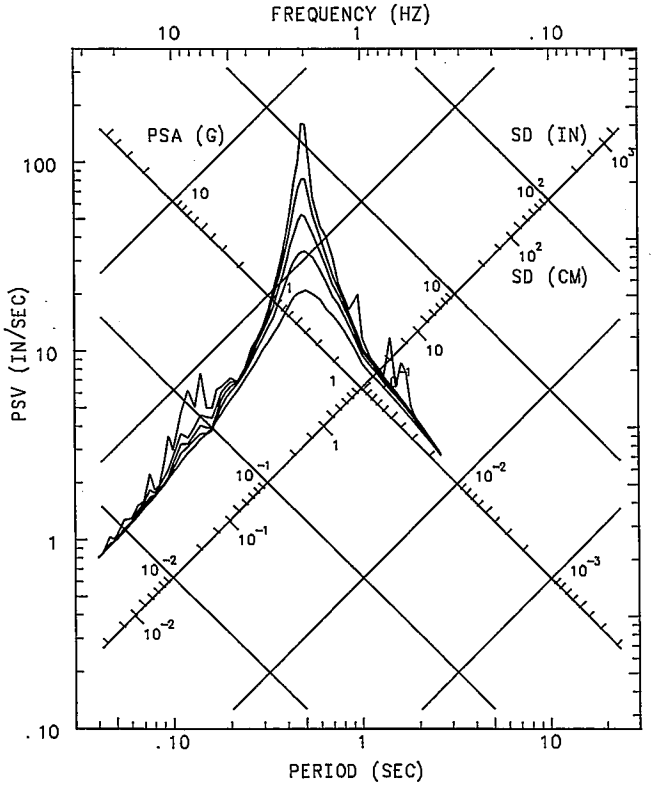
RECORD ID: 24385-C0193-91179.01

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

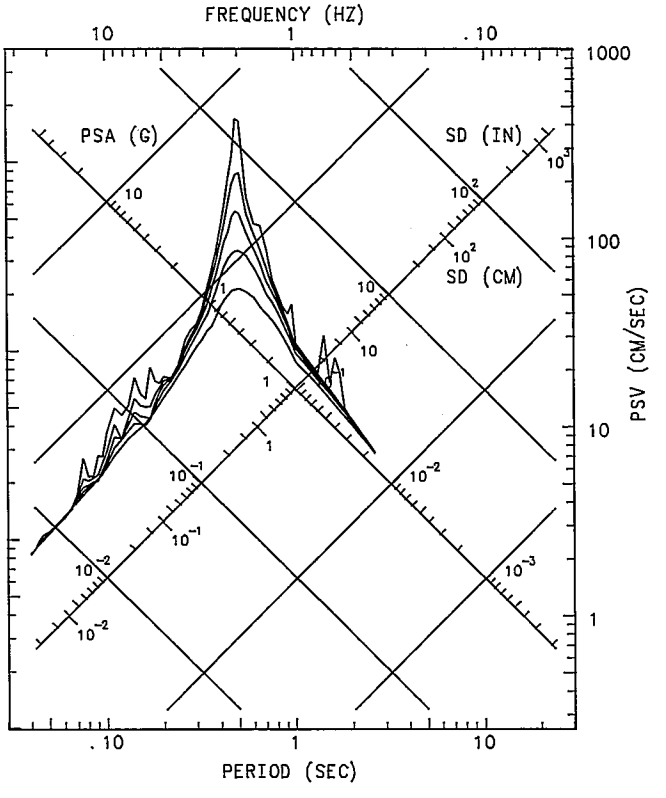
CHN 1: 0 DEG
1ST FLOOR, E. END



CHN 2: 0 DEG
ROOF, W. SHEAR WALL



CHN 3: 0 DEG
ROOF, E. SHEAR WALL



BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

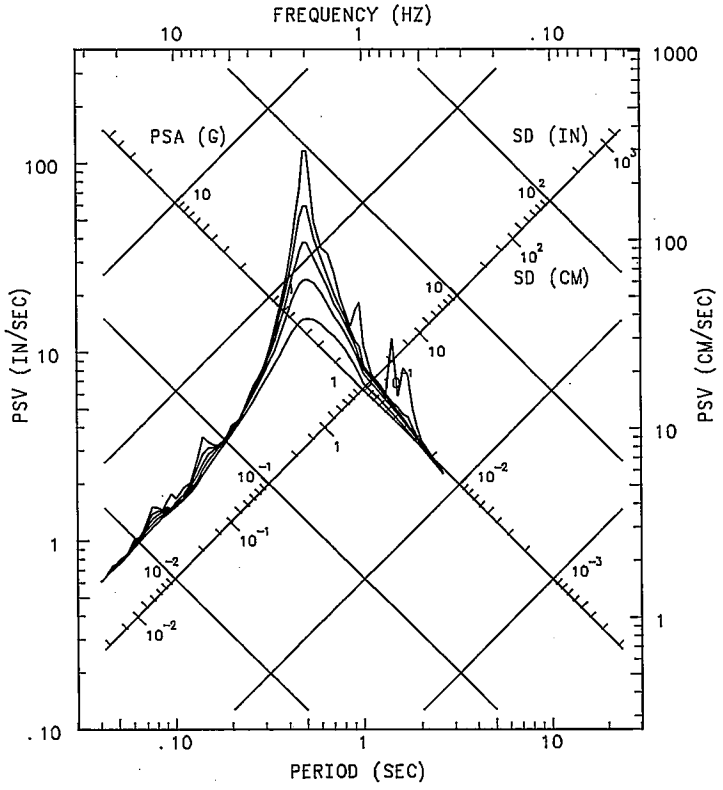
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

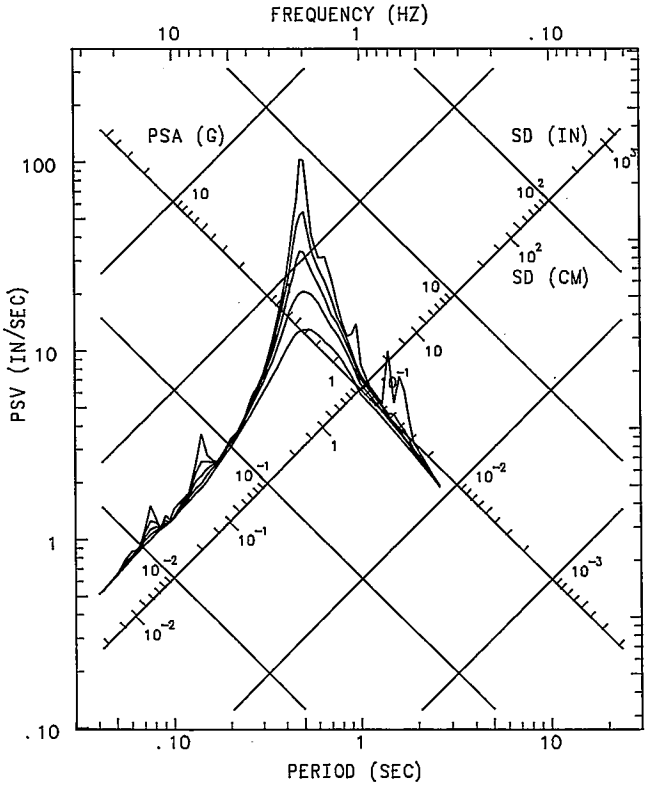
RECORD ID: 24385-C0193-91179.01

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

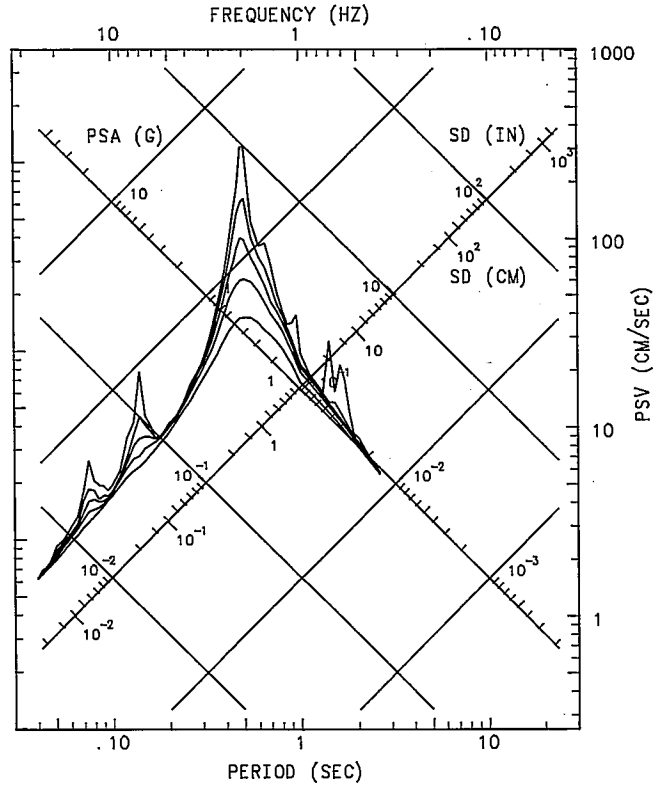
CHN 4: 0 DEG
8TH FLOOR, W. SHEAR WALL



CHN 5: 0 DEG
8TH FLOOR, E. SHEAR WALL



CHN 6: 0 DEG
8TH FLOOR, E. END



BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

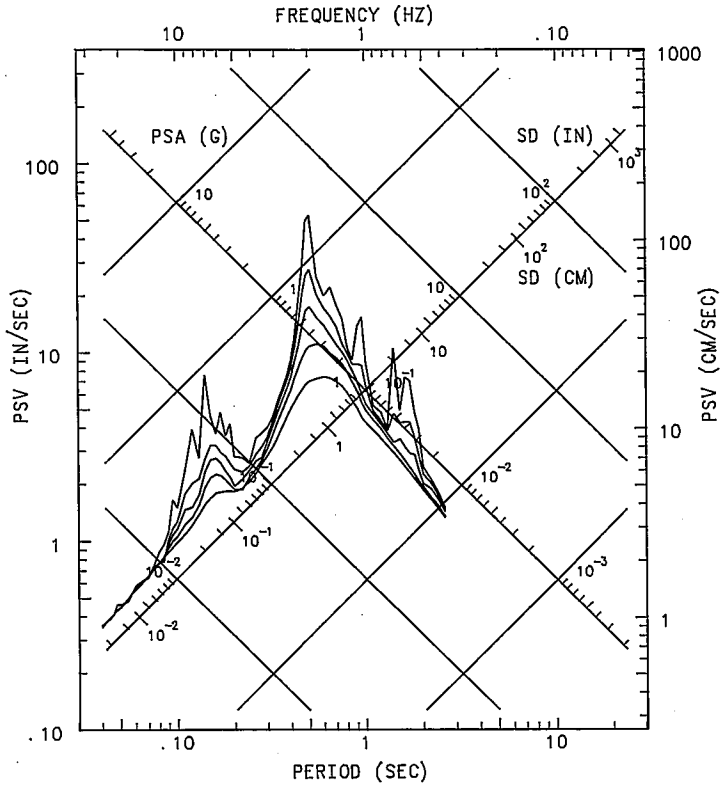
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

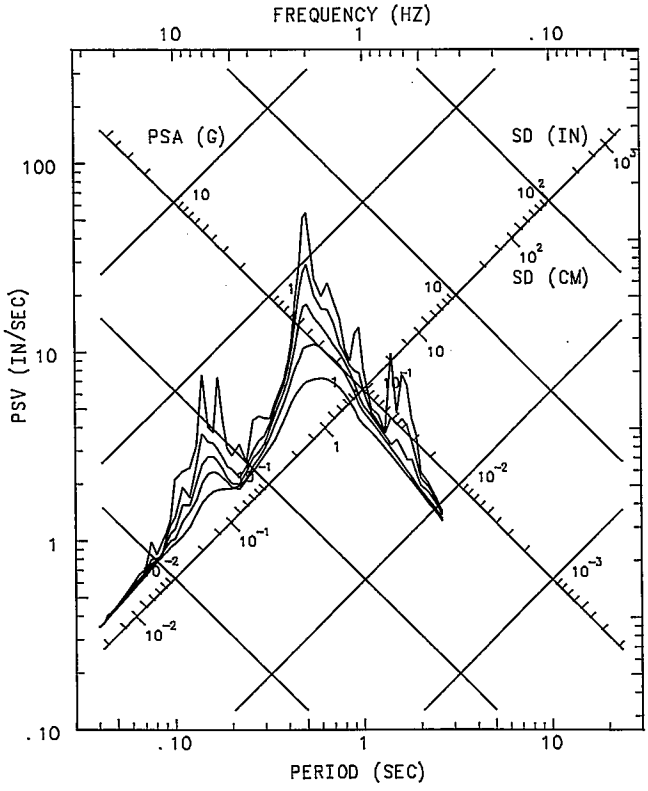
RECORD ID: 24385-C0193-91179.01

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

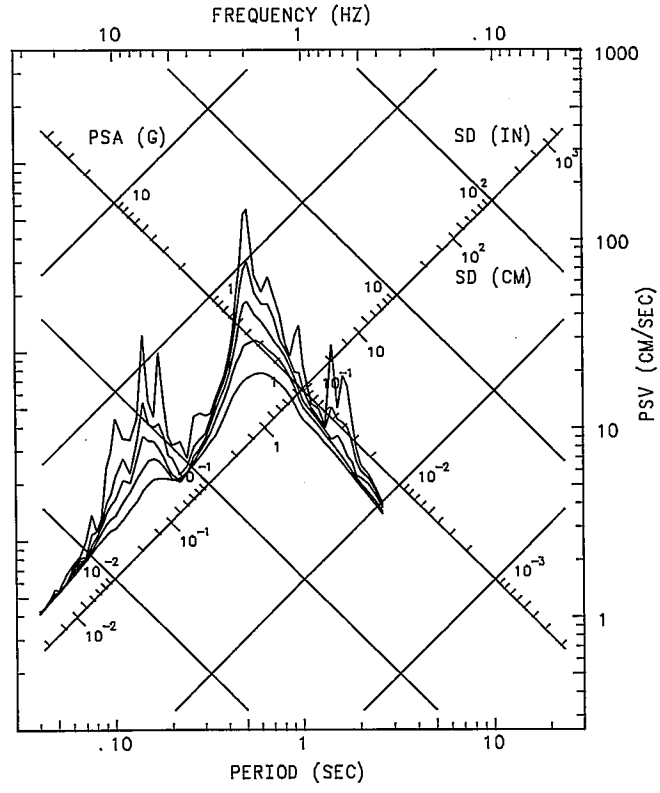
CHN 7: 0 DEG
4TH FLOOR, W. SHEAR WALL



CHN 8: 0 DEG
4TH FLOOR, E. SHEAR WALL



CHN 9: 0 DEG
4TH FLOOR, E. END



BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

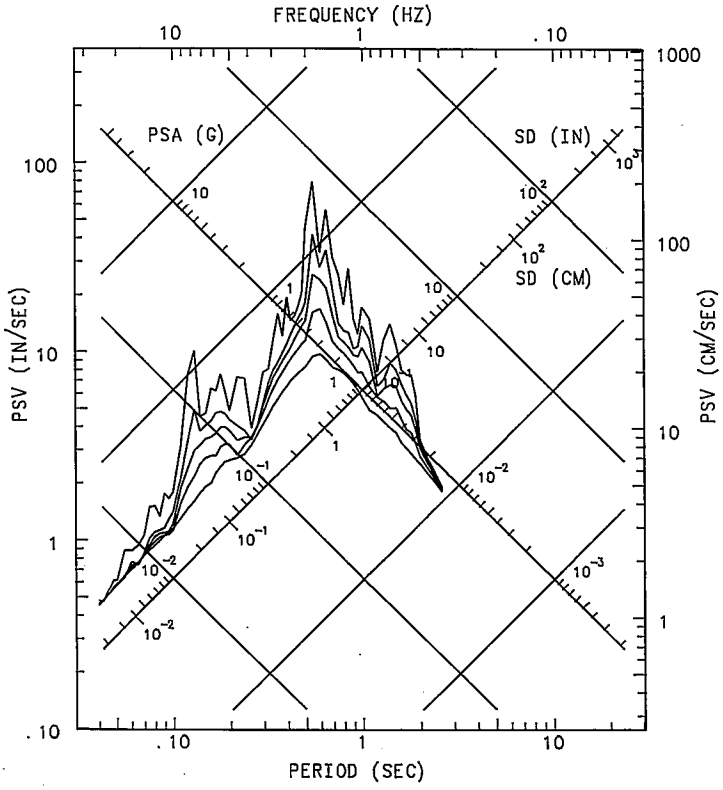
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

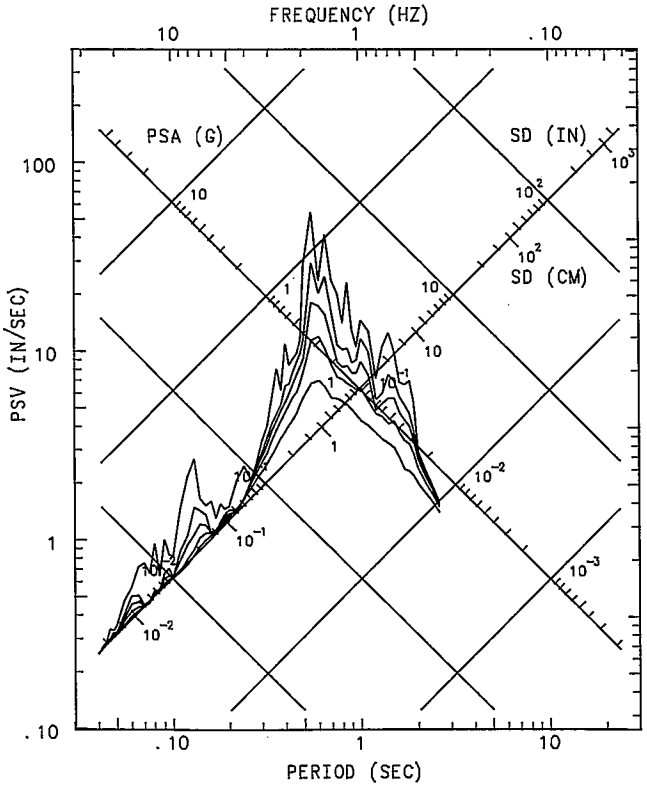
RECORD ID: 24385-C0193-91179.01

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

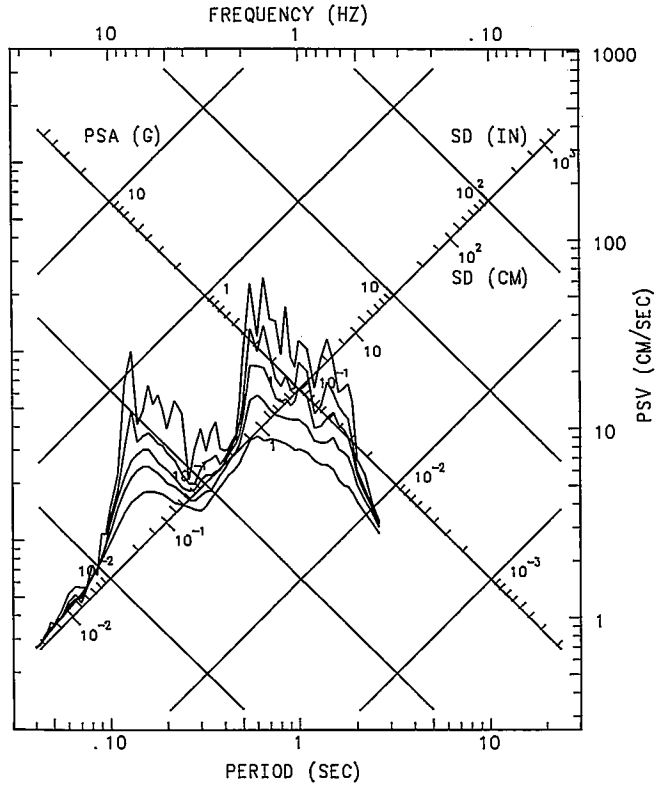
CHN 10: 270 DEG
ROOF, CENTER



CHN 11: 270 DEG
8TH FLOOR, CENTER



CHN 12: 270 DEG
4TH FLOOR, CENTER



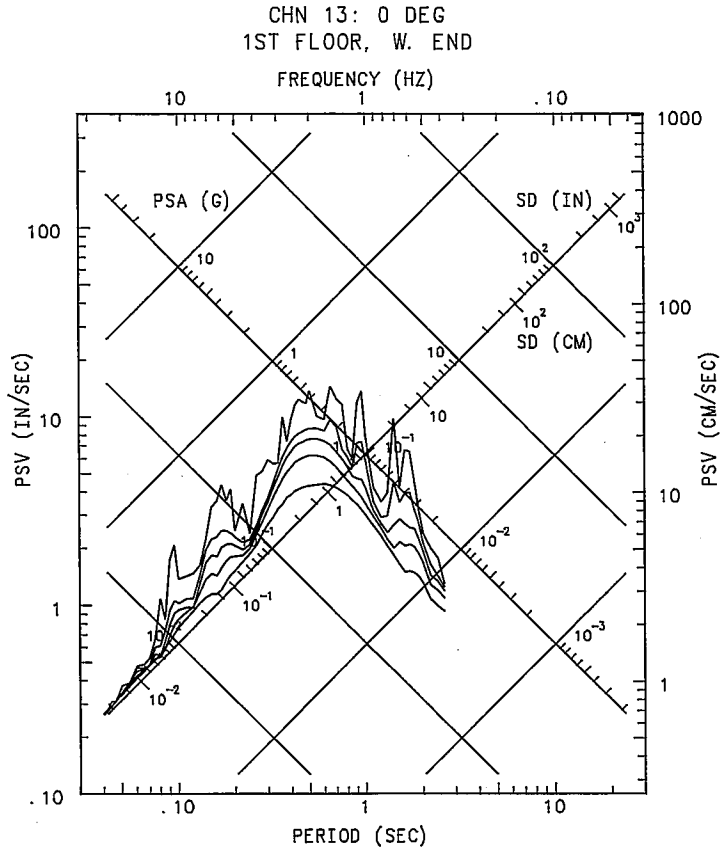
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

RECORD ID: 24385-C0193-91179.01

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



BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385

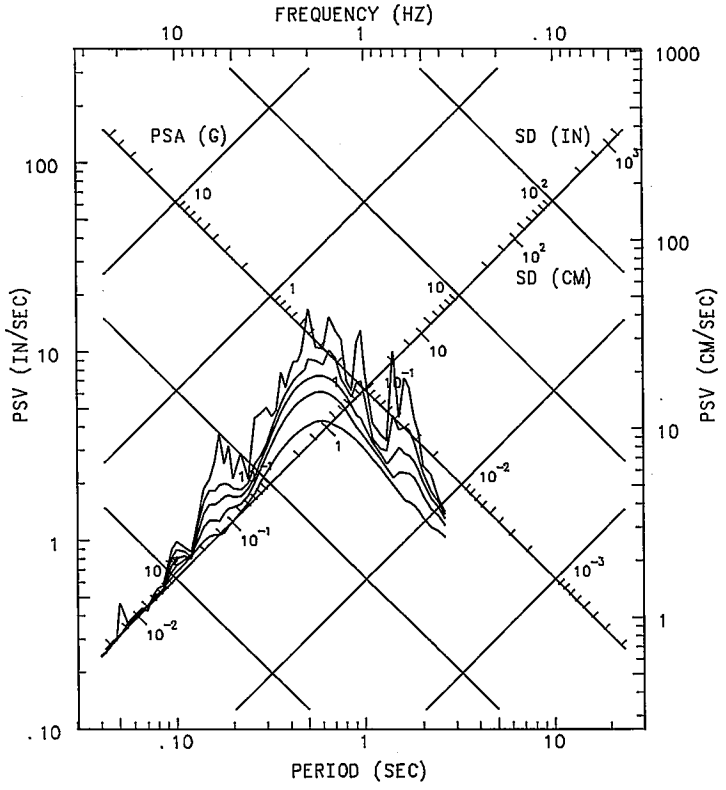
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

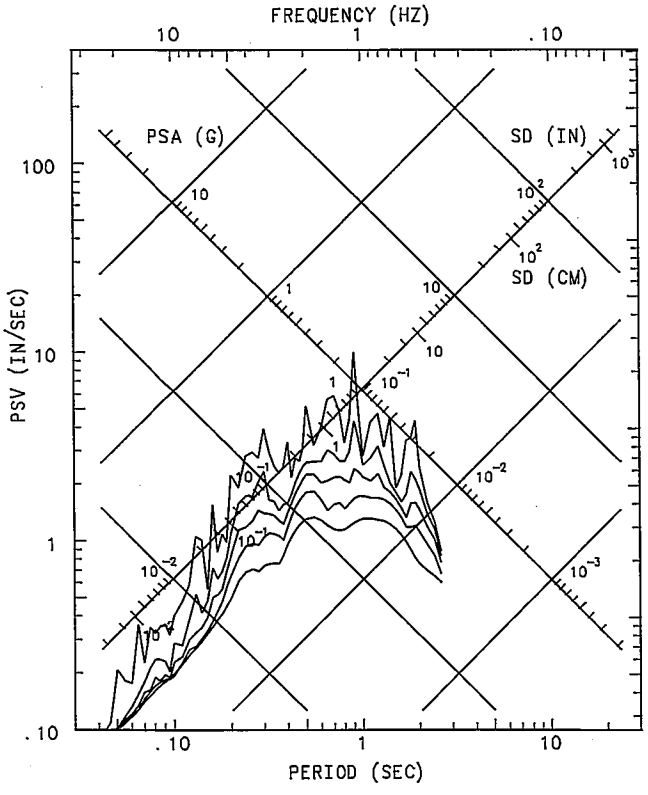
RECORD ID: 24385-S3486-91180.01

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

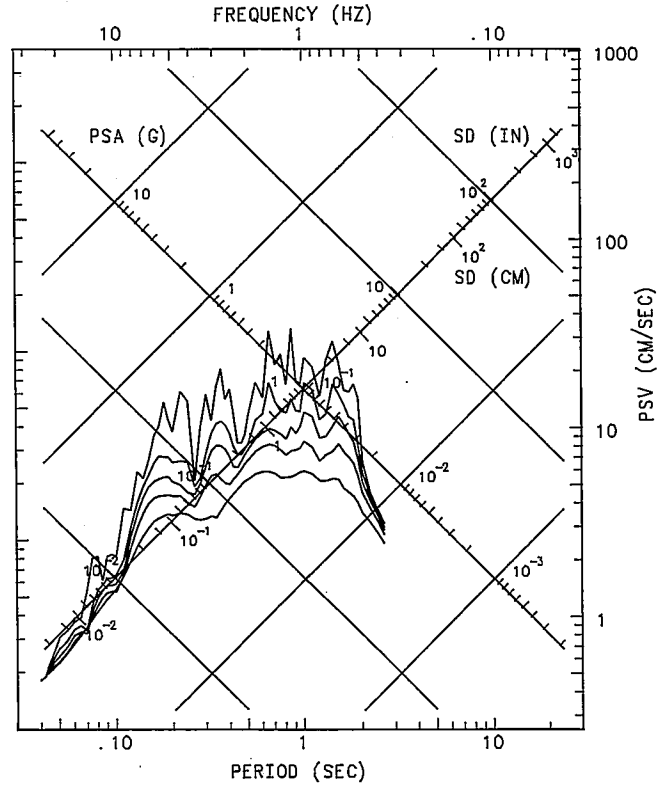
CHN 1 (STA CHN 14): 0 DEG
1ST FLOOR, CENTER



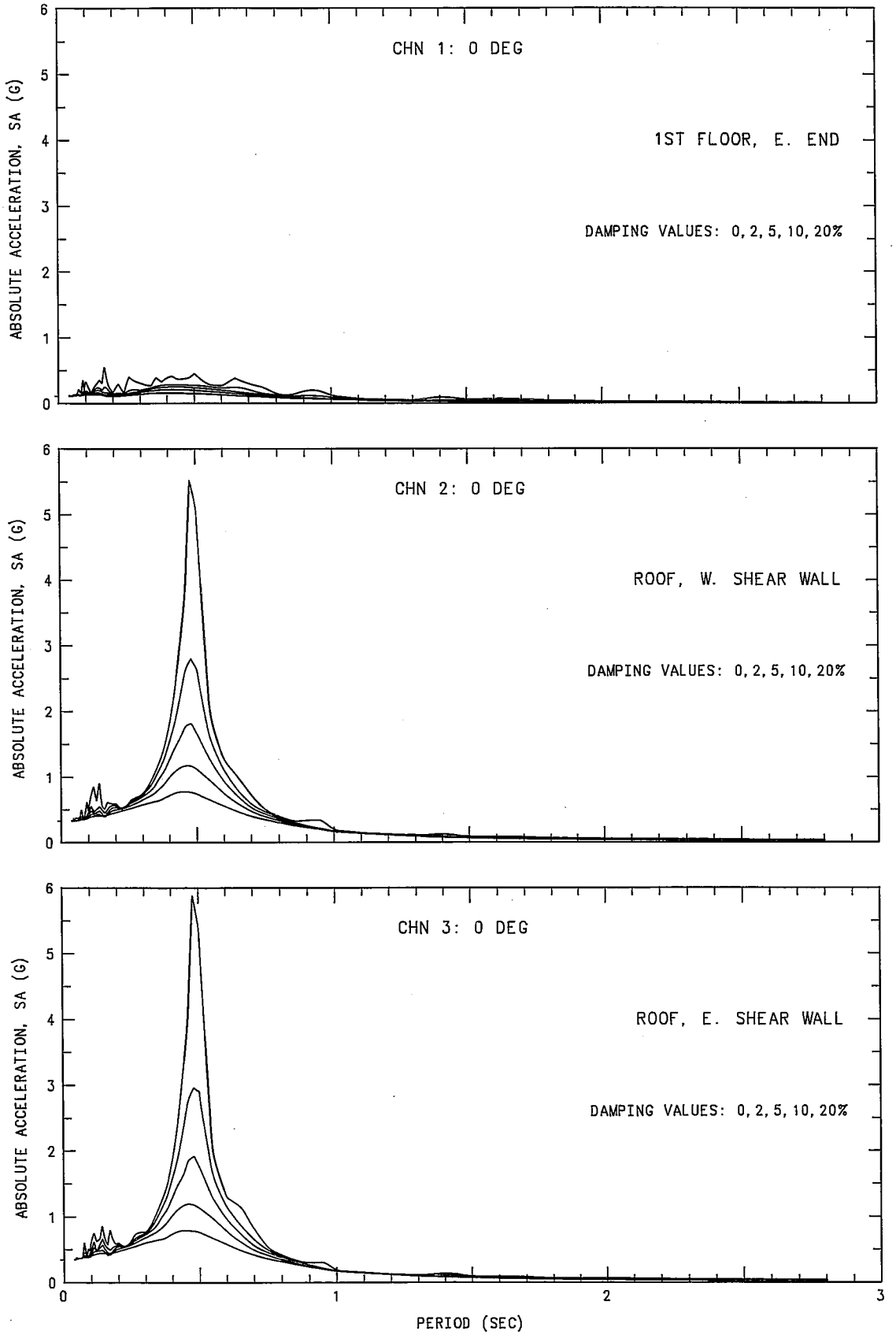
CHN 2 (STA CHN 15): UP
1ST FLOOR, CENTER



CHN 3 (STA CHN 16): 270 DEG
1ST FLOOR, CENTER



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24385-C0193-91179.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385
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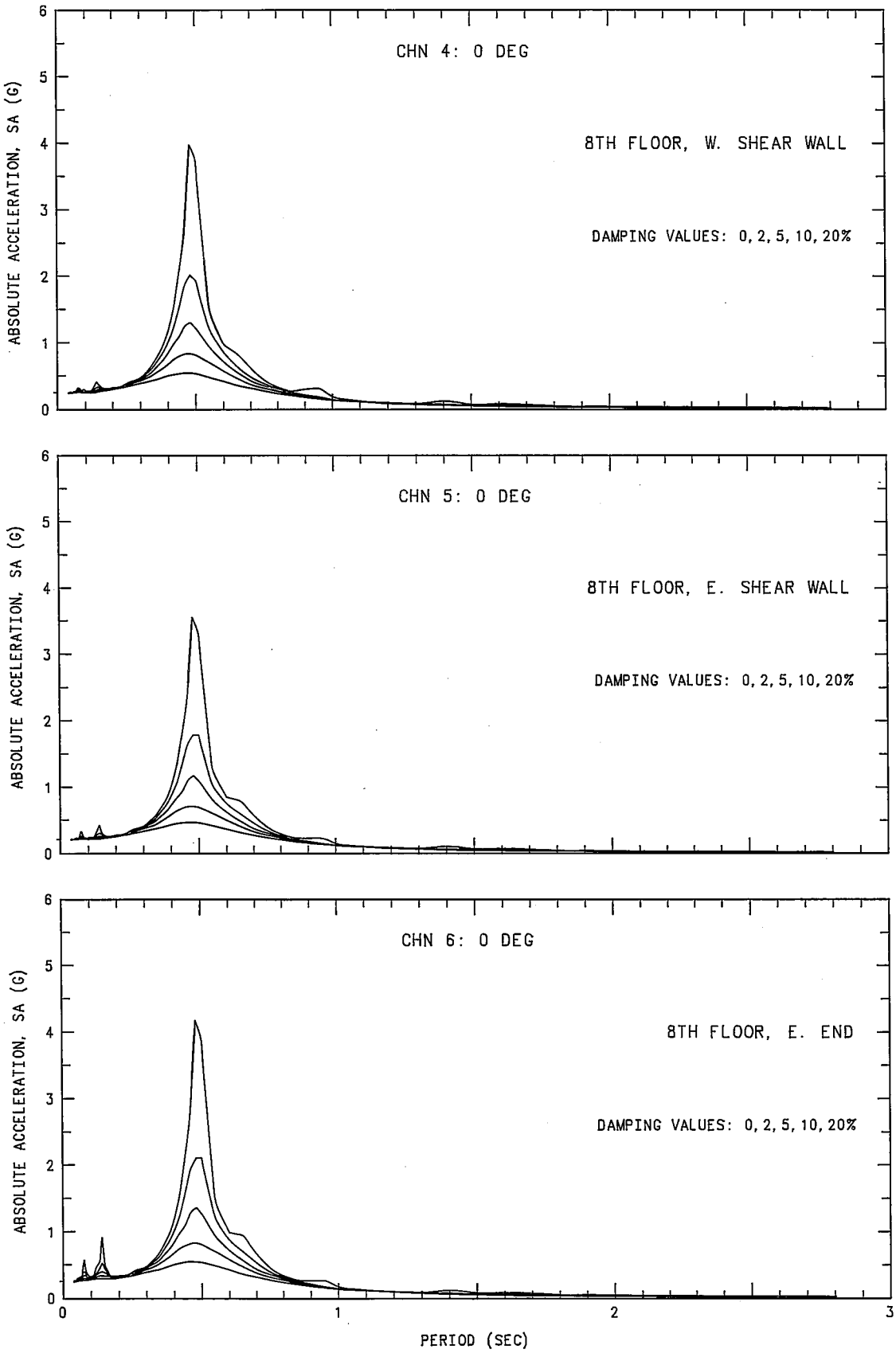

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385
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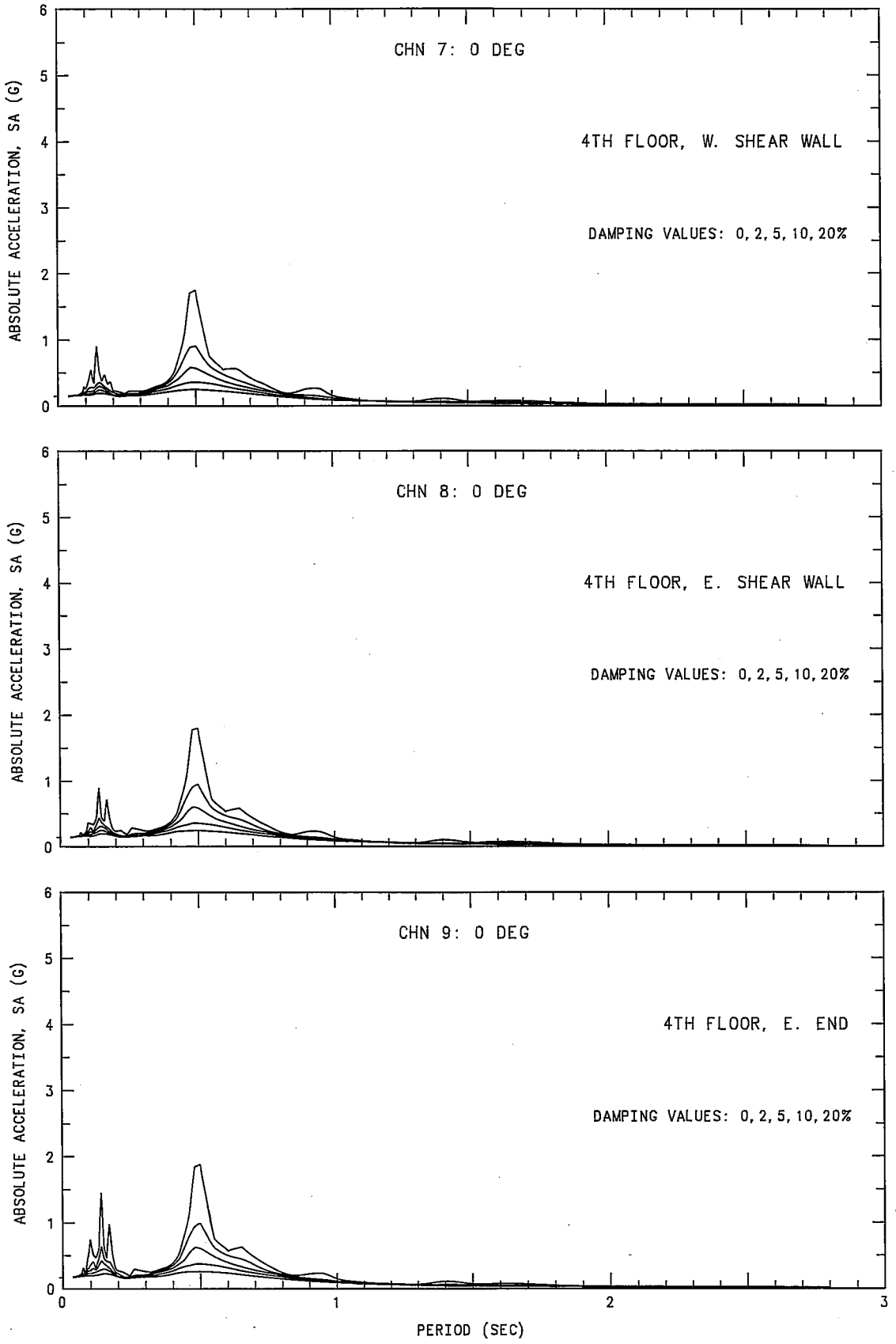

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
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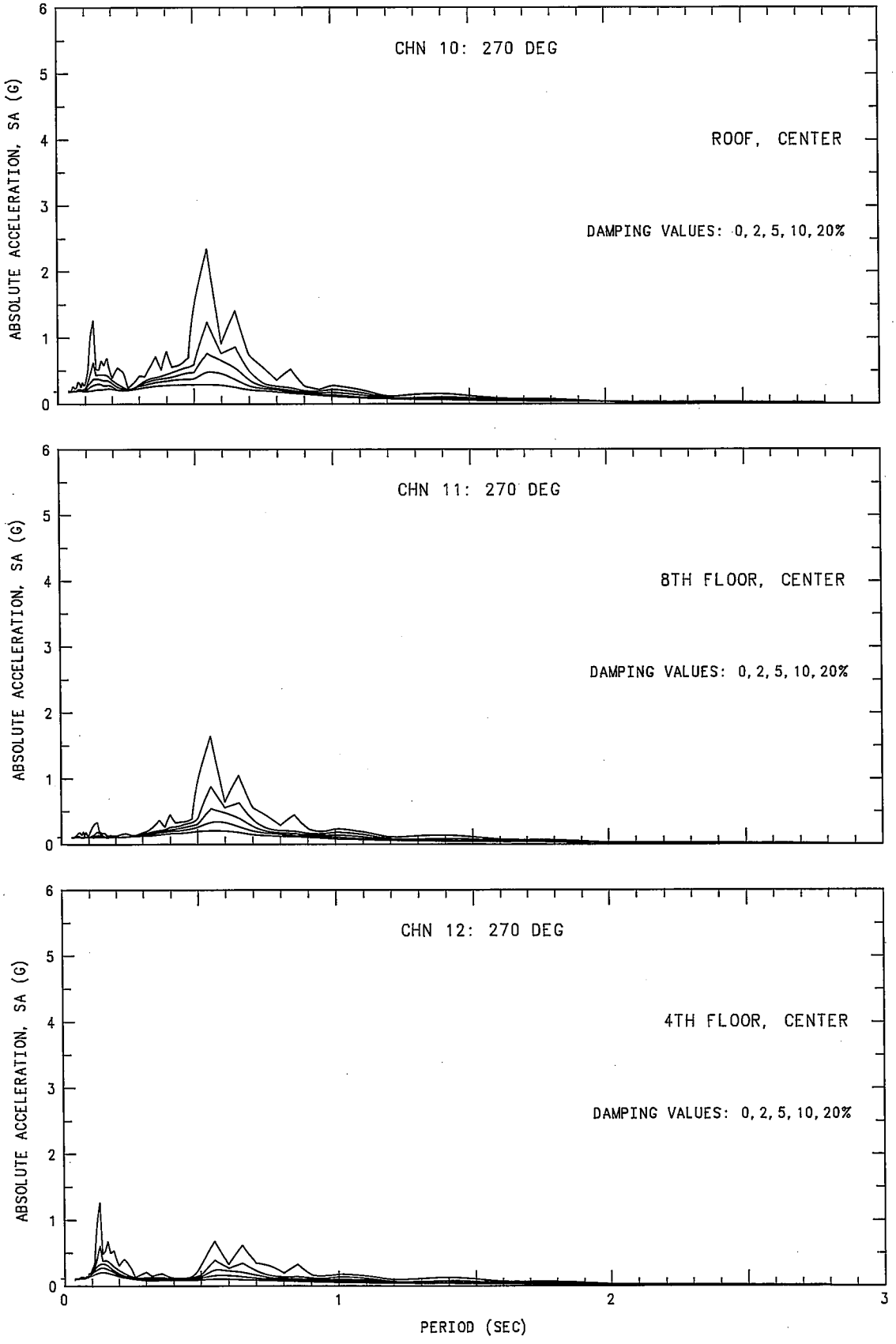

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385
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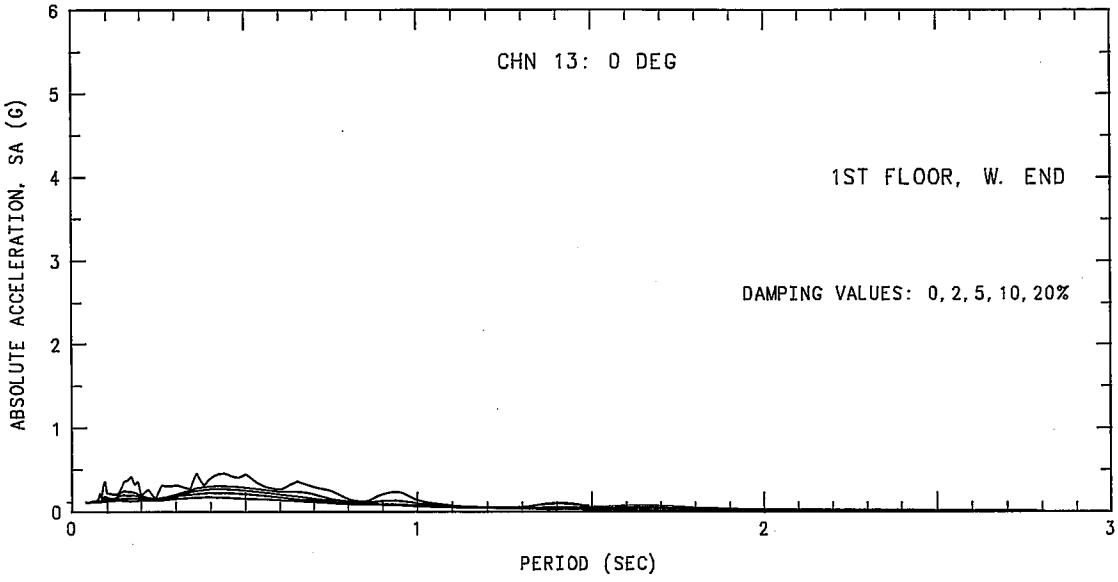

SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
BURBANK - 10-STORY RESIDENTIAL BLDG.: CSMIP S/N 385
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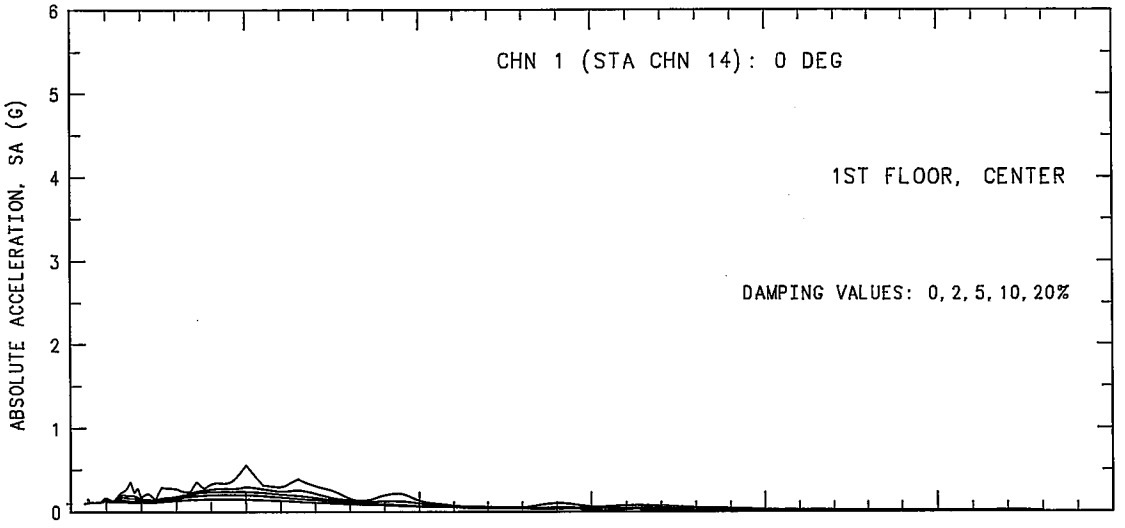
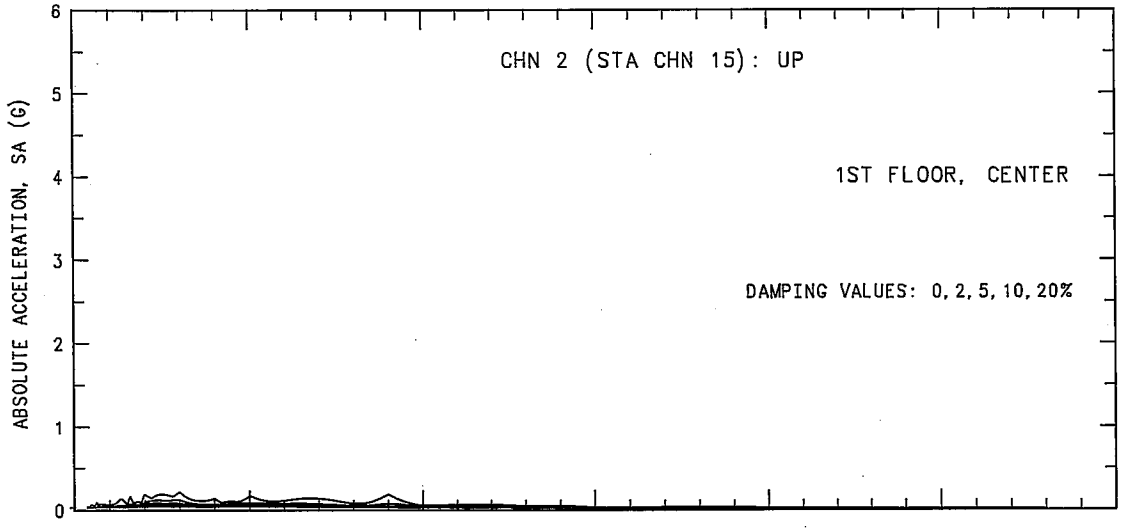
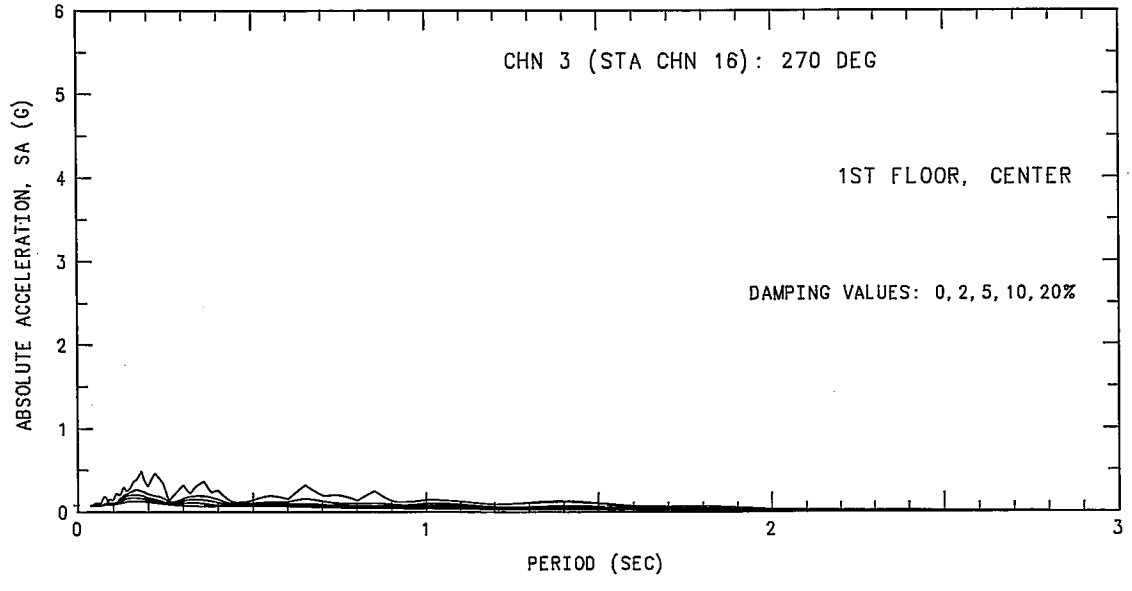




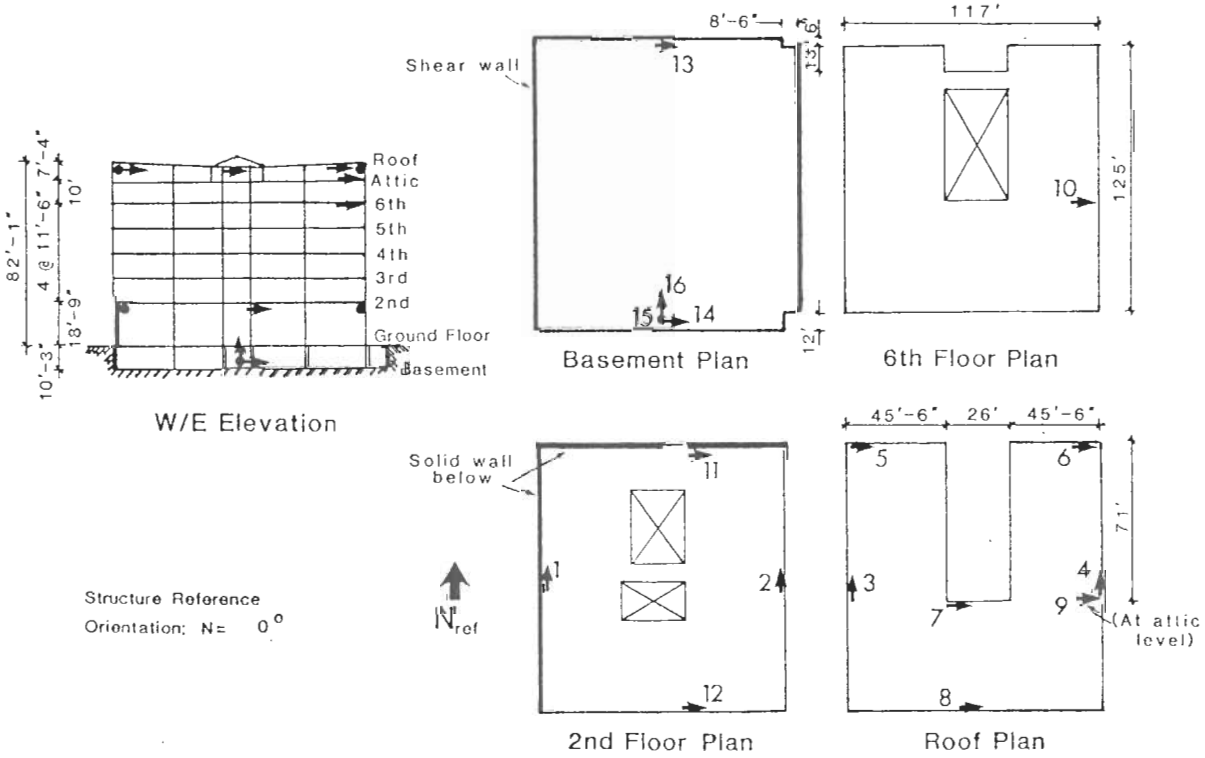


Pasadena - 6-story Office Bldg.
(CSMIP Station No. 24541)

No. of Stories above/below ground: 6/1
Plan Shape: "U" shaped
Base Dimensions: 126' x 143'
Typical Floor Dimensions: 117' x 125'
Design Date: 1906
Construction Date: 1907

Vertical Load Carrying System:
Steel frames with unreinforced masonry infill walls. Floors consist of hollow clay tile covered with concrete.
Lateral Force Resisting System:
Unreinforced masonry walls on the perimeter.
Foundation Type:
Spread footings.

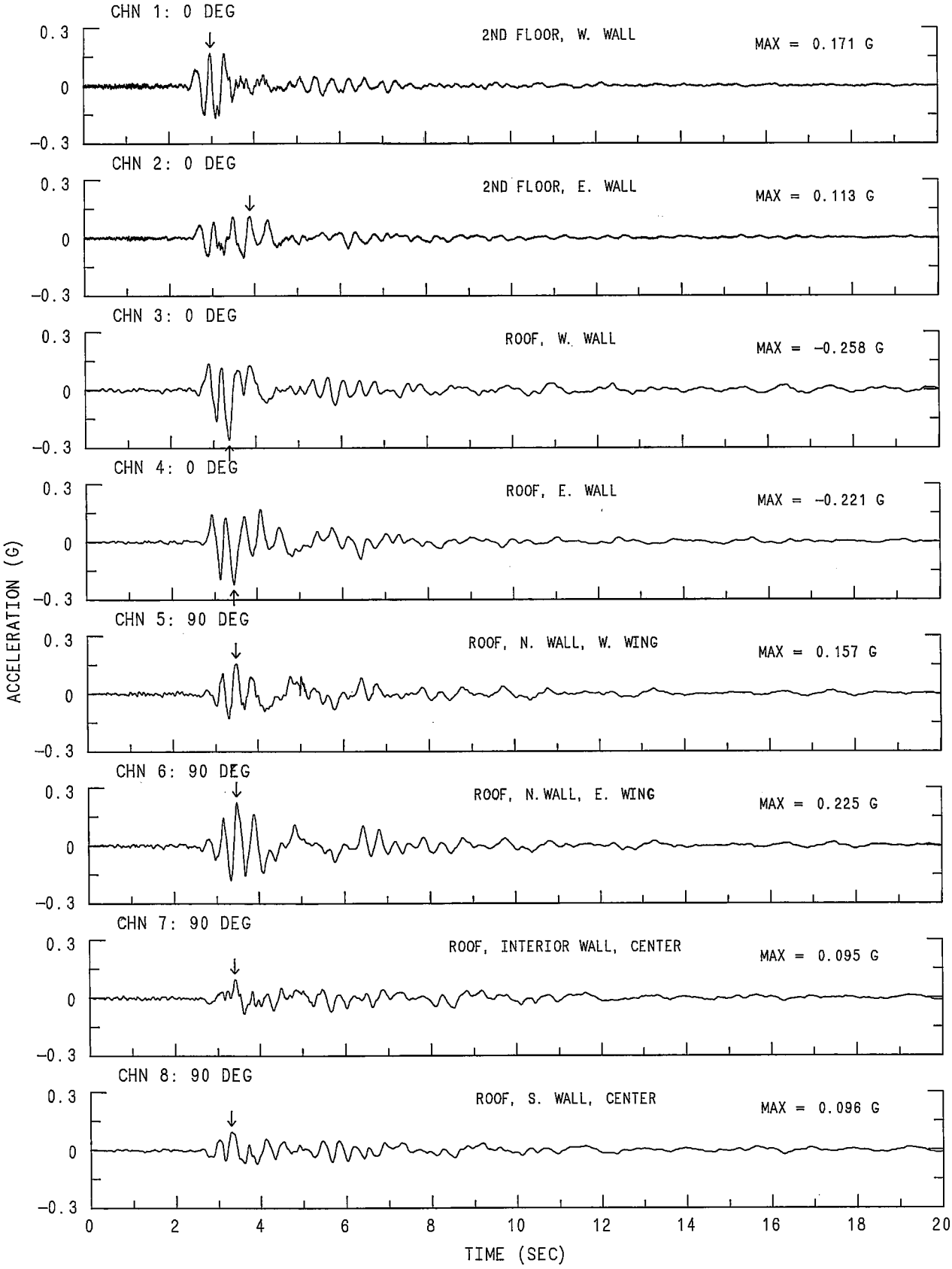
SENSOR LOCATIONS



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

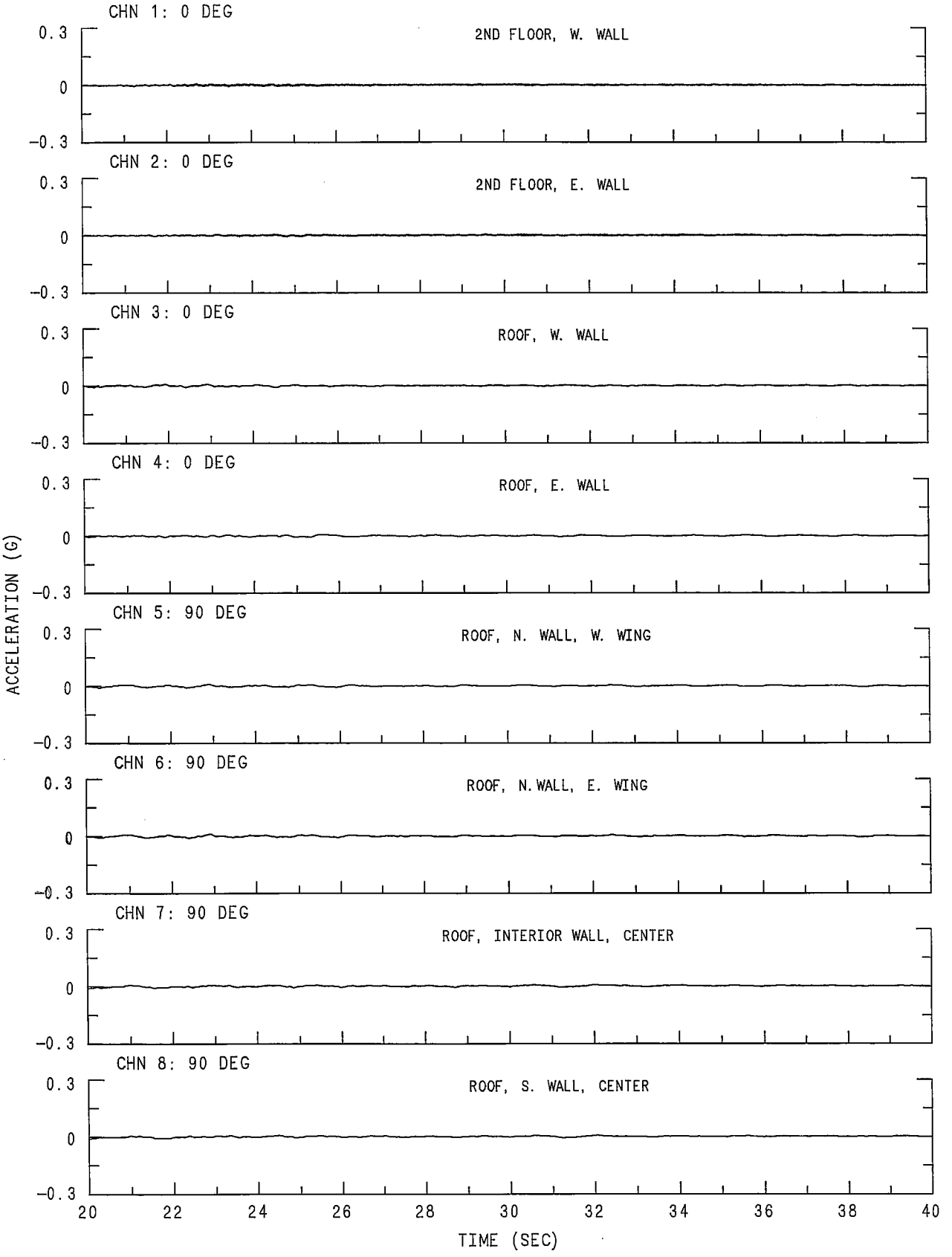
PHASE 1 ACCELERATION. RECORD ID: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

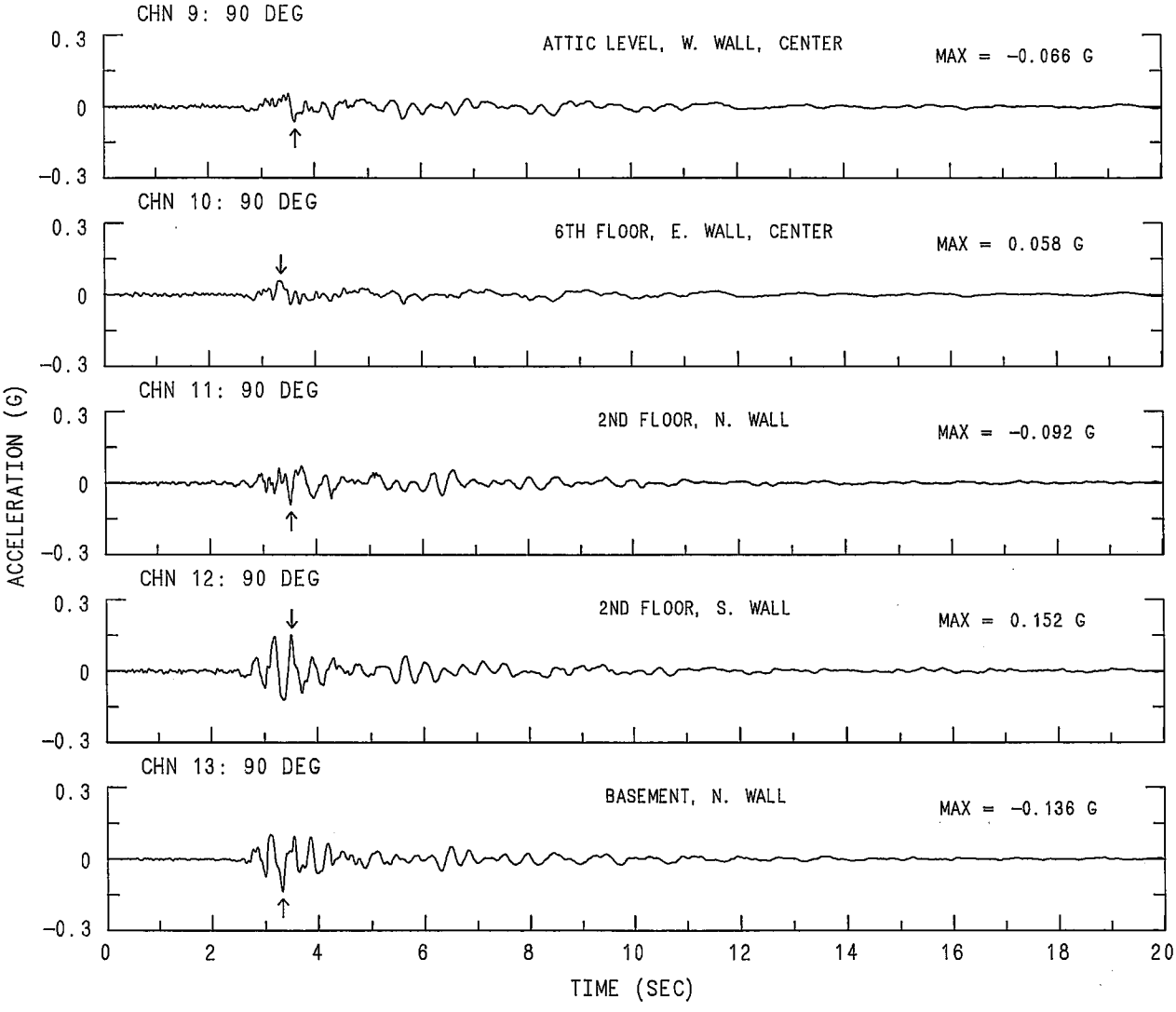
PHASE 1 ACCELERATION. RECORD ID: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

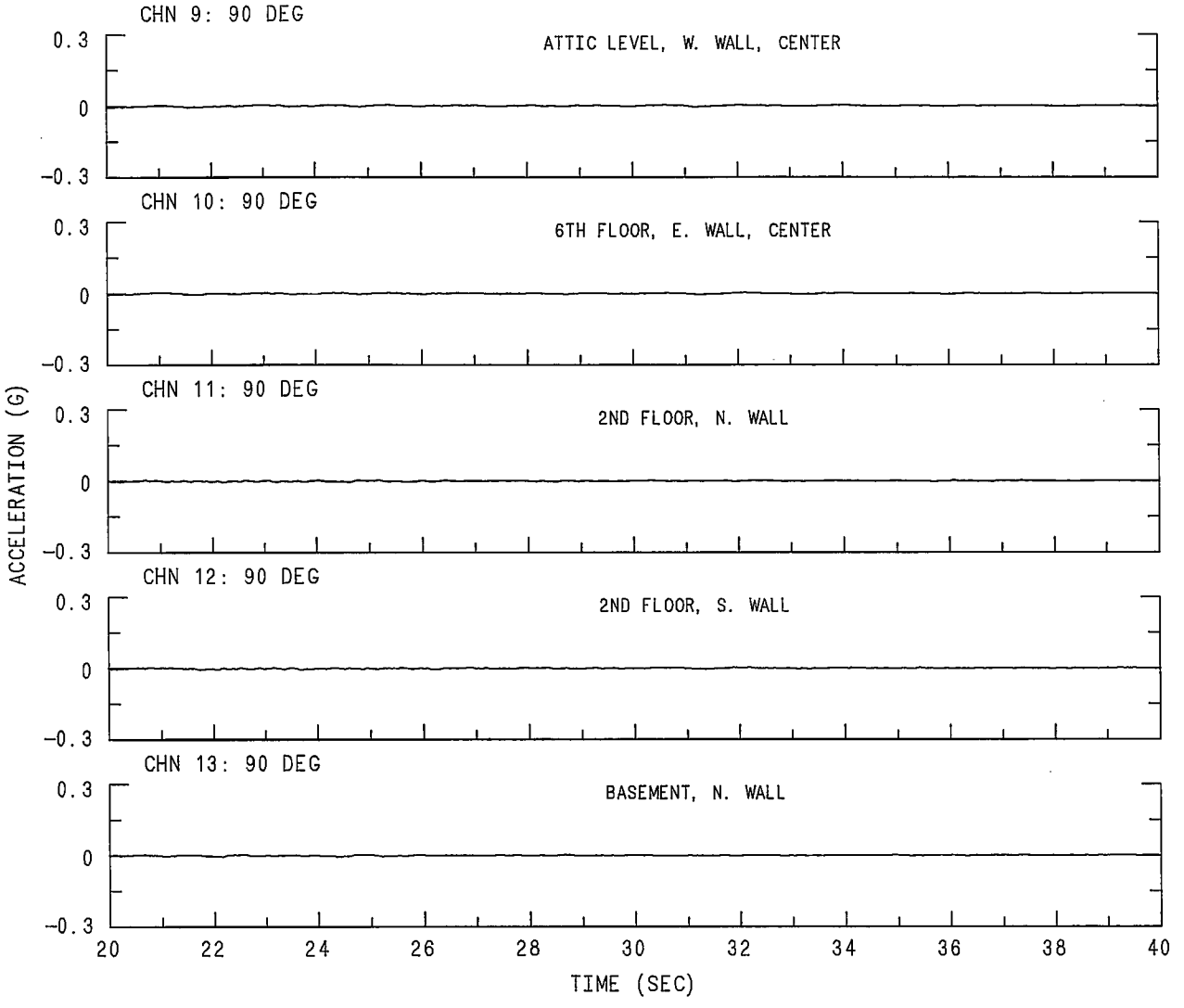
PHASE 1 ACCELERATION. RECORD ID: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

PHASE 1 ACCELERATION. RECORD ID: 24541-C0281-91179.01

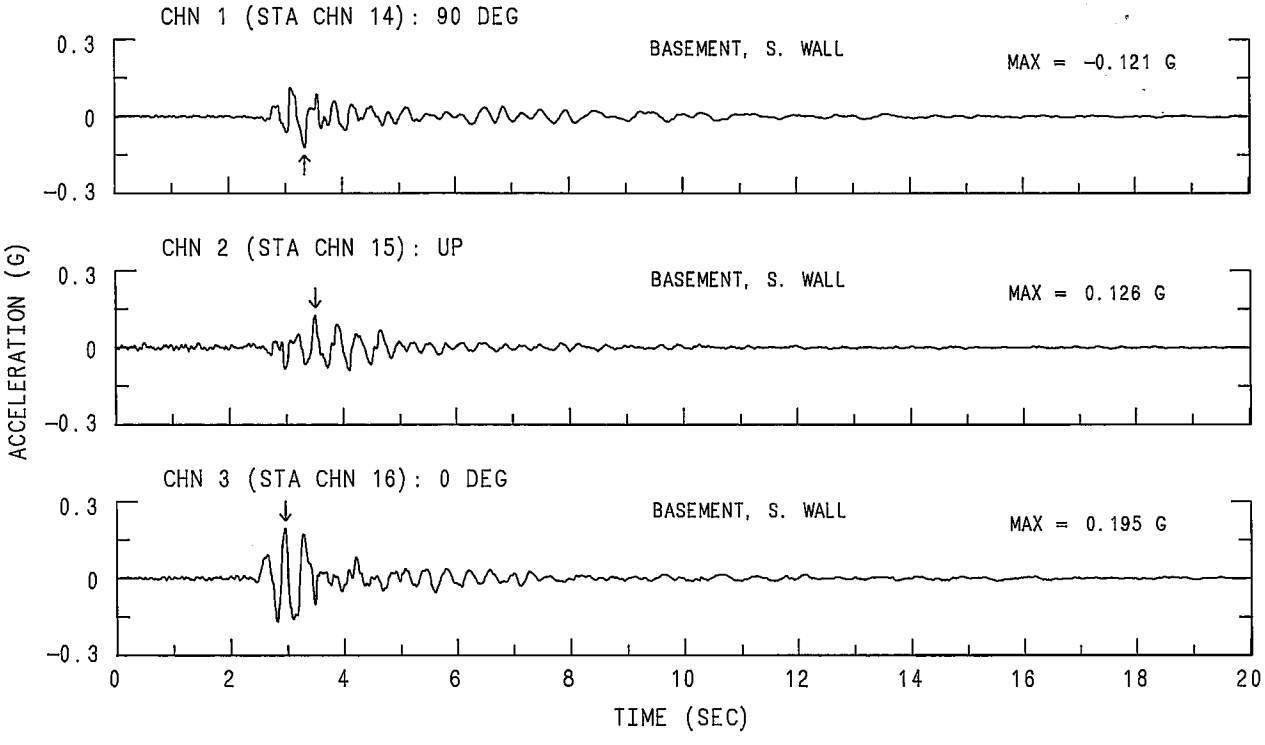


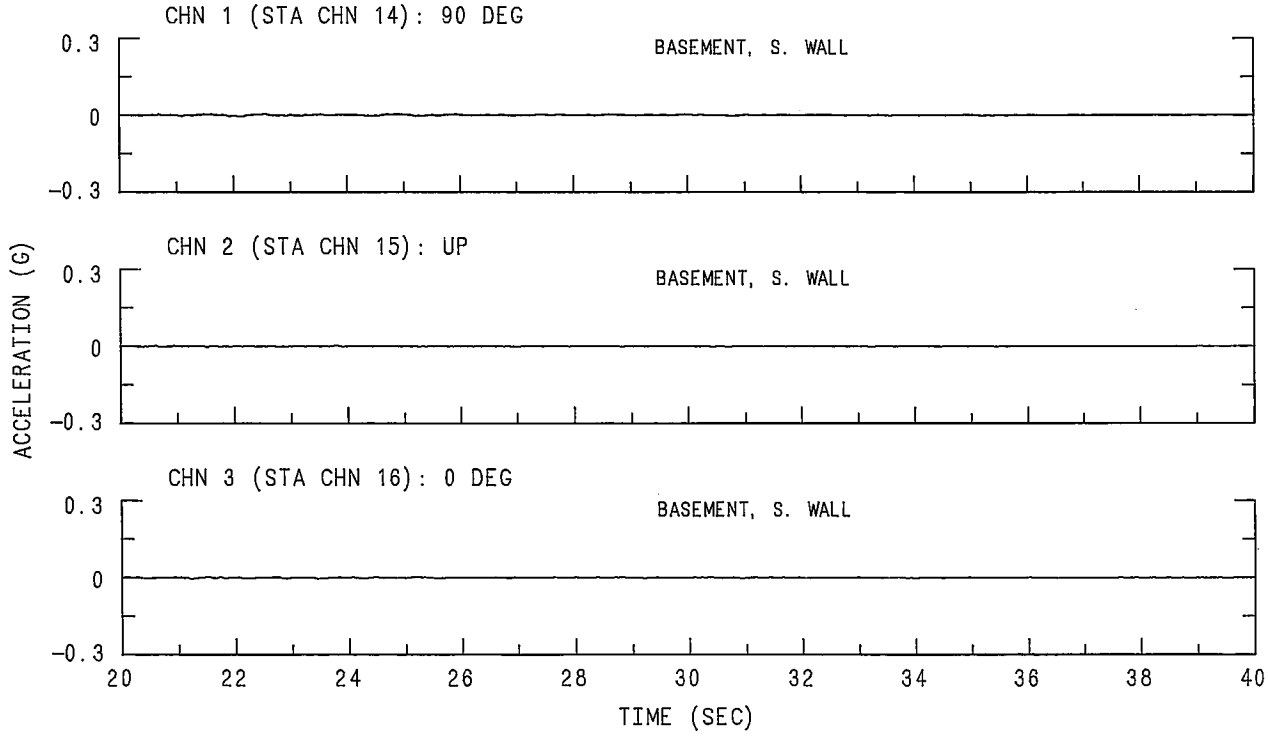
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

PHASE 1 ACCELERATION

RECORD ID: 24541-S1869-91179.01

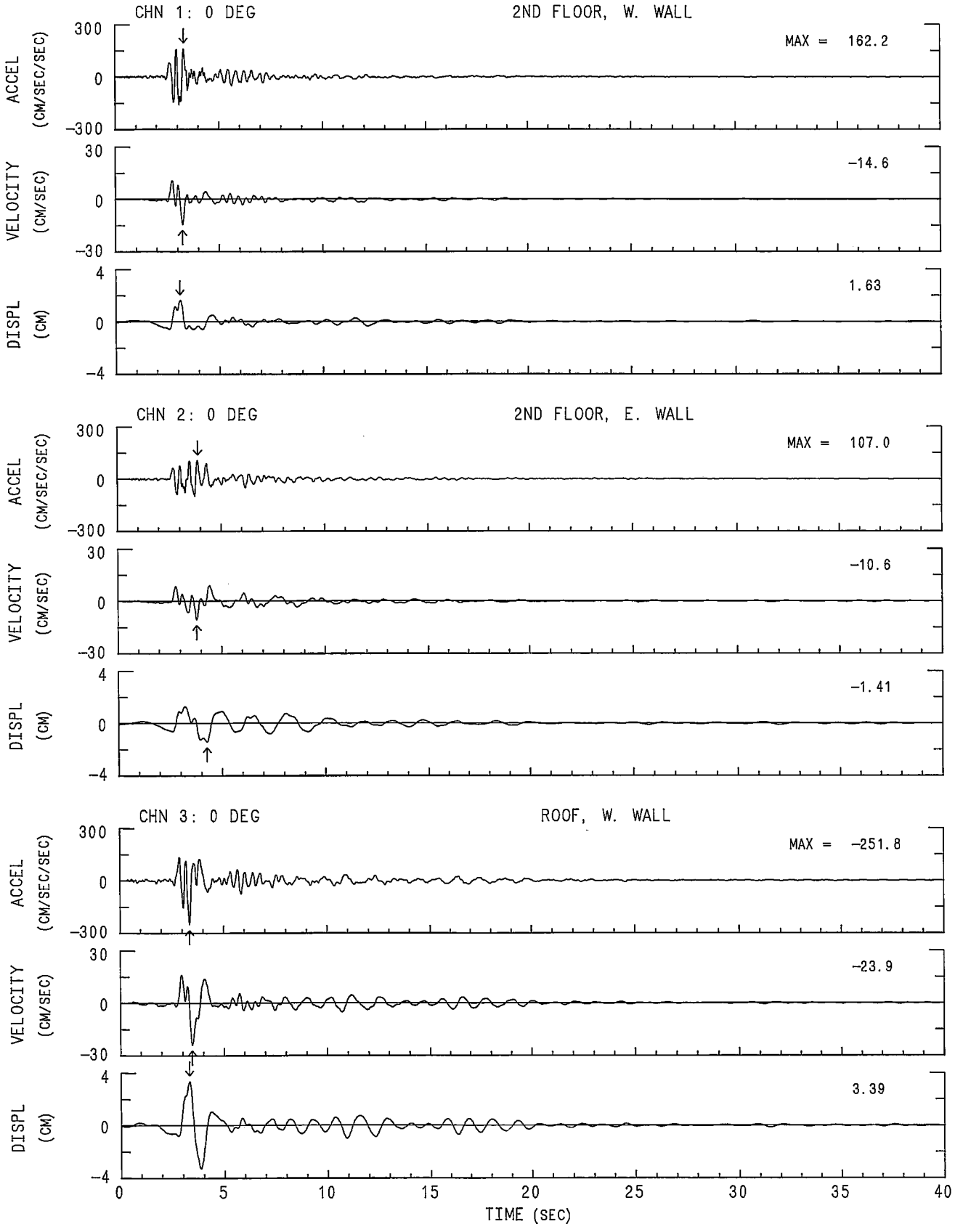




SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

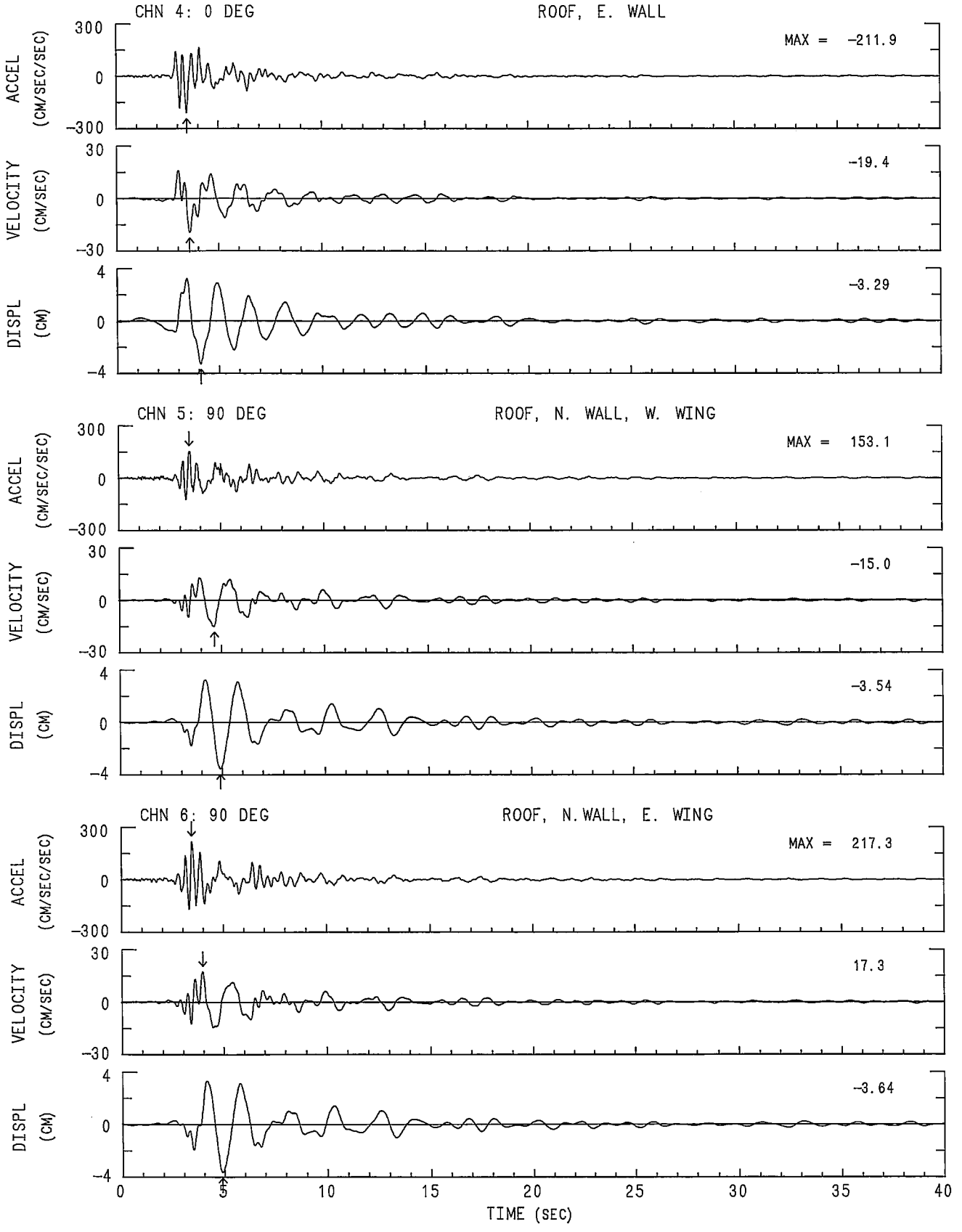
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 24541-C0281-91179.01



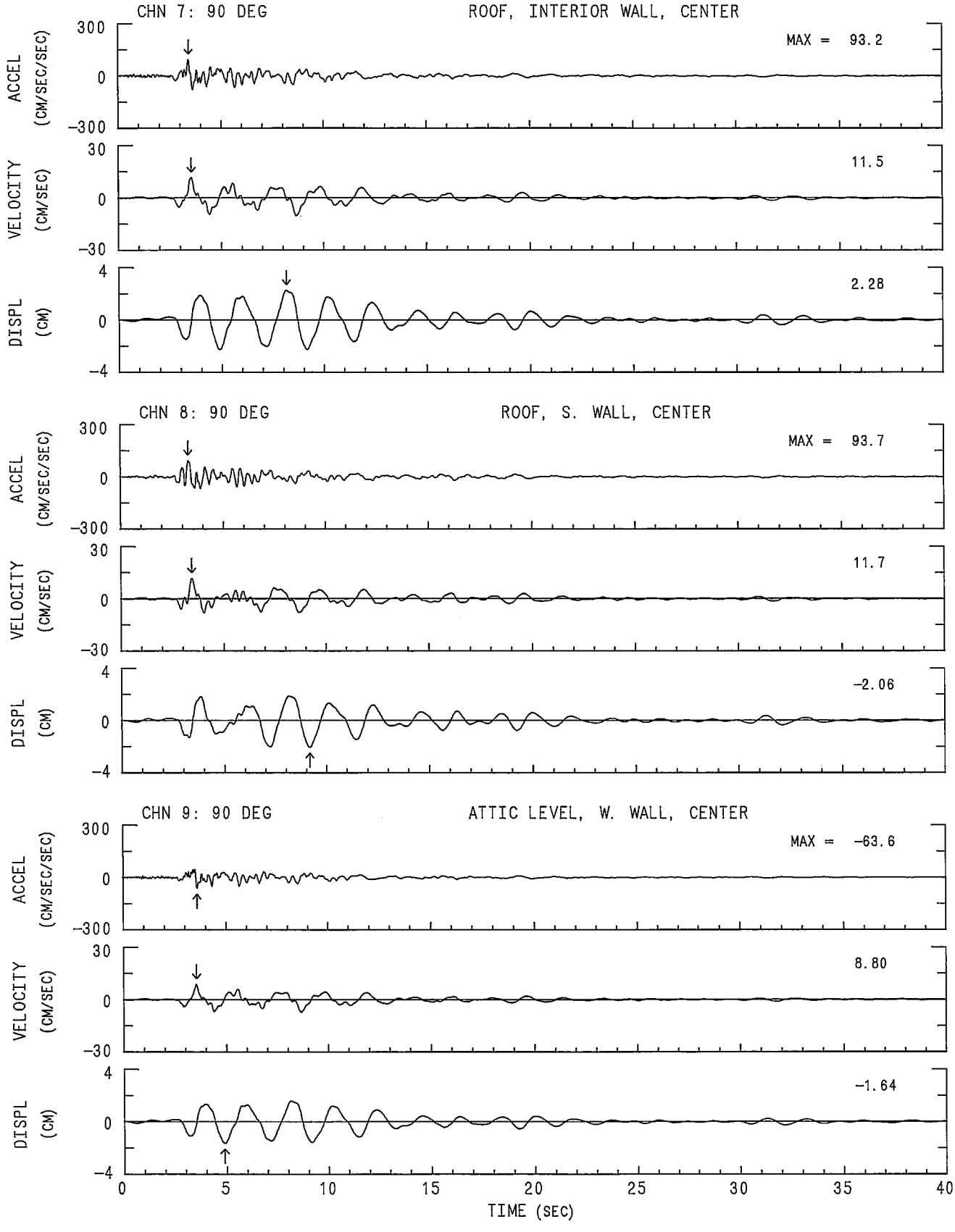
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

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: 24541-C0281-91179.01



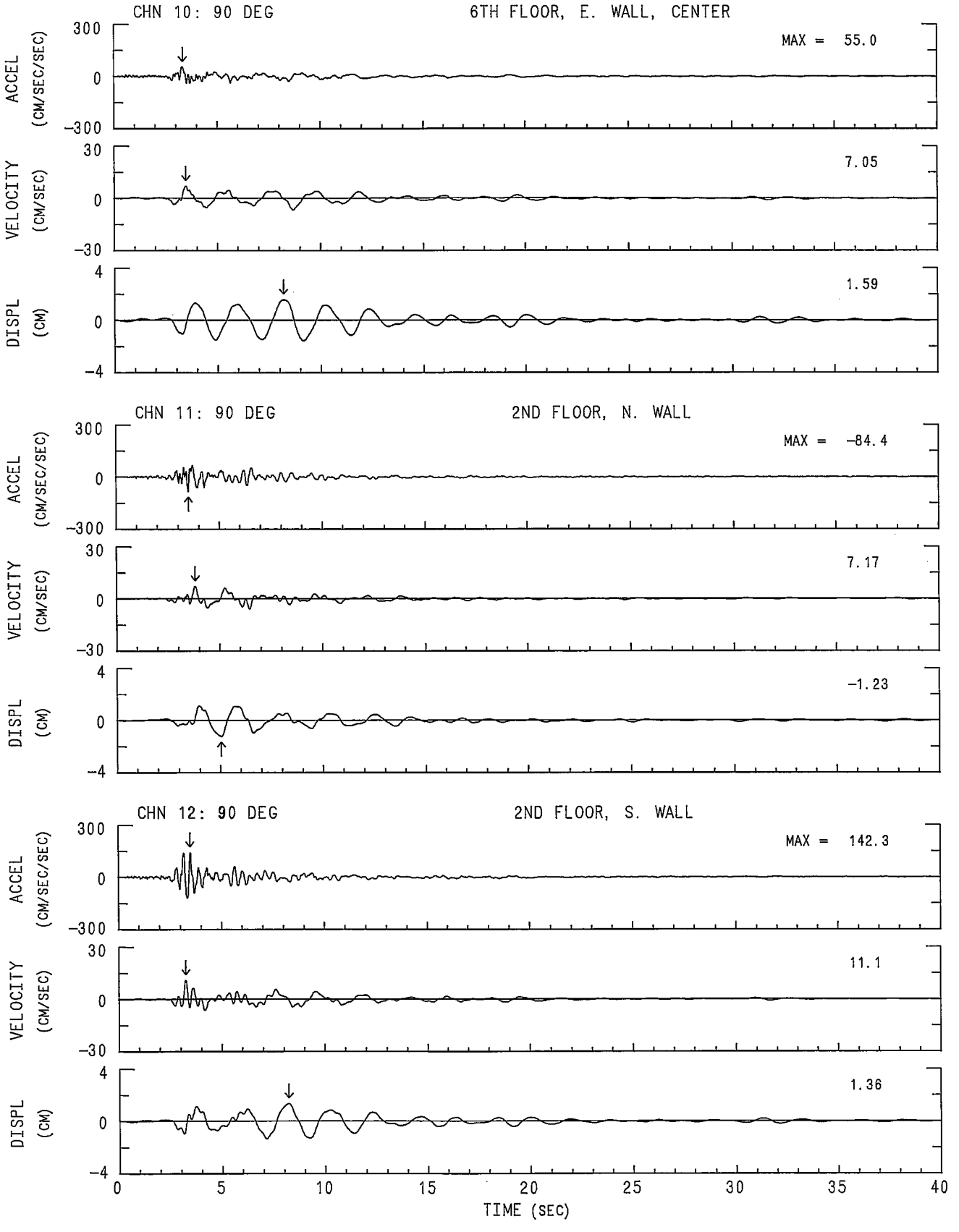
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

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: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

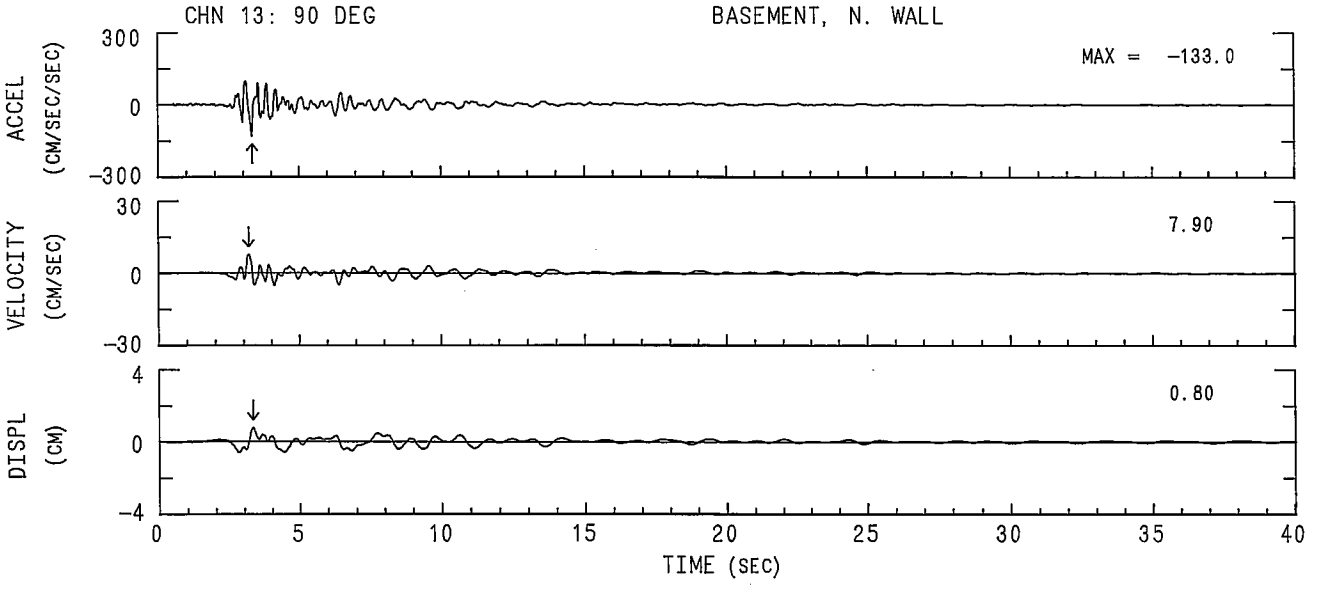
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

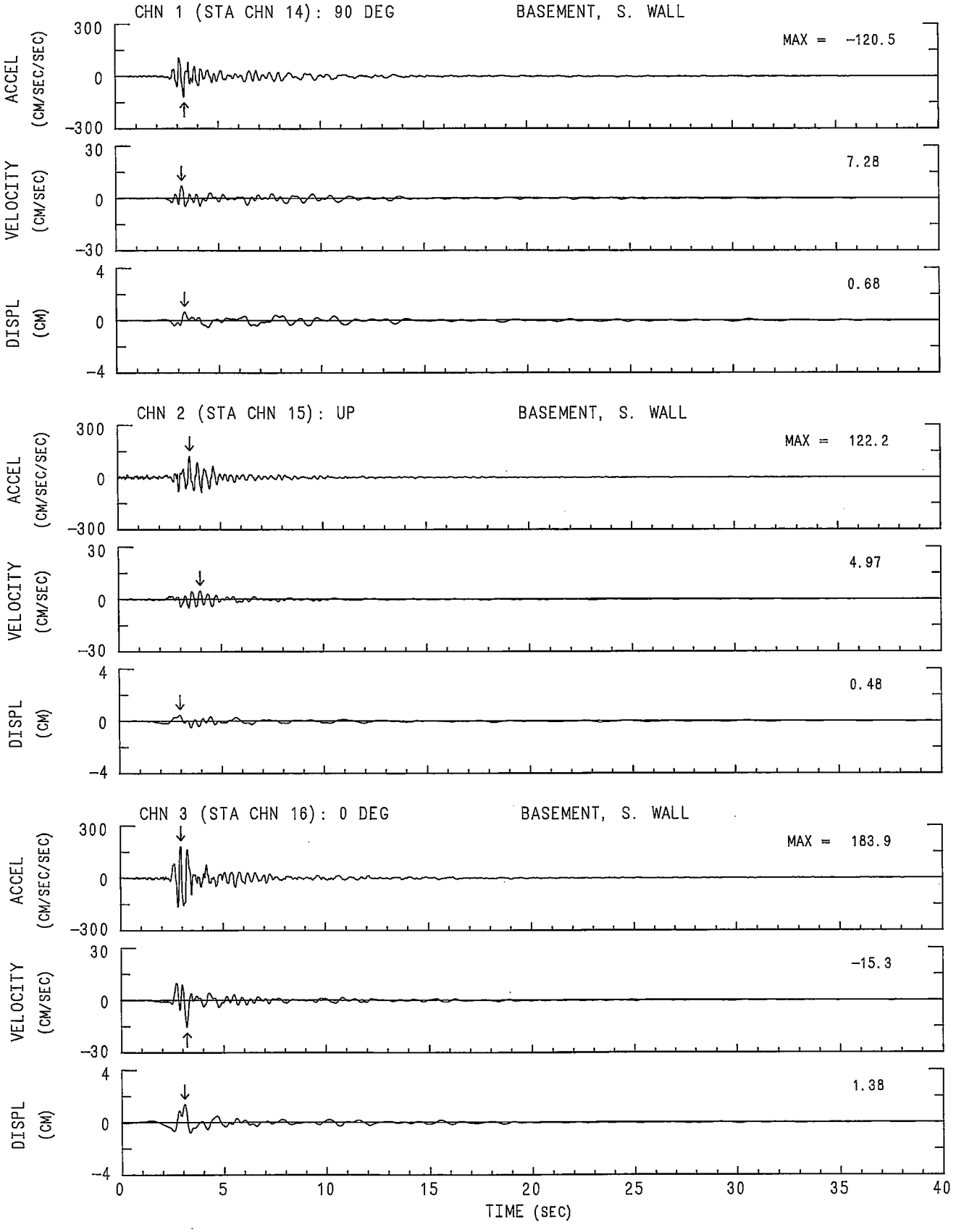
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC) RECORD ID: 24541-C0281-91179.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

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: 24541-S1869-91179.01



PASADENA – 6-STORY OFFICE BLDG.: CSMIP S/N 541

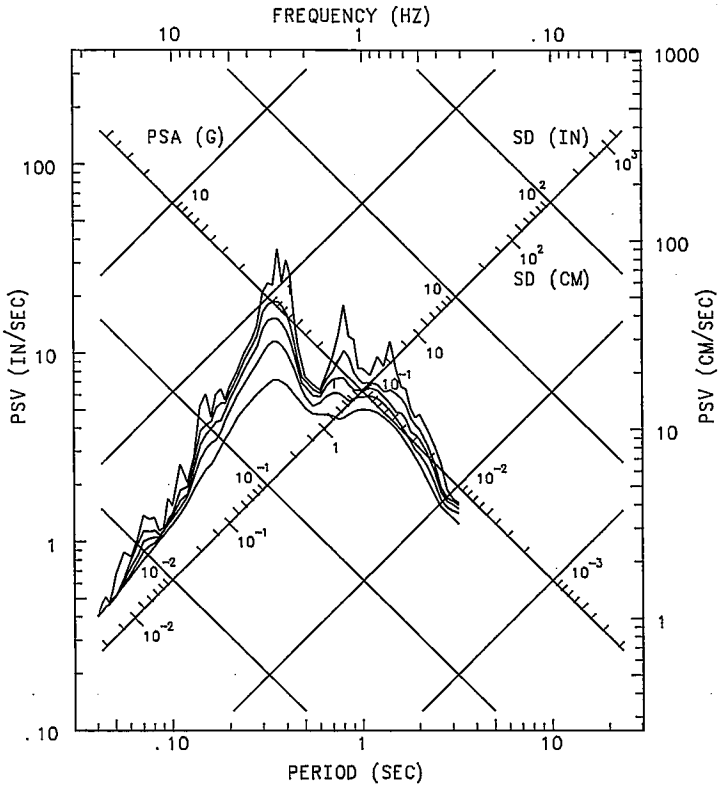
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

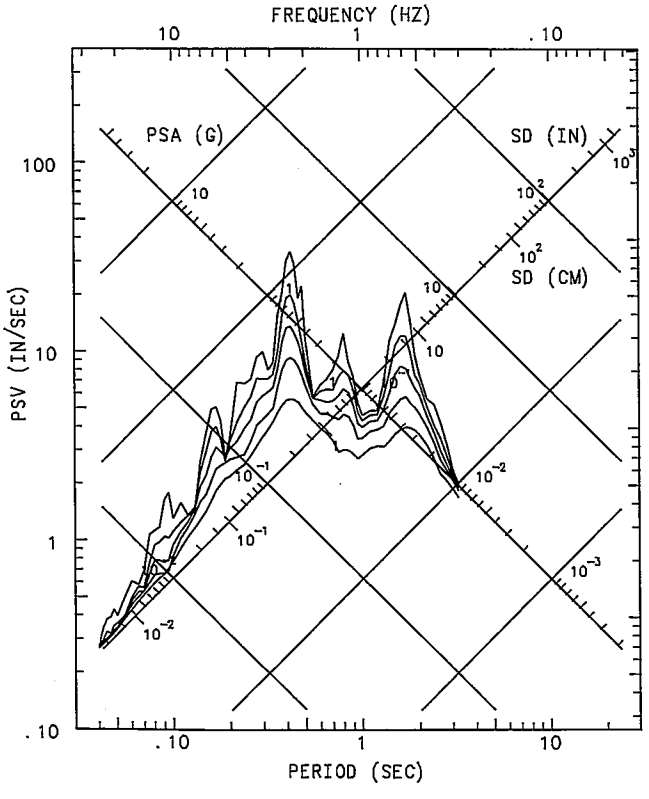
RECORD ID: 24541-C0281-91179.01

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

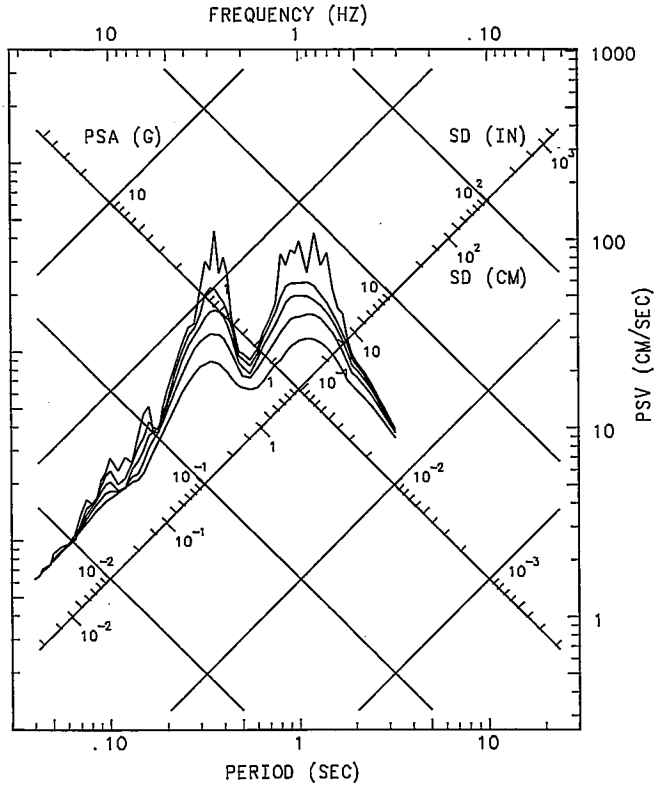
CHN 1: 0 DEG
2ND FLOOR, W. WALL



CHN 2: 0 DEG
2ND FLOOR, E. WALL



CHN 3: 0 DEG
ROOF, W. WALL



PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

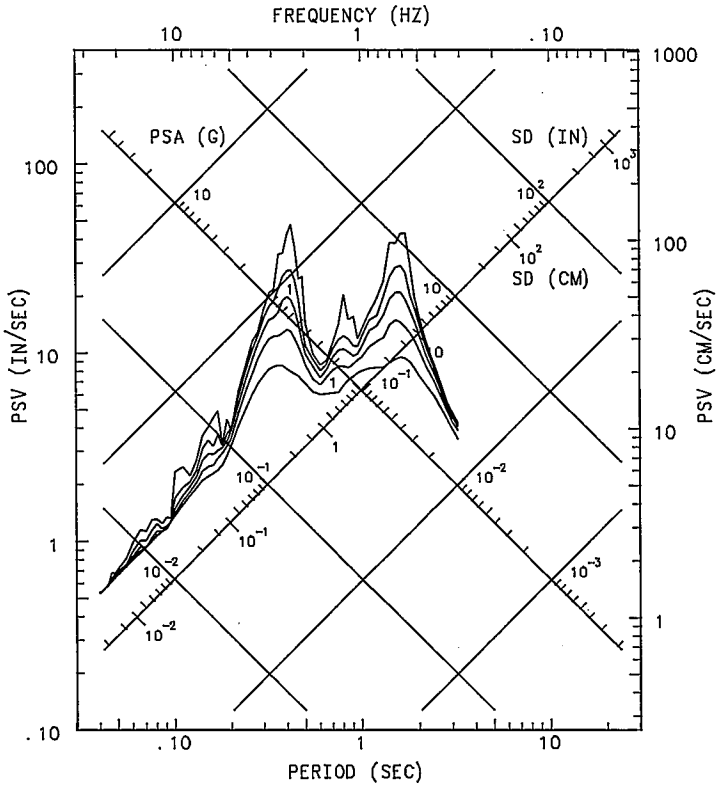
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

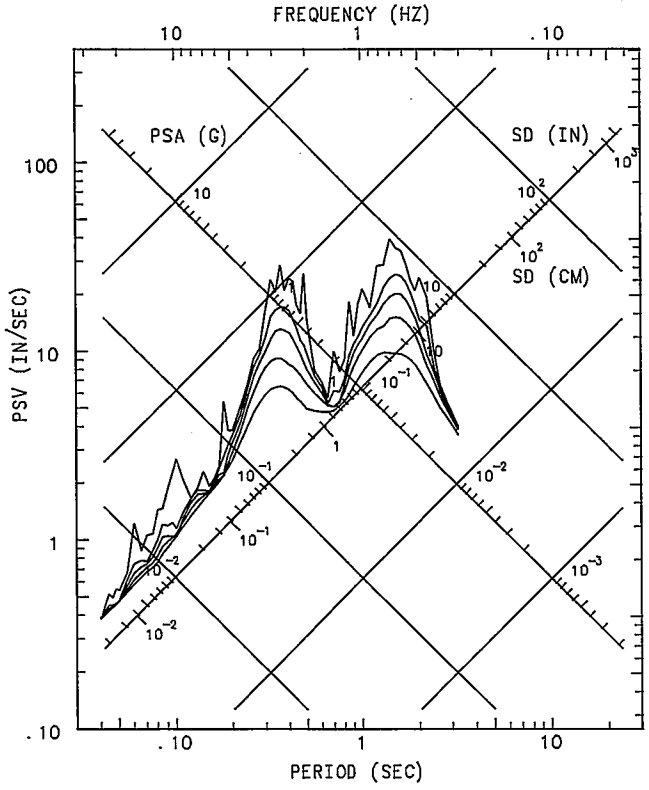
RECORD ID: 24541-C0281-91179.01

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

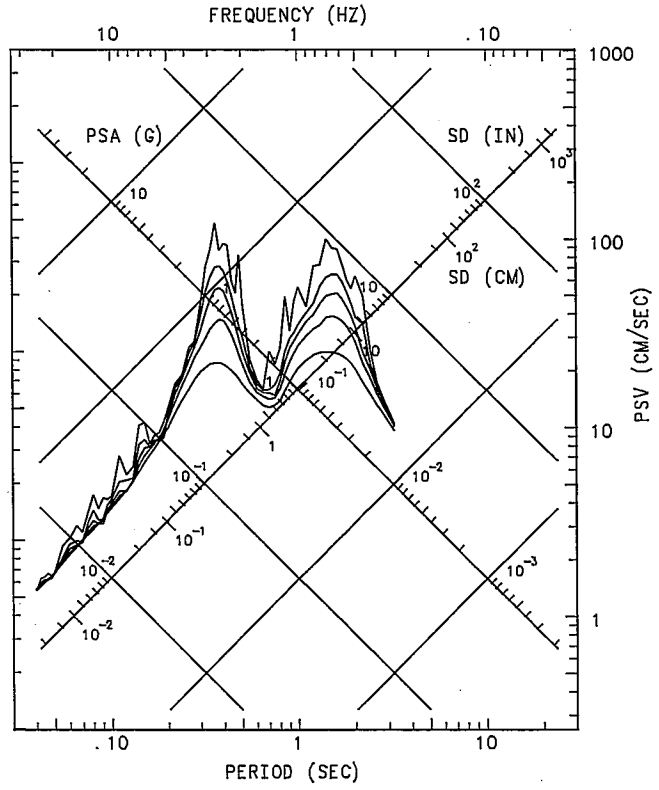
CHN 4: 0 DEG
ROOF, E. WALL



CHN 5: 90 DEG
ROOF, N. WALL, W. WING



CHN 6: 90 DEG
ROOF, N. WALL, E. WING



PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

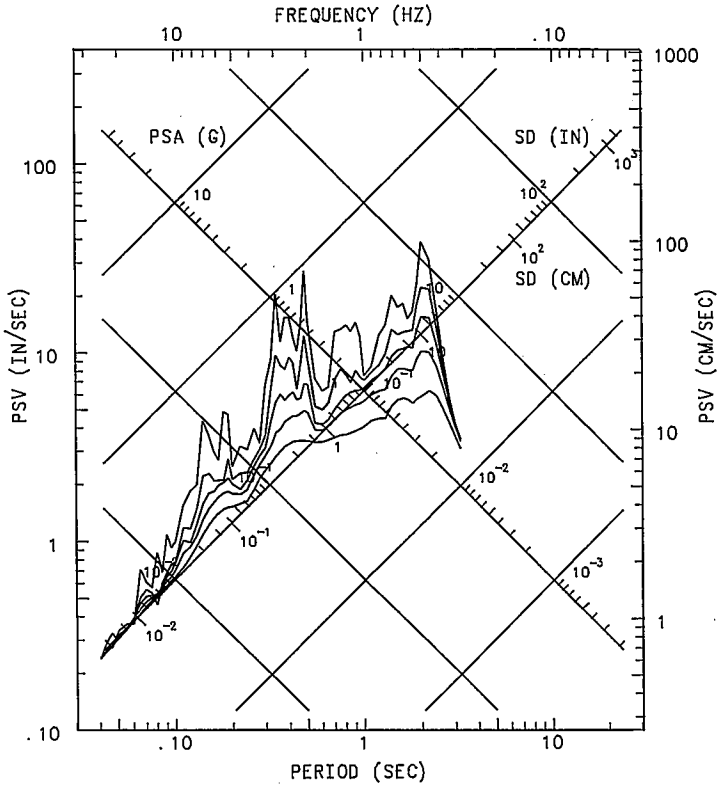
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

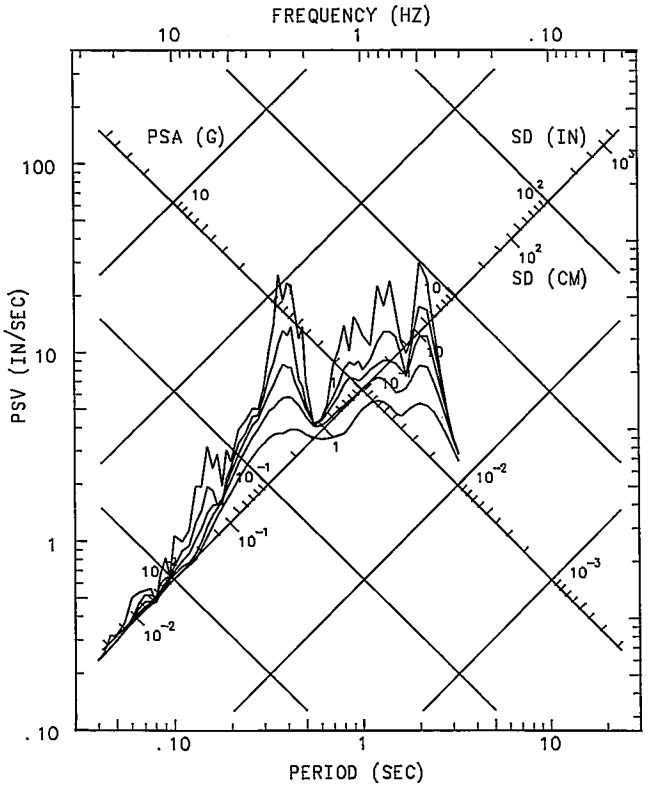
RECORD ID: 24541-C0281-91179.01

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

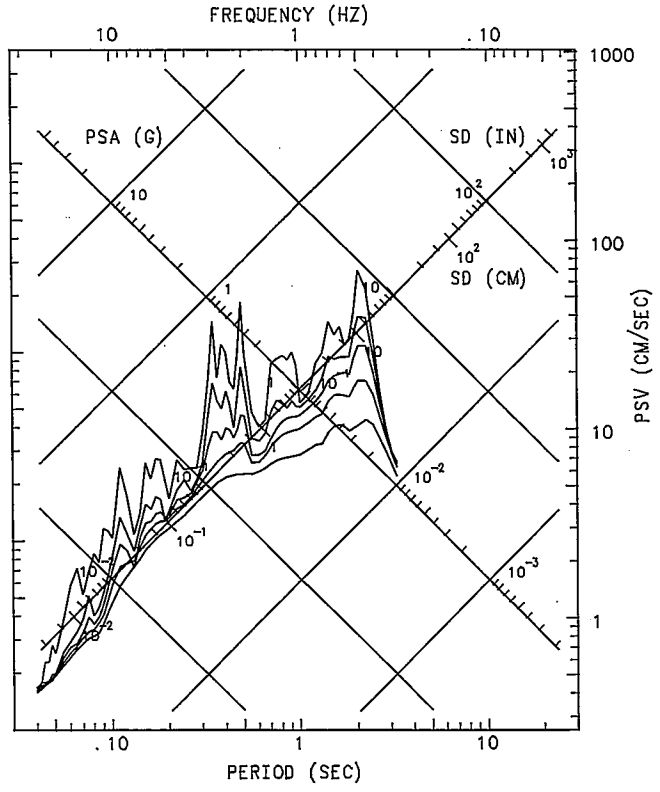
CHN 7: 90 DEG
ROOF, INTERIOR WALL, CENTER



CHN 8: 90 DEG
ROOF, S. WALL, CENTER



CHN 9: 90 DEG
ATTIC LEVEL, W. WALL, CENTER



PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

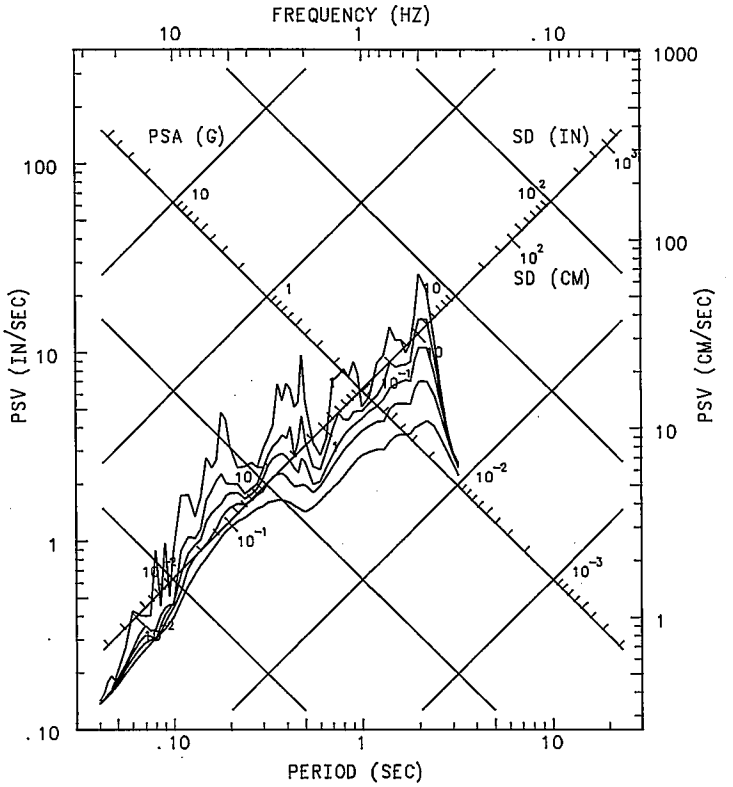
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

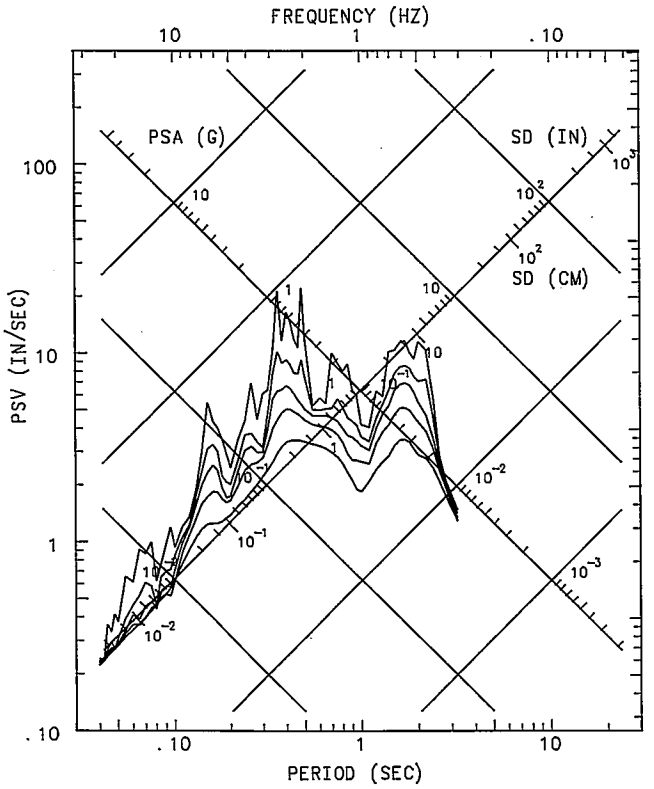
RECORD ID: 24541-C0281-91179.01

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

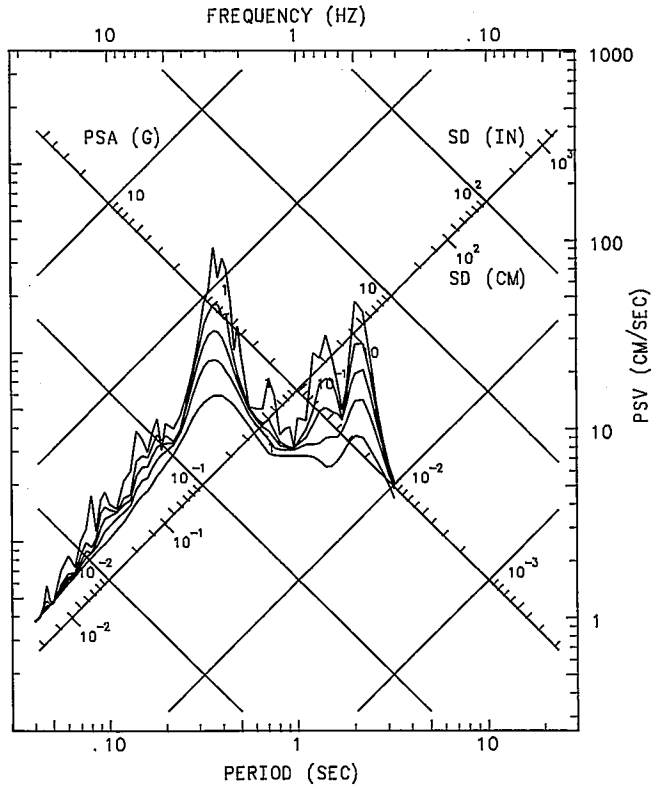
CHN 10: 90 DEG
6TH FLOOR, E. WALL, CENTER



CHN 11: 90 DEG
2ND FLOOR, N. WALL



CHN 12: 90 DEG
2ND FLOOR, S. WALL



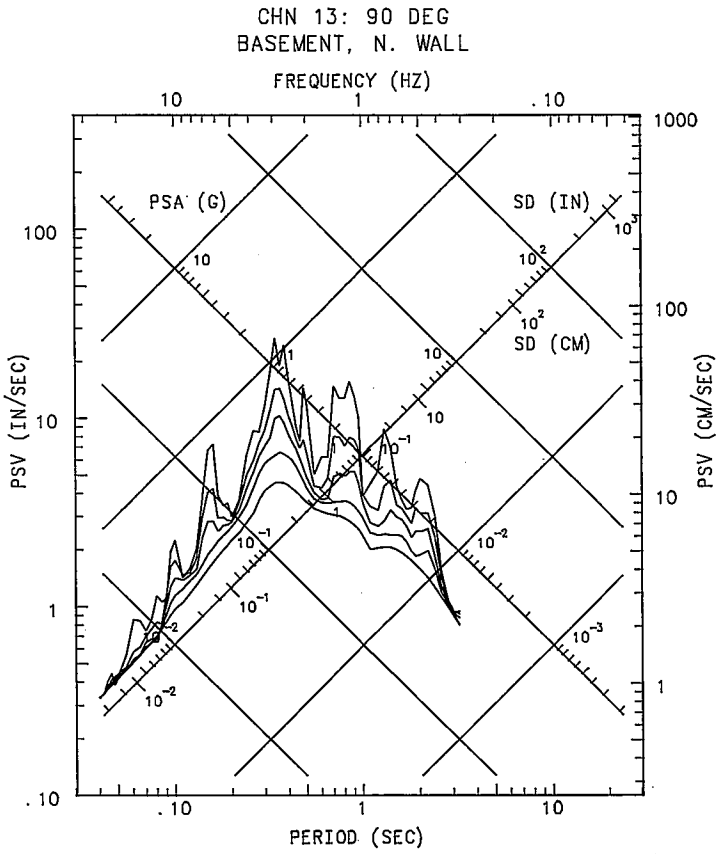
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

RECORD ID: 24541-C0281-91179.01

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



PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541

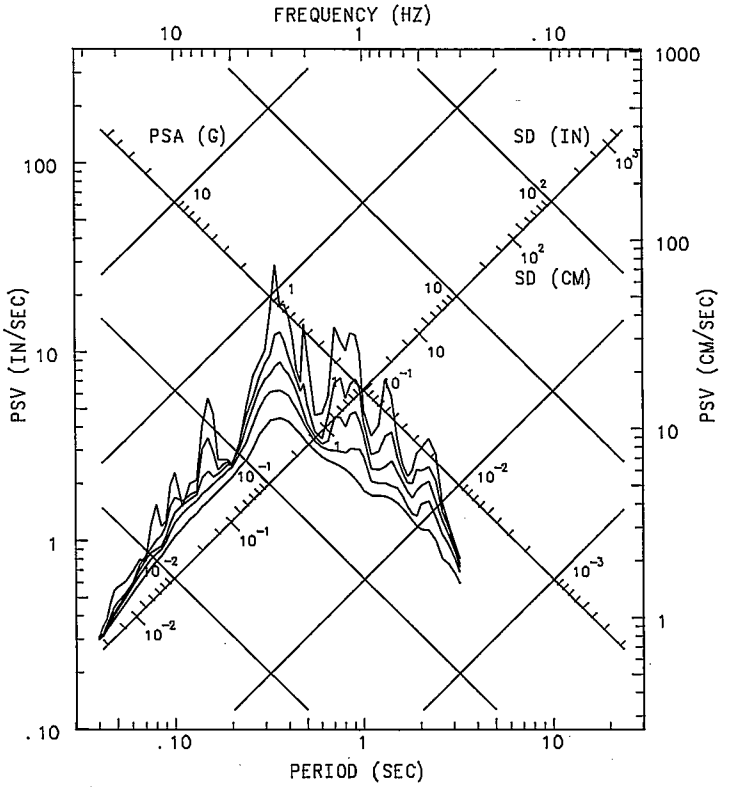
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

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

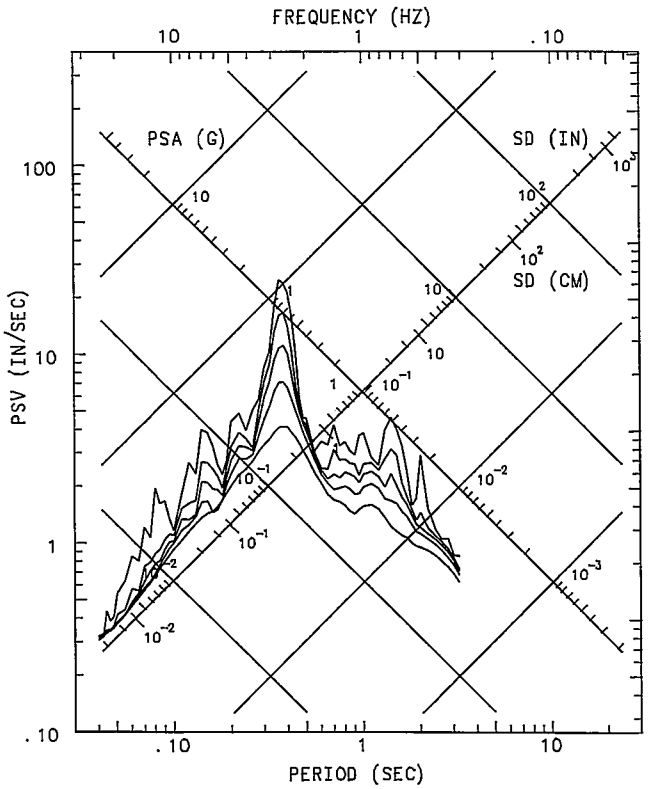
RECORD ID: 24541-S1869-91179.01

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

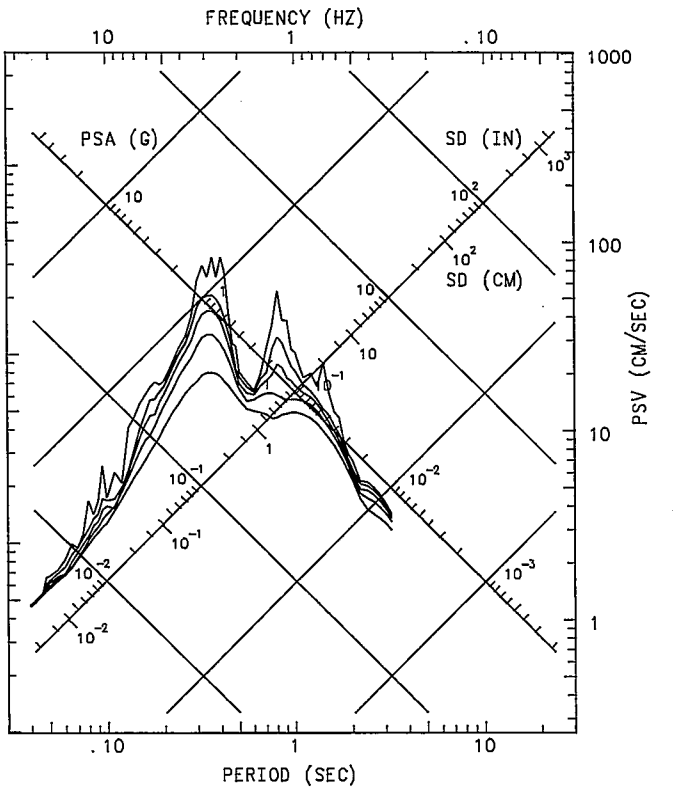
CHN 1 (STA CHN 14): 90 DEG
BASEMENT, S. WALL



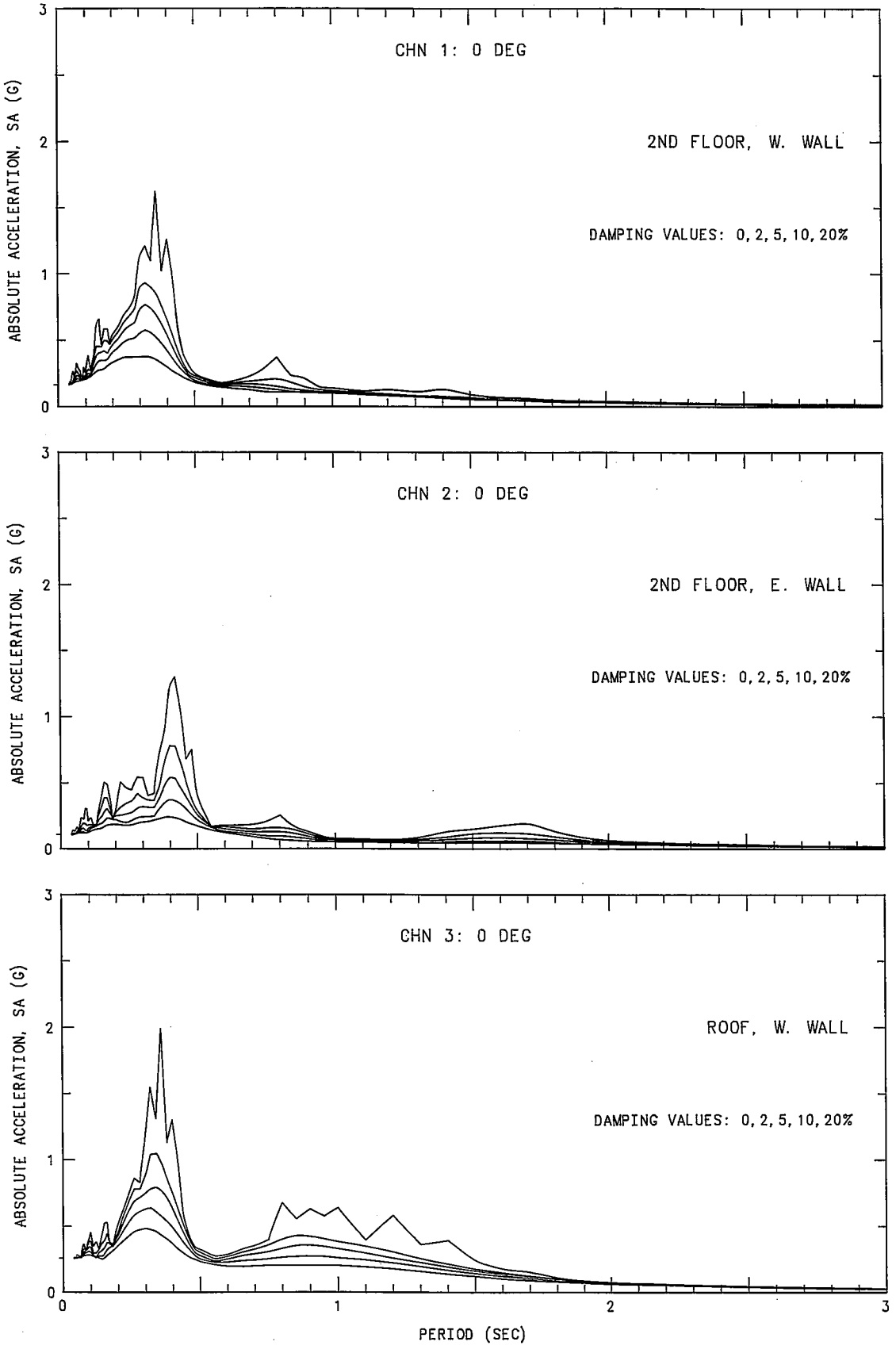
CHN 2 (STA CHN 15): UP
BASEMENT, S. WALL



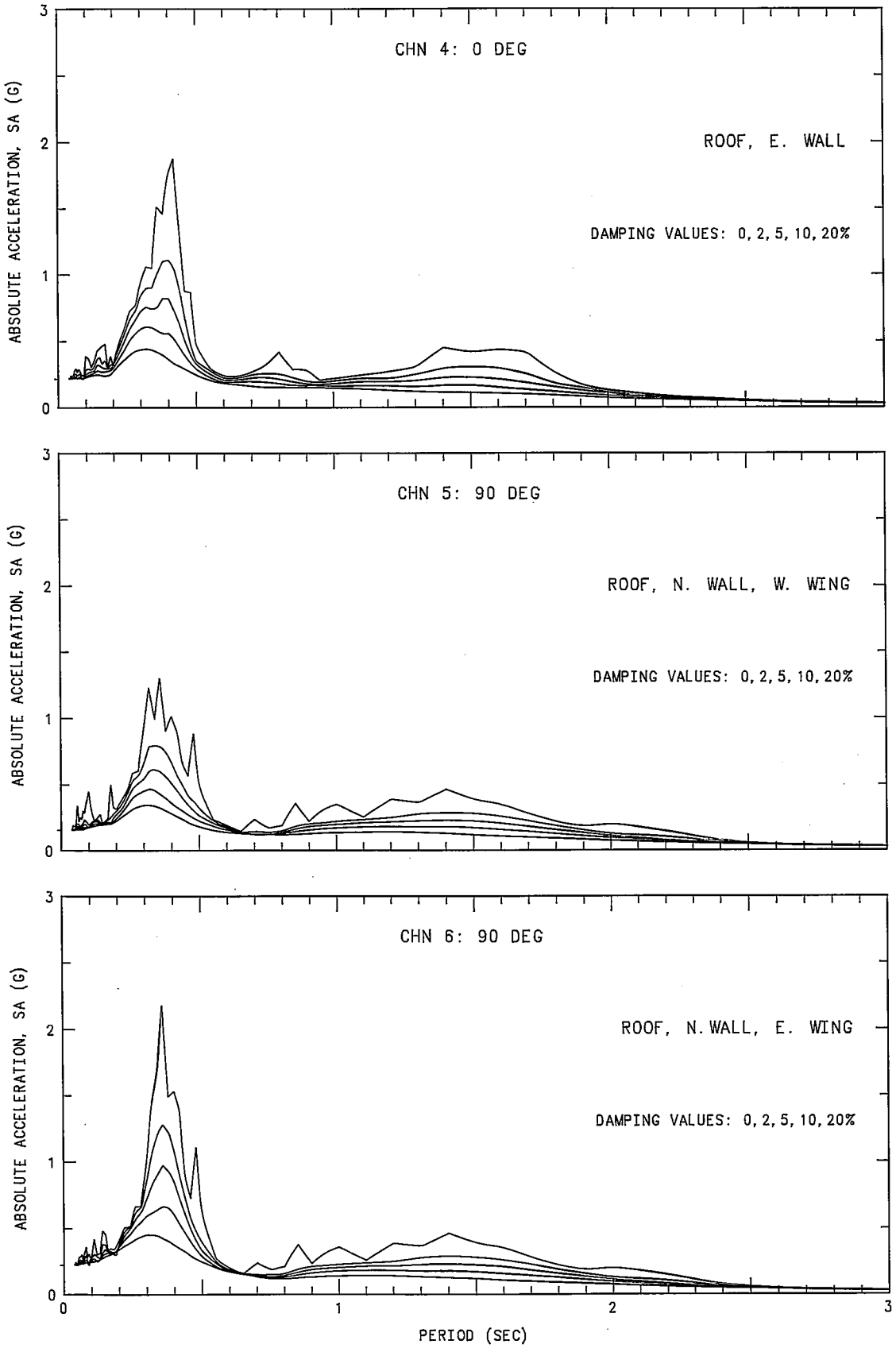
CHN 3 (STA CHN 16): 0 DEG
BASEMENT, S. WALL



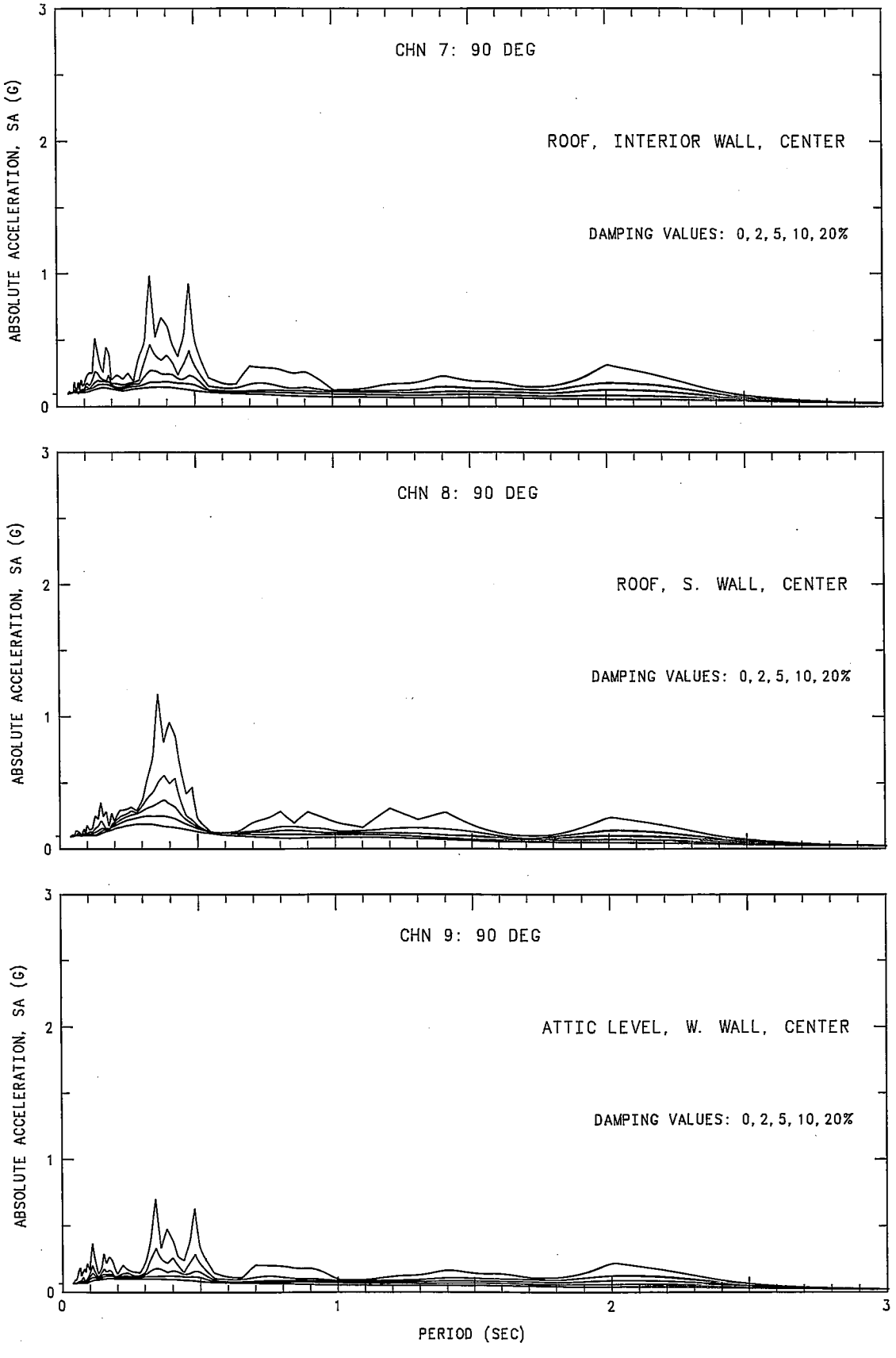
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-C0281-91179.01
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



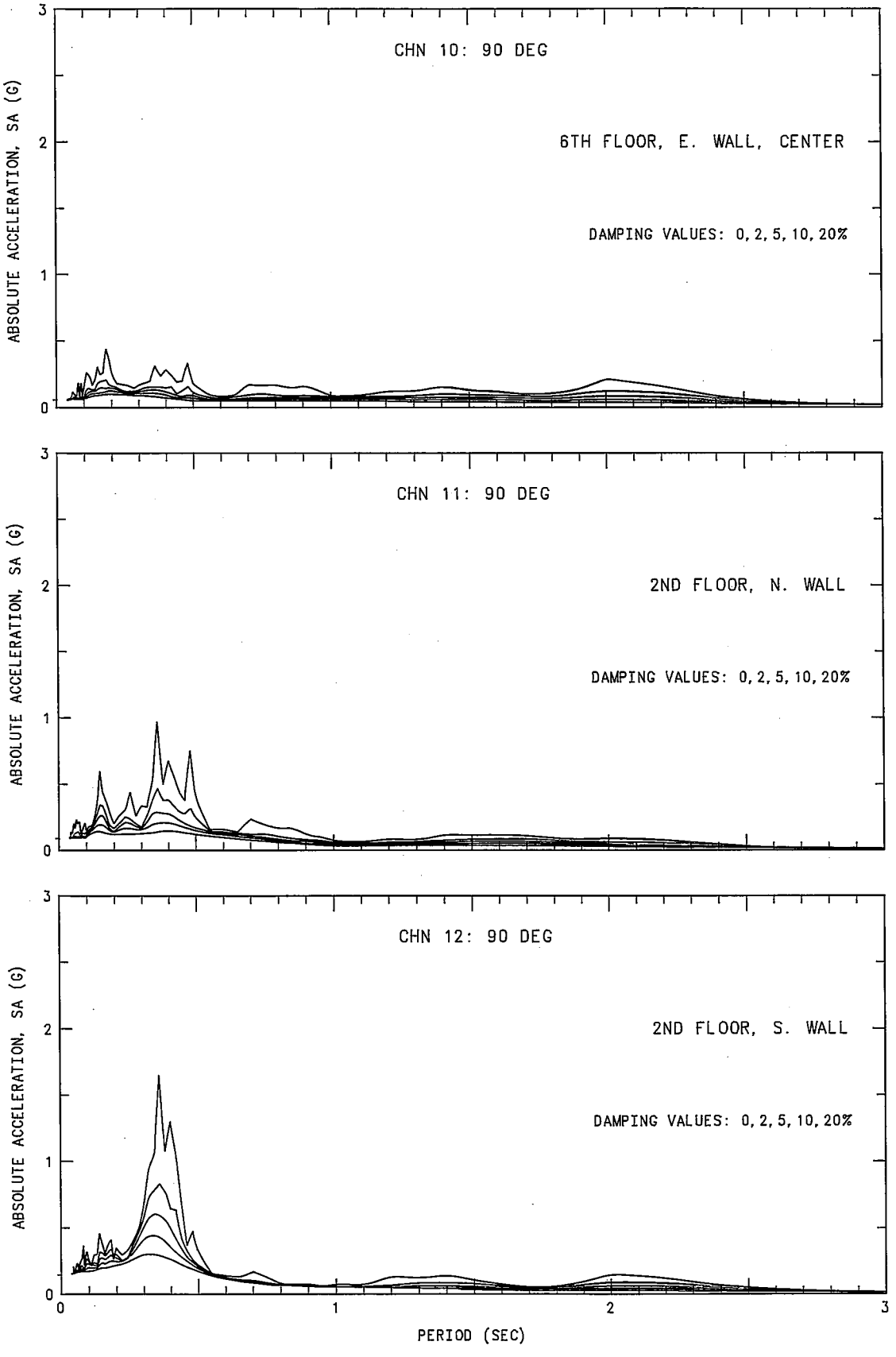
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-C0281-91179.01
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



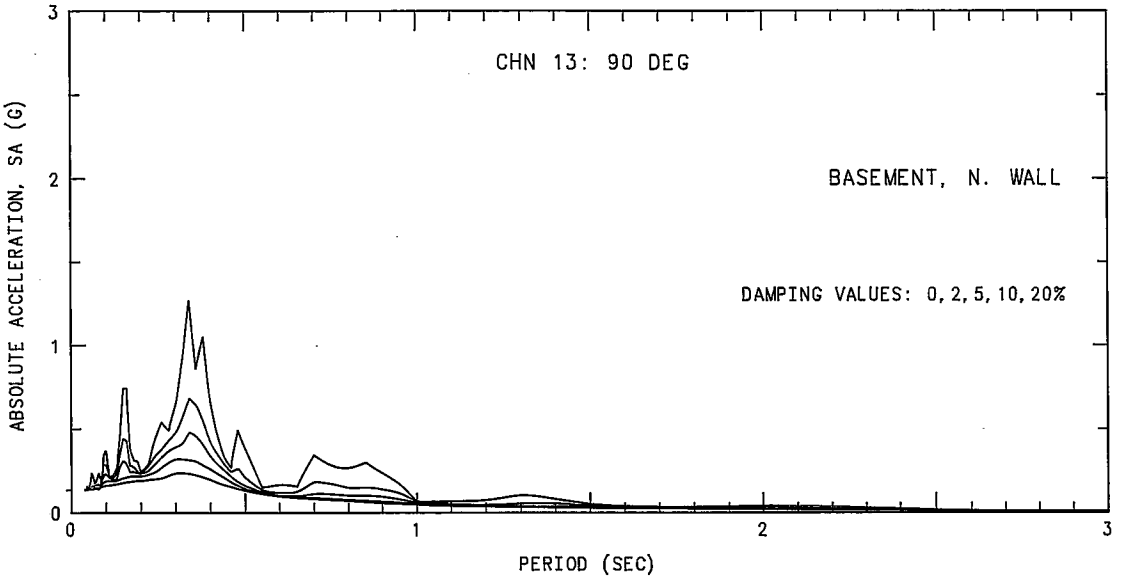
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-C0281-91179.01
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-C0281-91179.01
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-C0281-91179.01
USABLE DATA BANDWIDTH: 0.34 TO 23.6 HZ (0.04 TO 2.94 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
PASADENA - 6-STORY OFFICE BLDG.: CSMIP S/N 541
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 24541-S1869-91179.01
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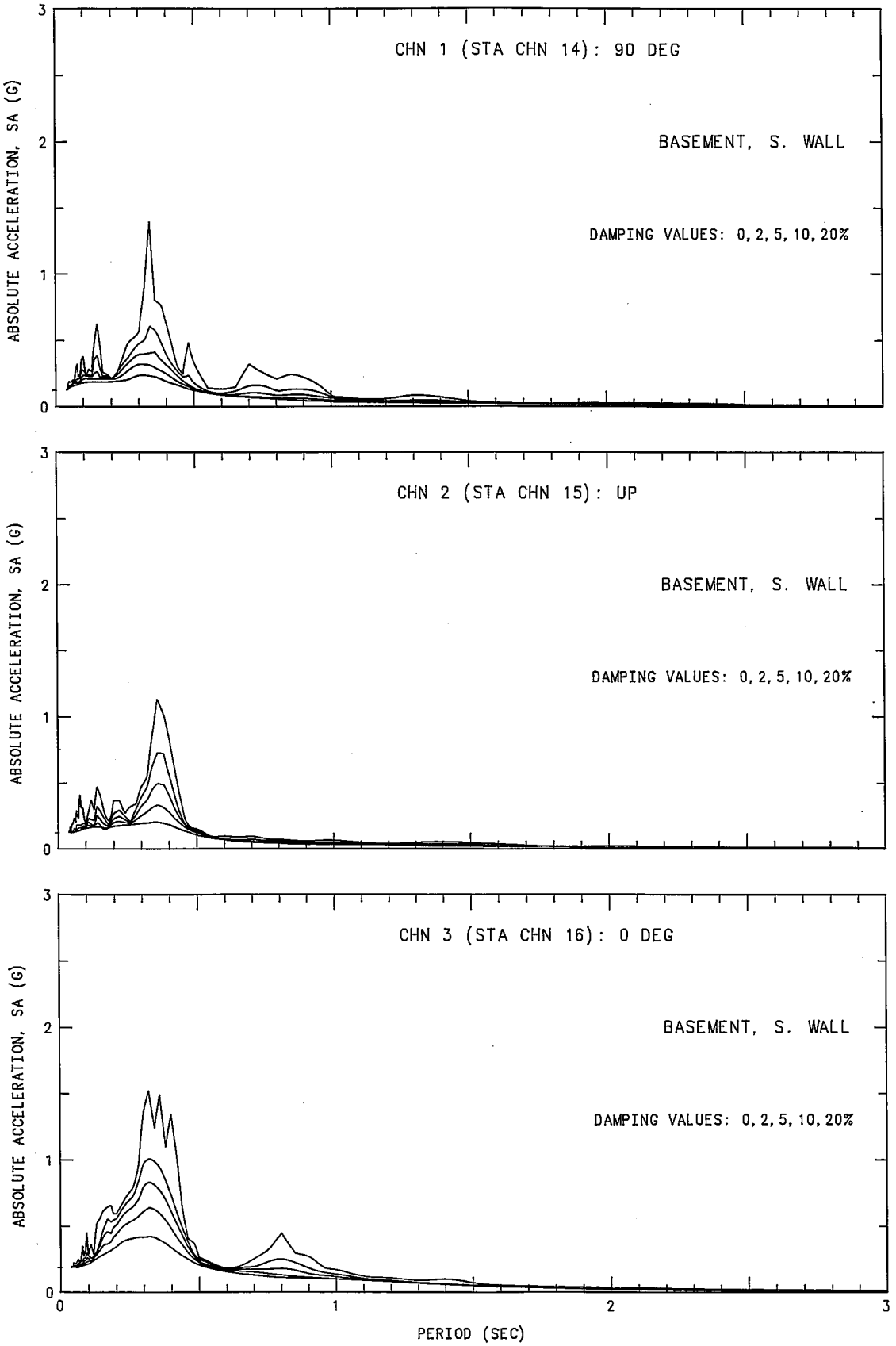
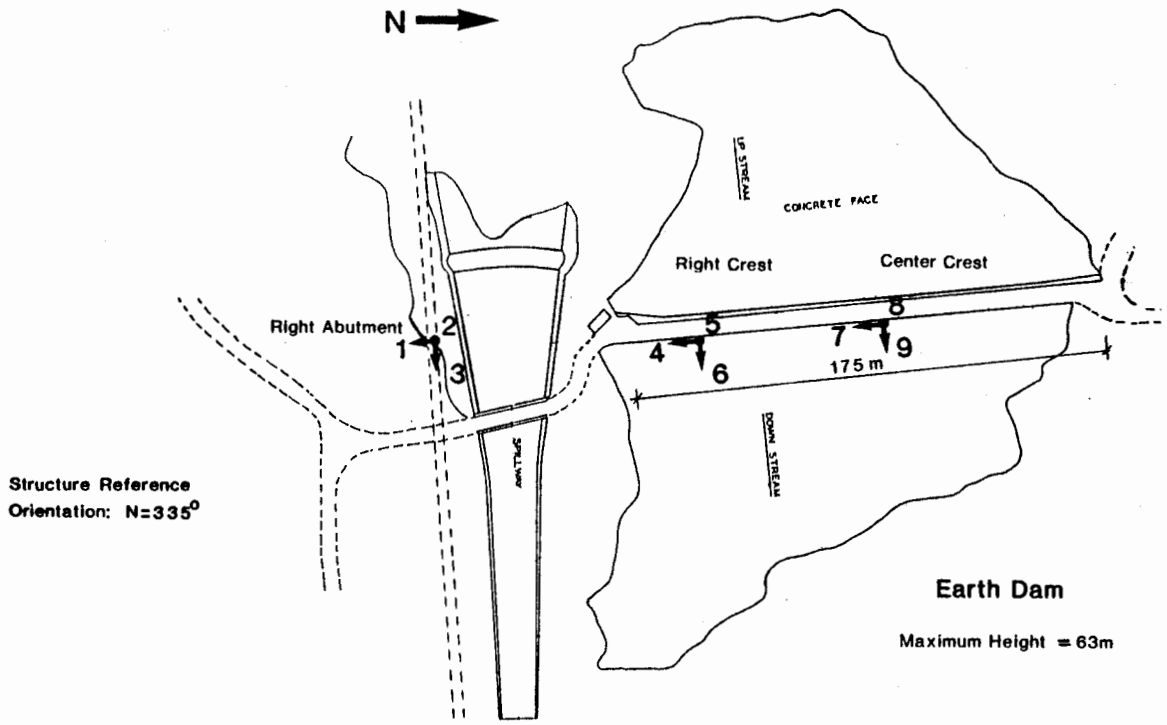


Cogswell Reservoir - Cogswell Dam
(CSMIP Station No. 23210)

SENSOR LOCATIONS

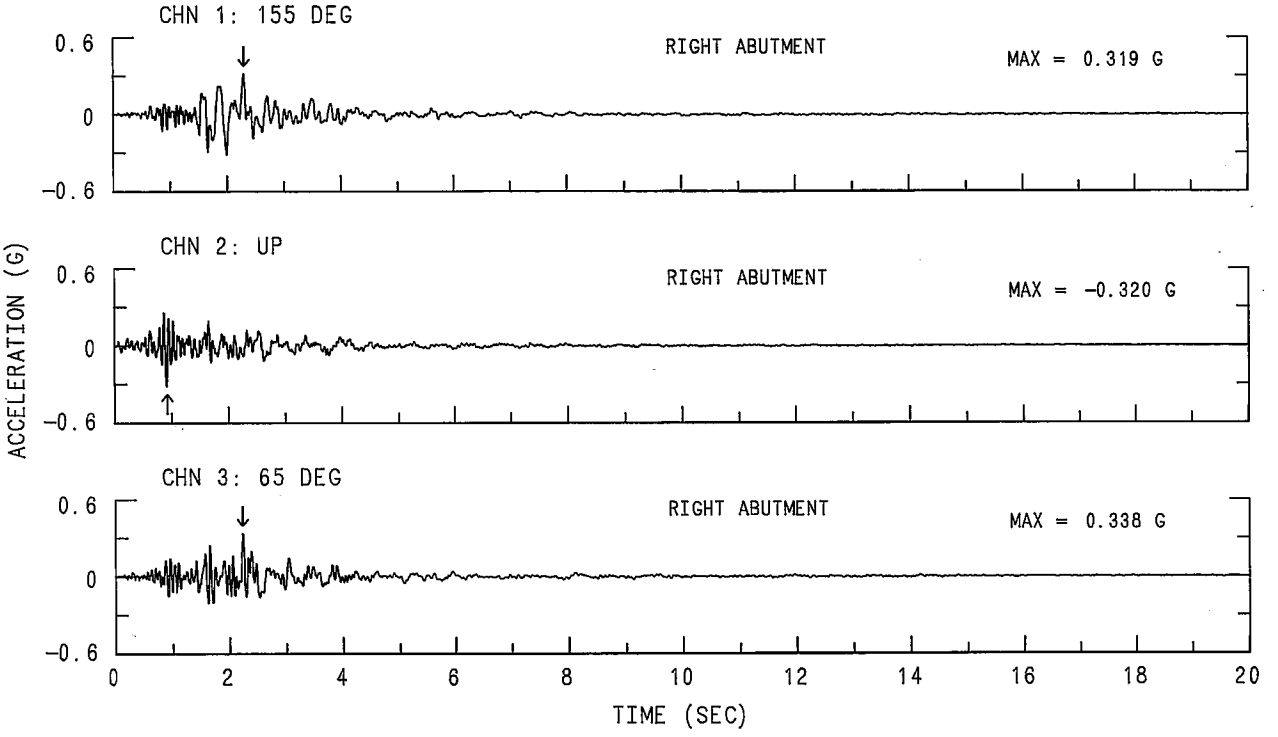


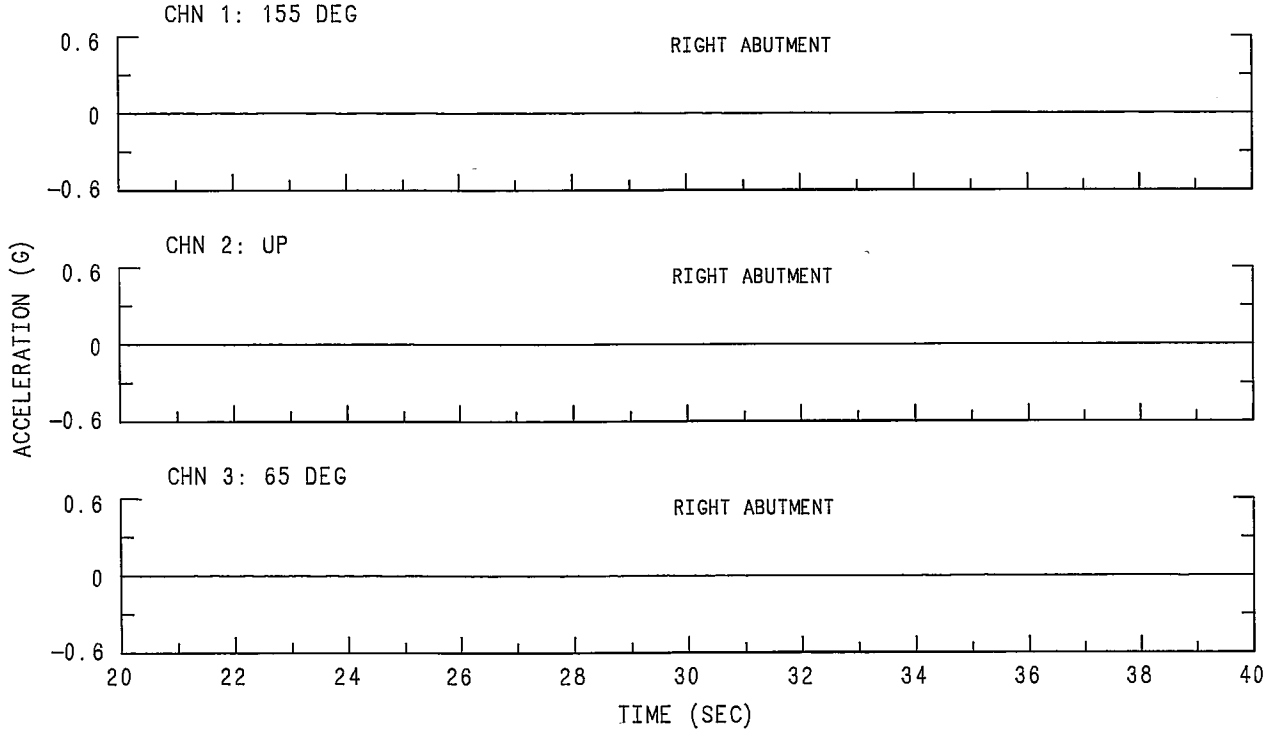
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

COGSWELL DAM: CSMIP S/N 210

PHASE 1 ACCELERATION

RECORD ID: 23210-S1867-91184.01



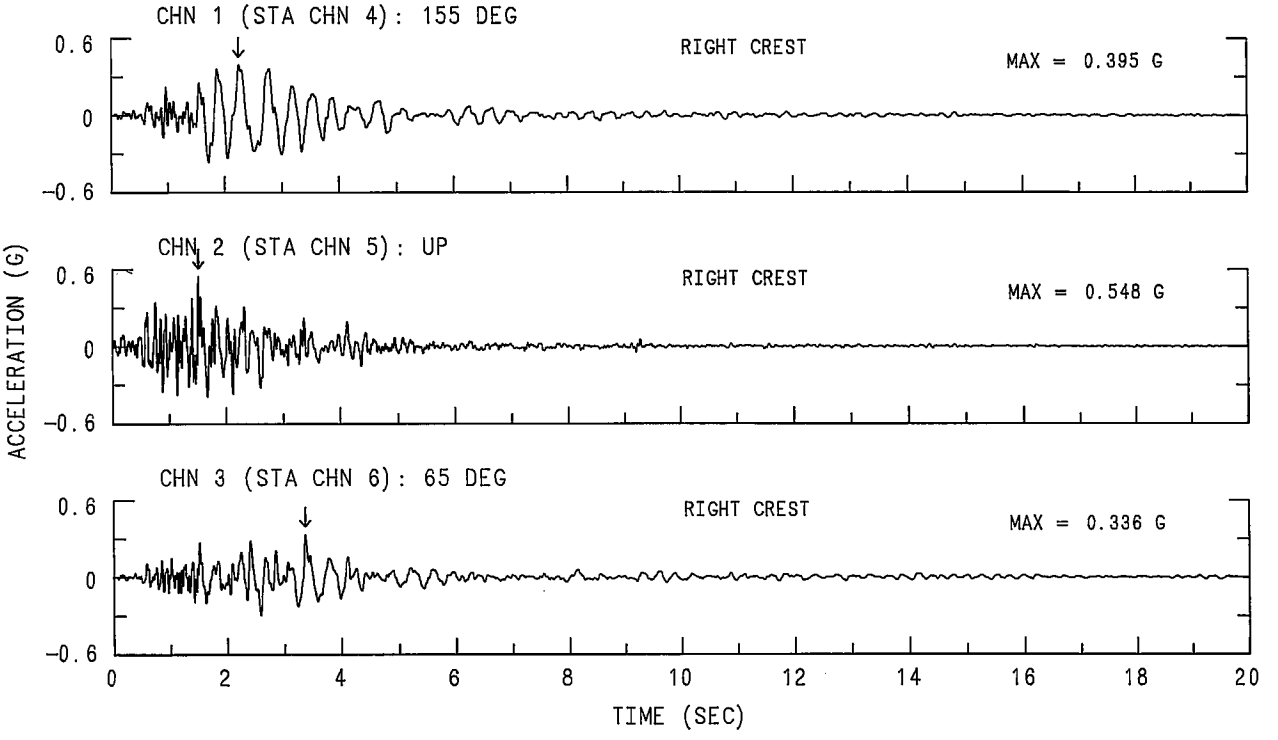


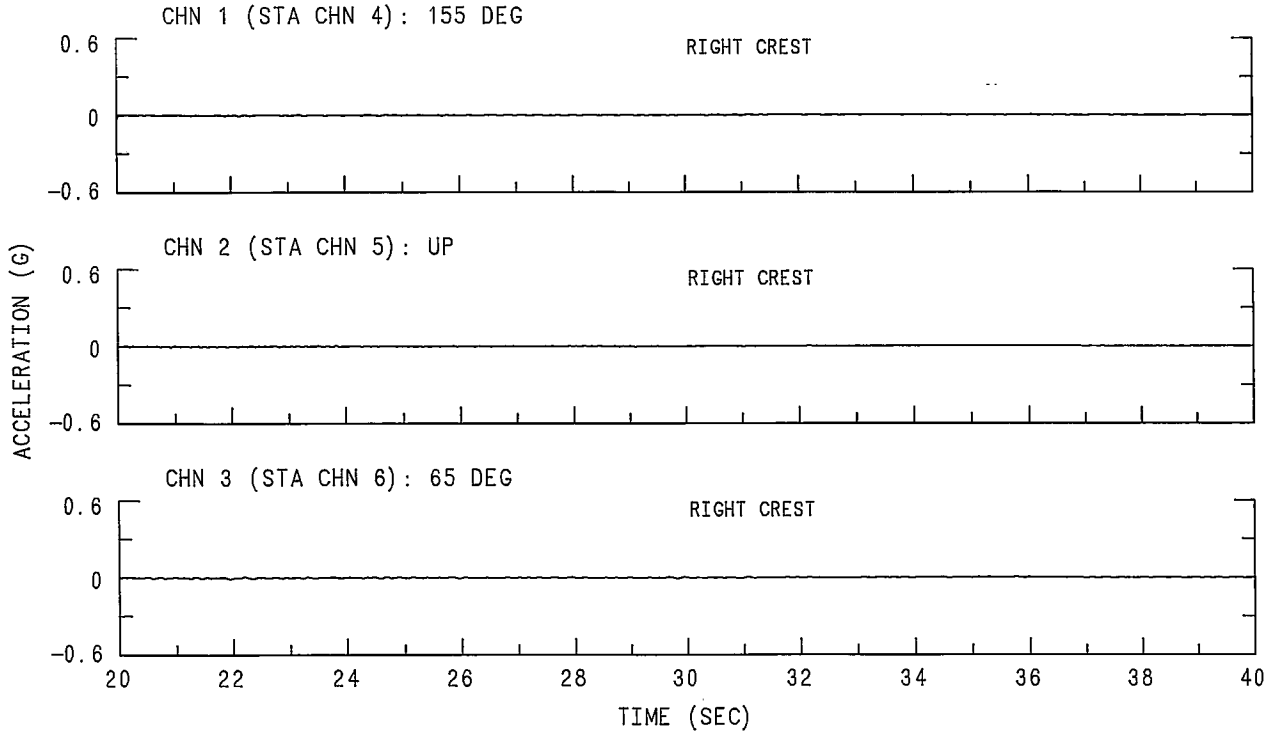
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

COGSWELL DAM: CSMIP S/N 210

PHASE 1 ACCELERATION

RECORD ID: 23210-S1680-91184.02



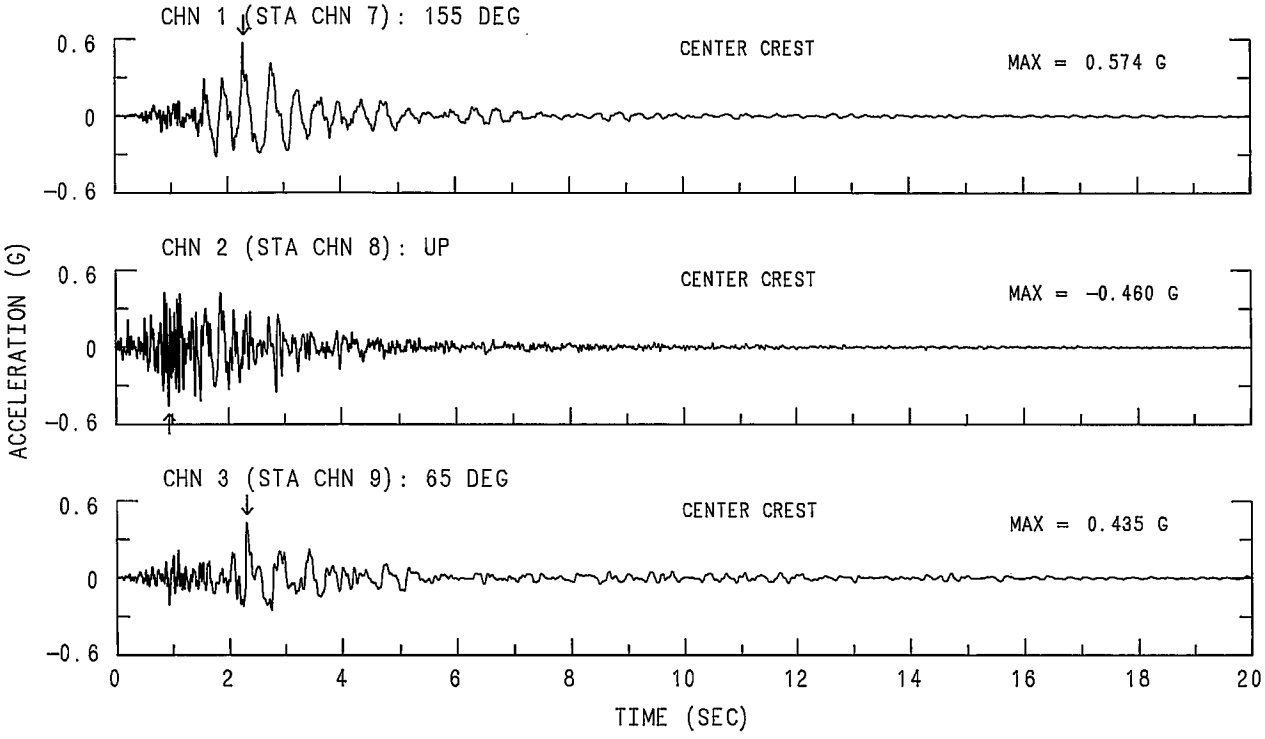


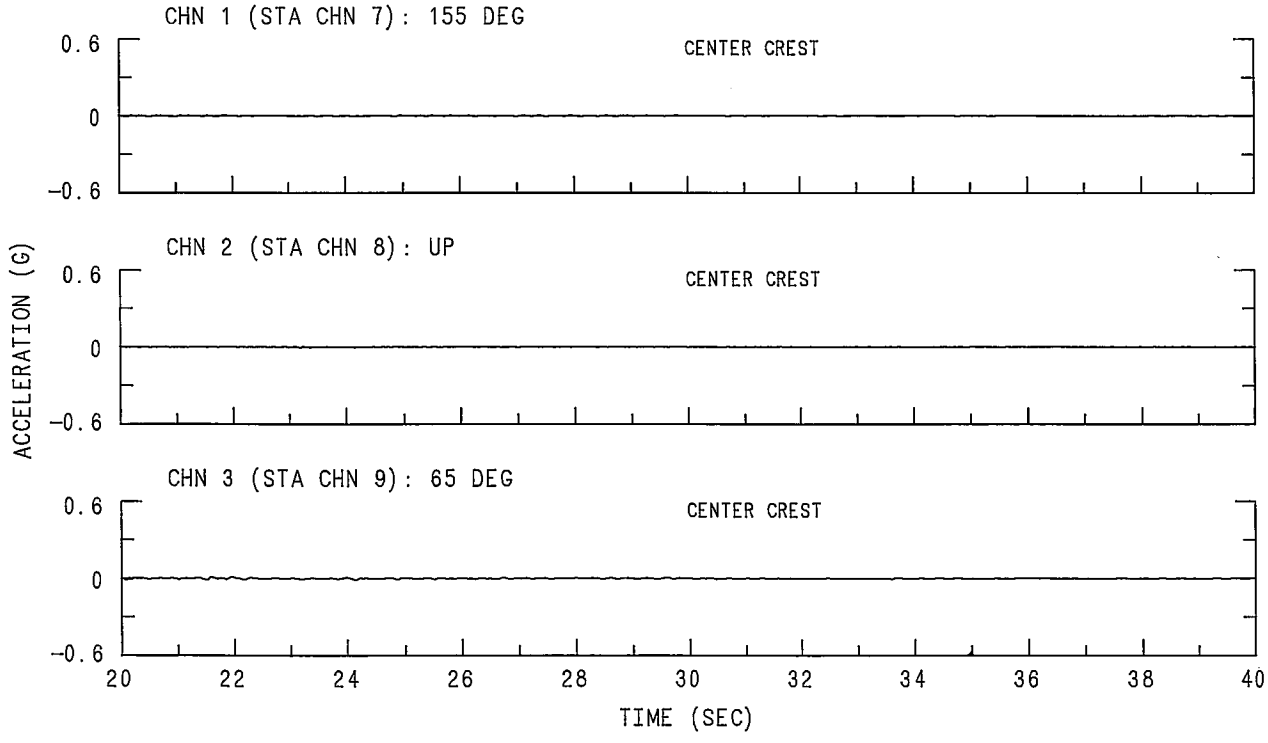
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT

COGSWELL DAM: CSMIP S/N 210

PHASE 1 ACCELERATION

RECORD ID: 23210-S1713-91184.01

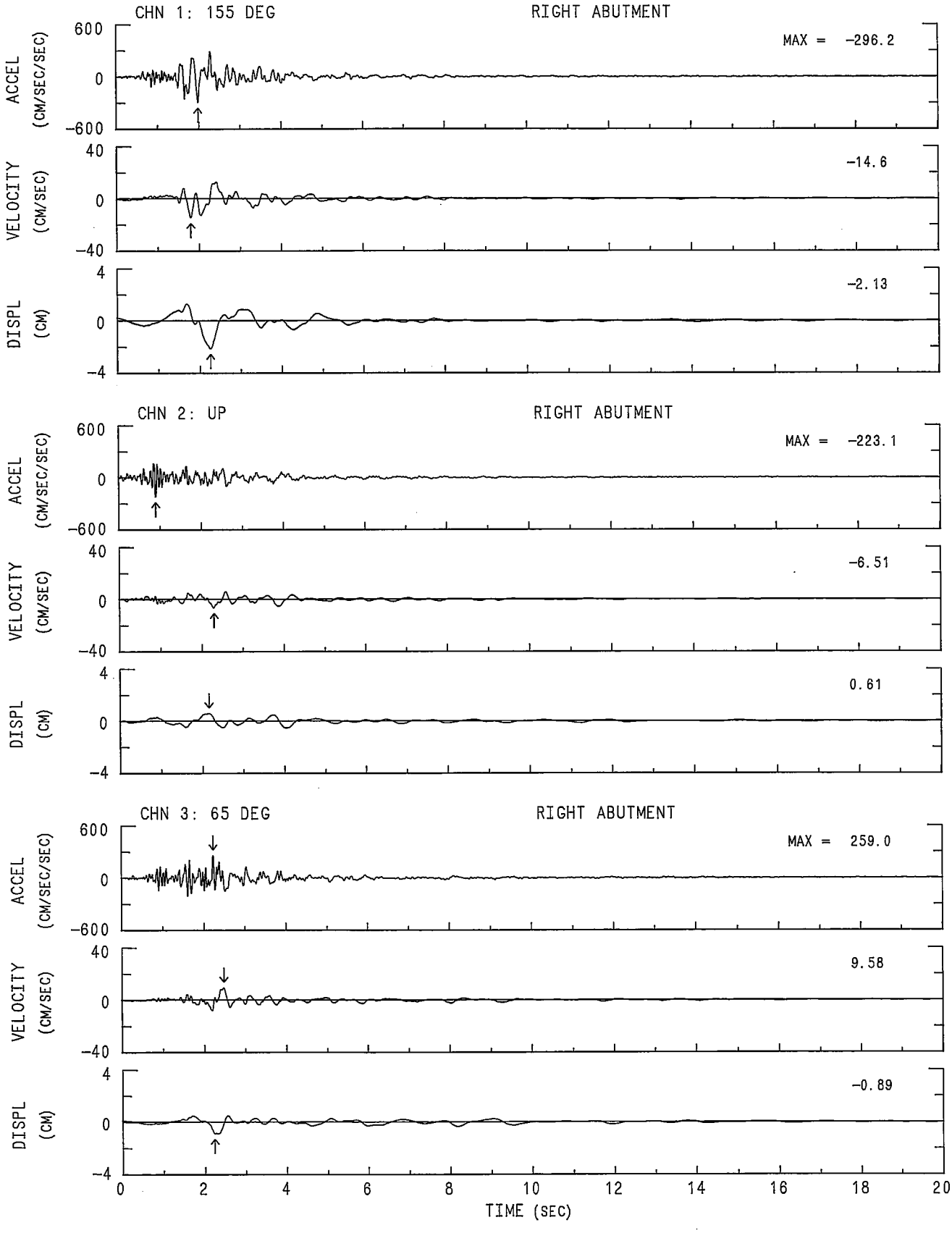




SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210

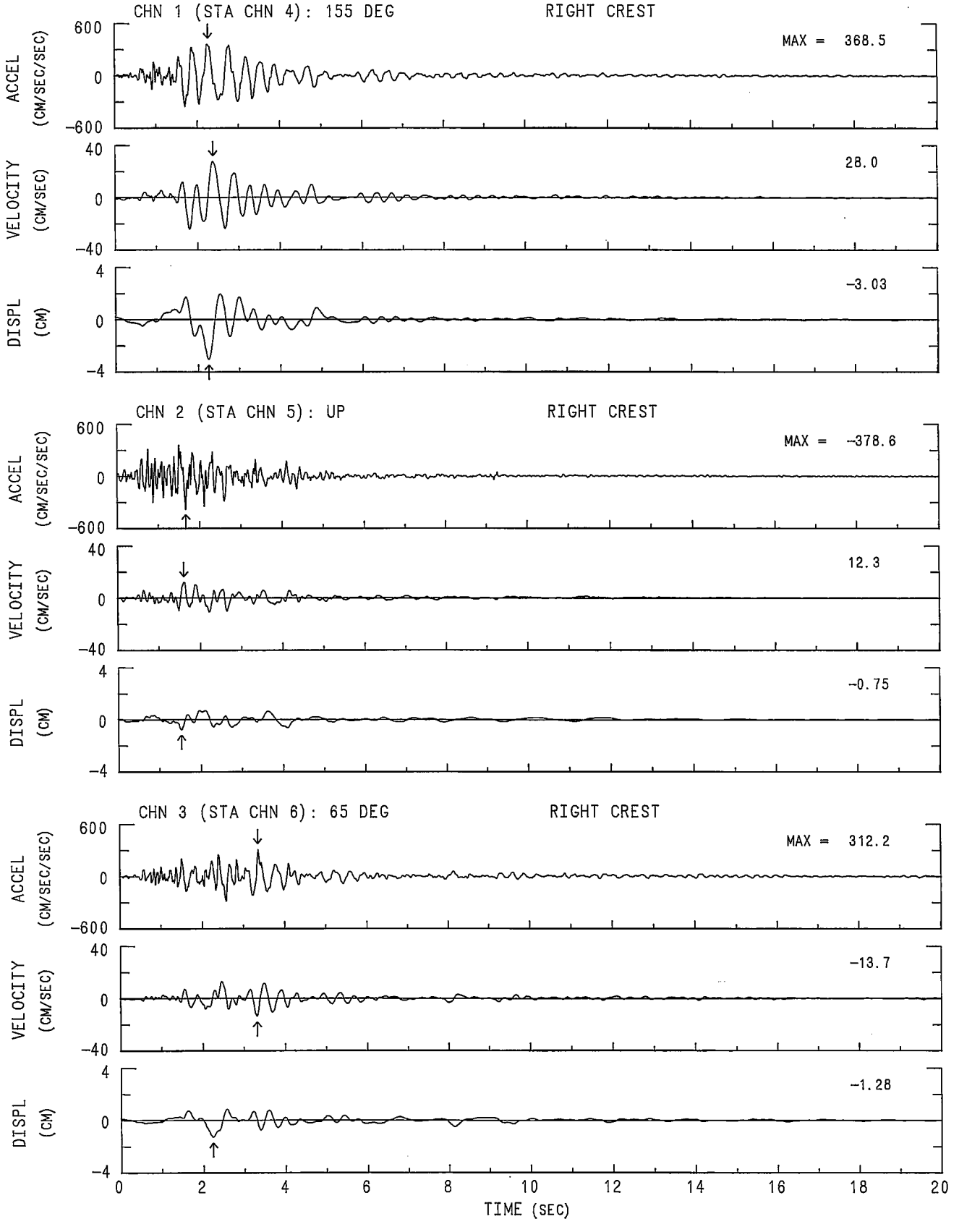
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 23210-S1867-91184.01



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210

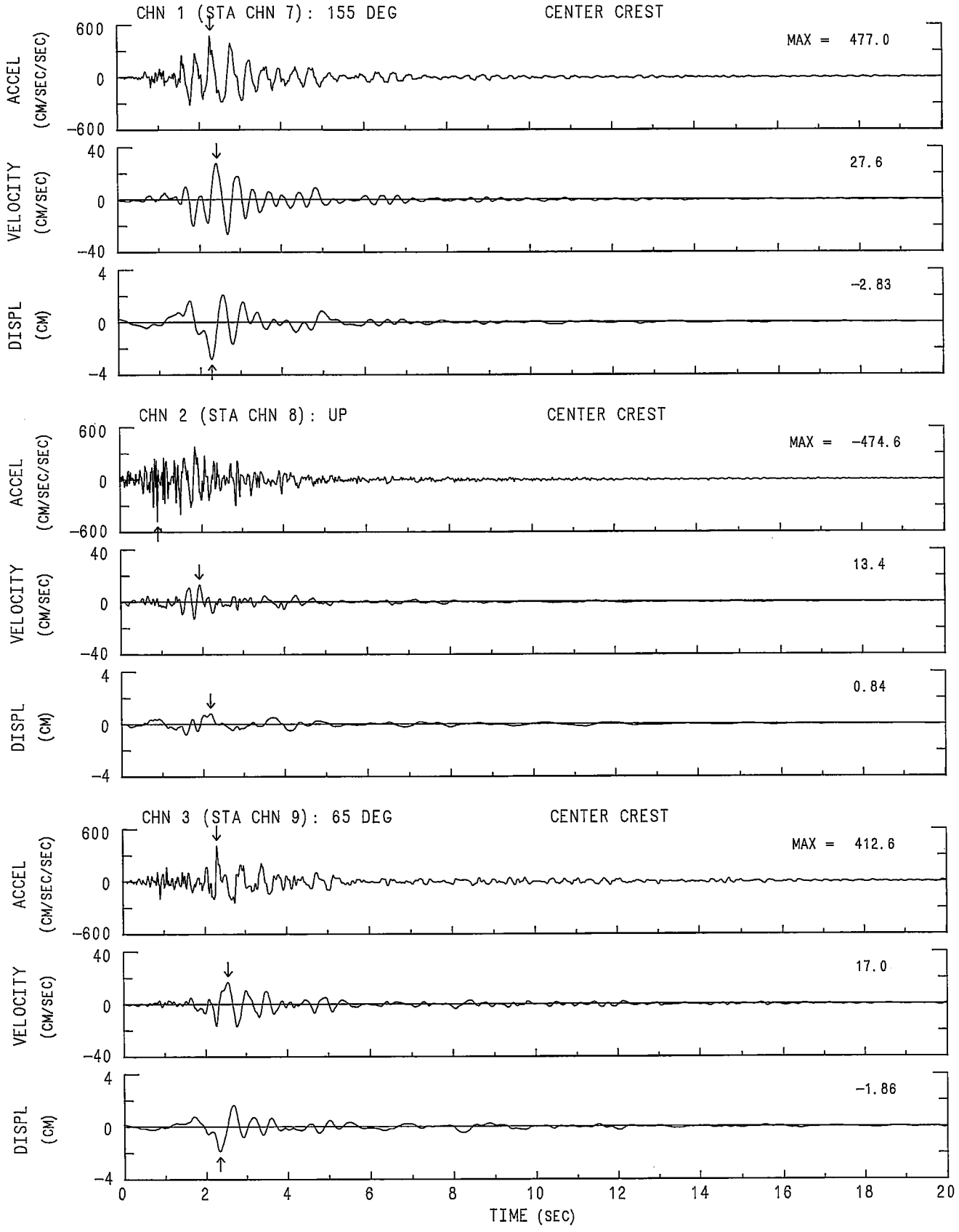
PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 23210-S1680-91184.02



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210

PHASE 2 FILTERED DATA: ACCELERATION, VELOCITY AND DISPLACEMENT

USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC) RECORD ID: 23210-S1713-91184.01



COGSWELL DAM: CSMIP S/N 210

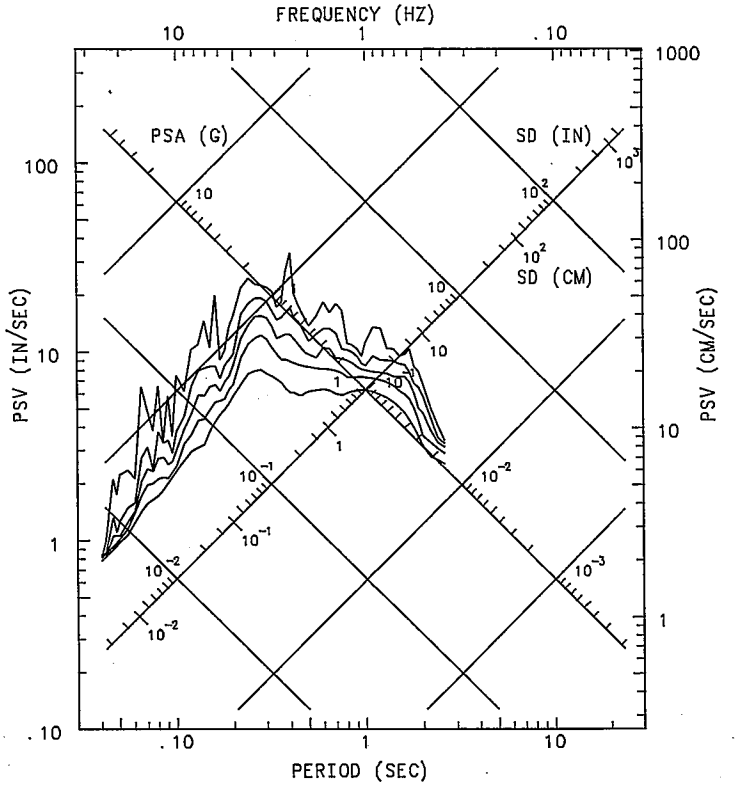
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

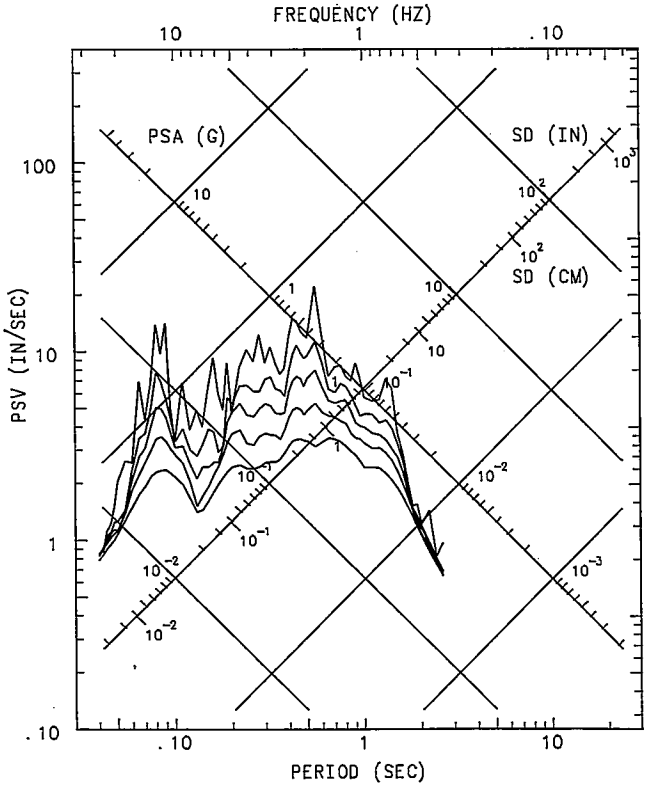
RECORD ID: 23210-S1867-91184.01

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

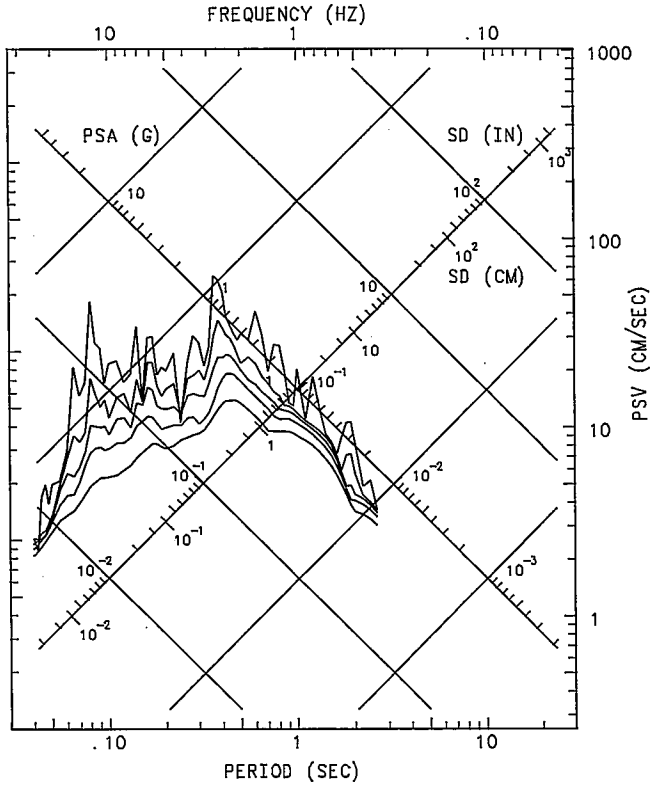
CHN 1: 155 DEG
RIGHT ABUTMENT



CHN 2: UP
RIGHT ABUTMENT



CHN 3: 65 DEG
RIGHT ABUTMENT



COGSWELL DAM: CSMIP S/N 210

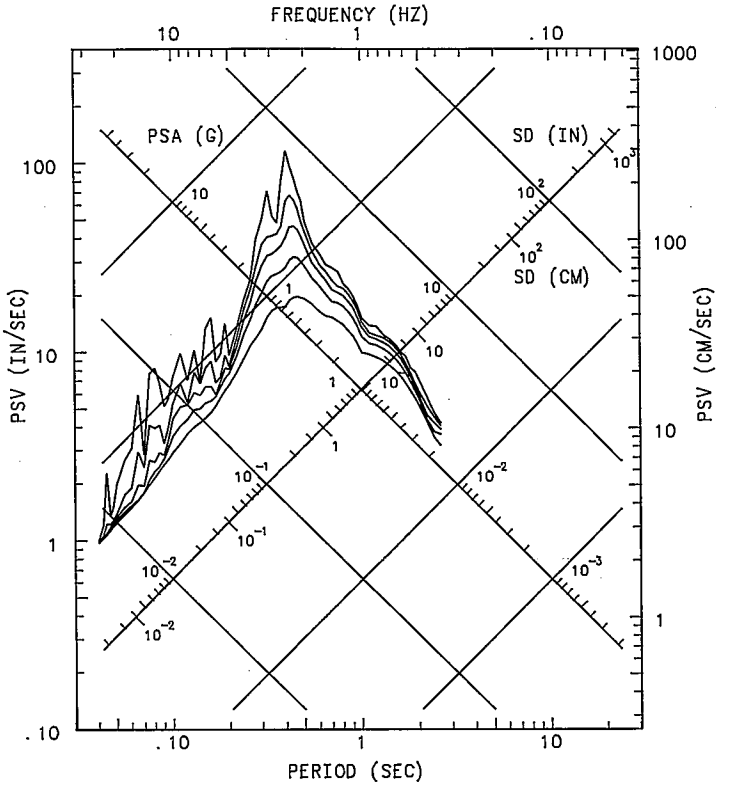
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

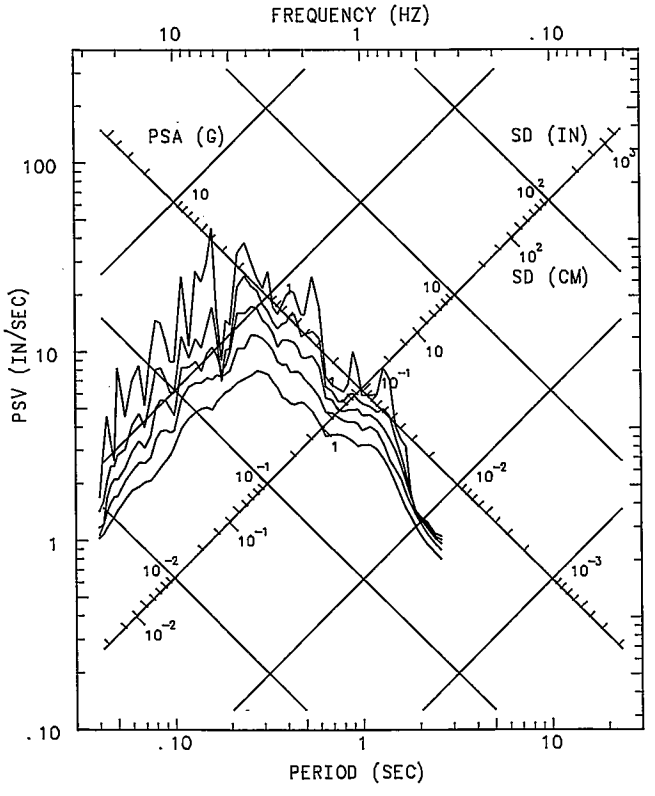
RECORD ID: 23210-S1680-91184.02

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

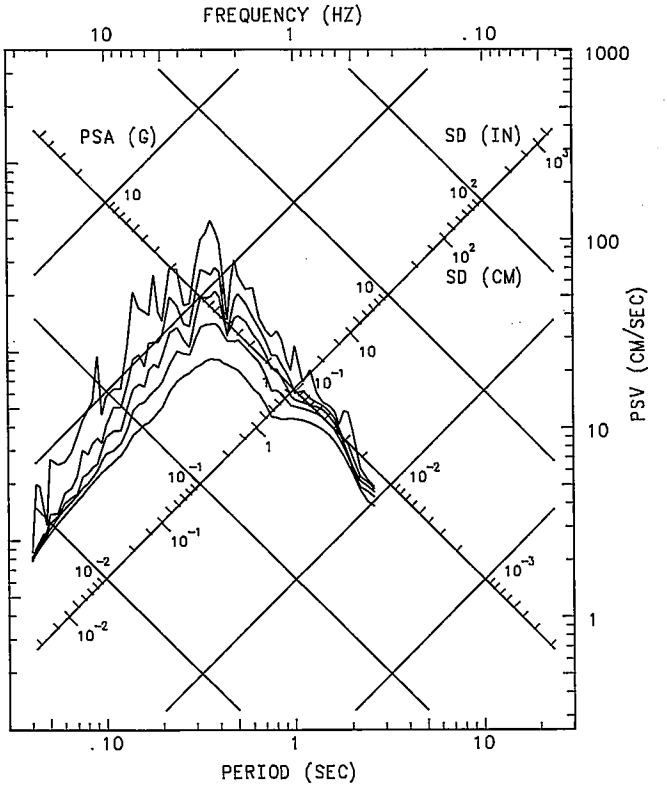
CHN 1 (STA CHN 4): 155 DEG
RIGHT CREST



CHN 2 (STA CHN 5): UP
RIGHT CREST



CHN 3 (STA CHN 6): 65 DEG
RIGHT CREST



COGSWELL DAM: CSMIP S/N 210

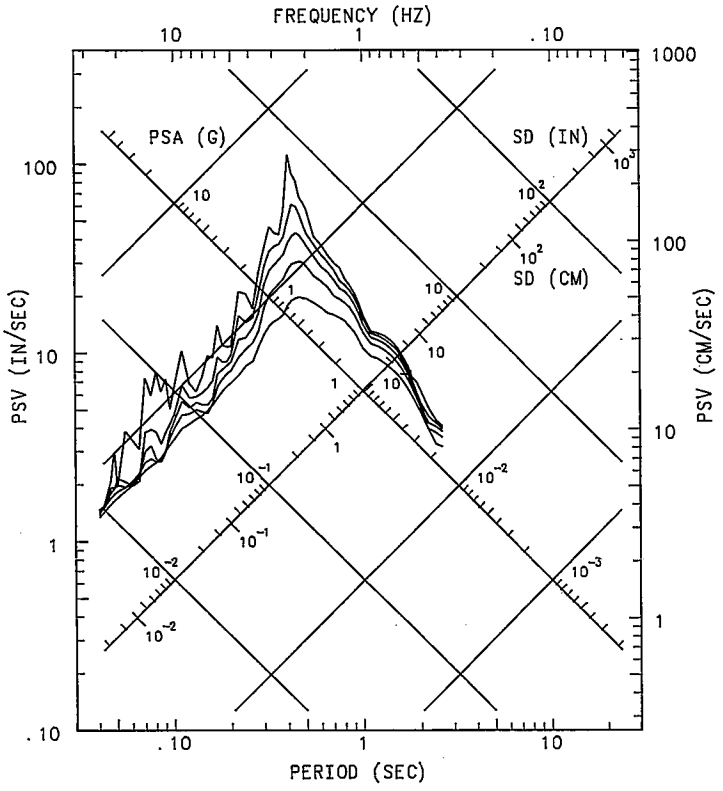
SIERRA MADRE EARTHQUAKE
JUNE 28, 1991 07:43 PDT

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ
(0.04 TO 2.35 SEC)

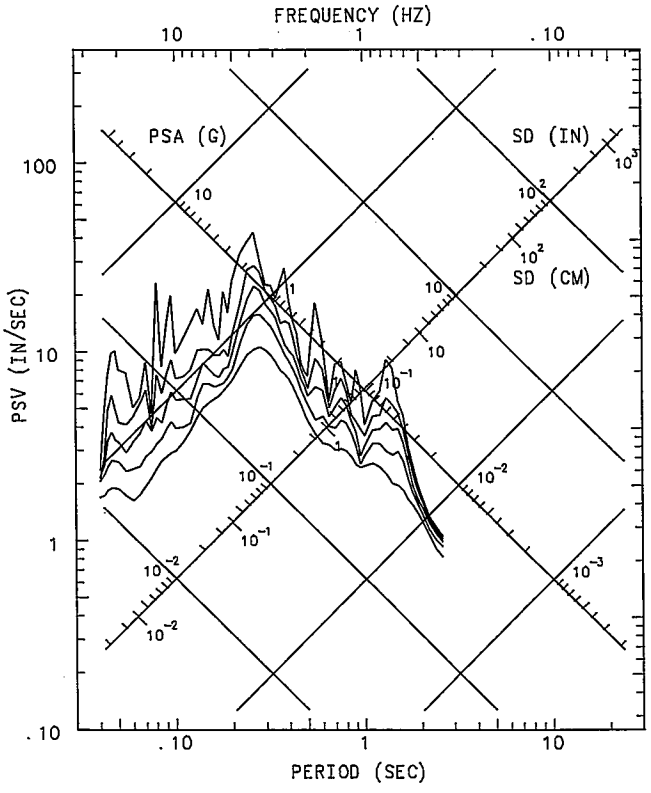
RECORD ID: 23210-S1713-91184.01

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

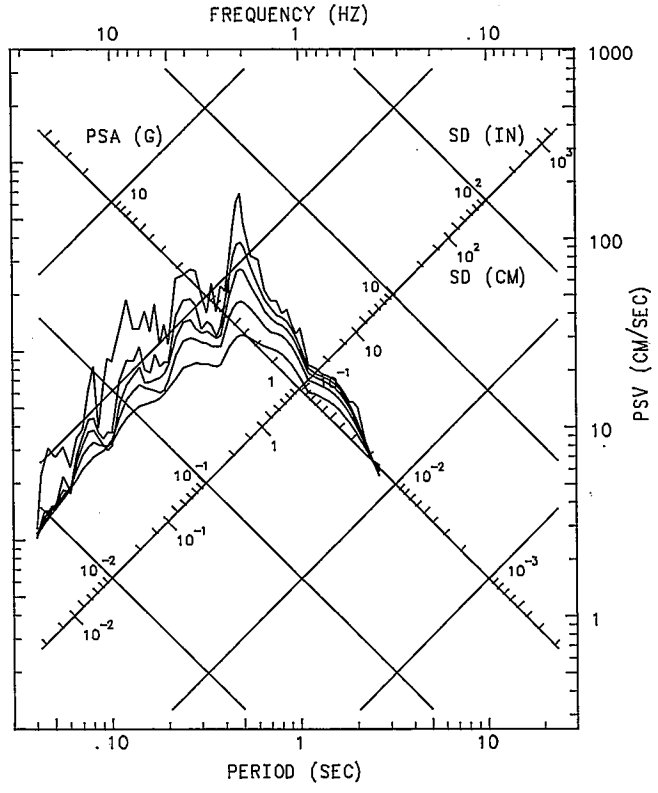
CHN 1 (STA CHN 7): 155 DEG
CENTER CREST



CHN 2 (STA CHN 8): UP
CENTER CREST

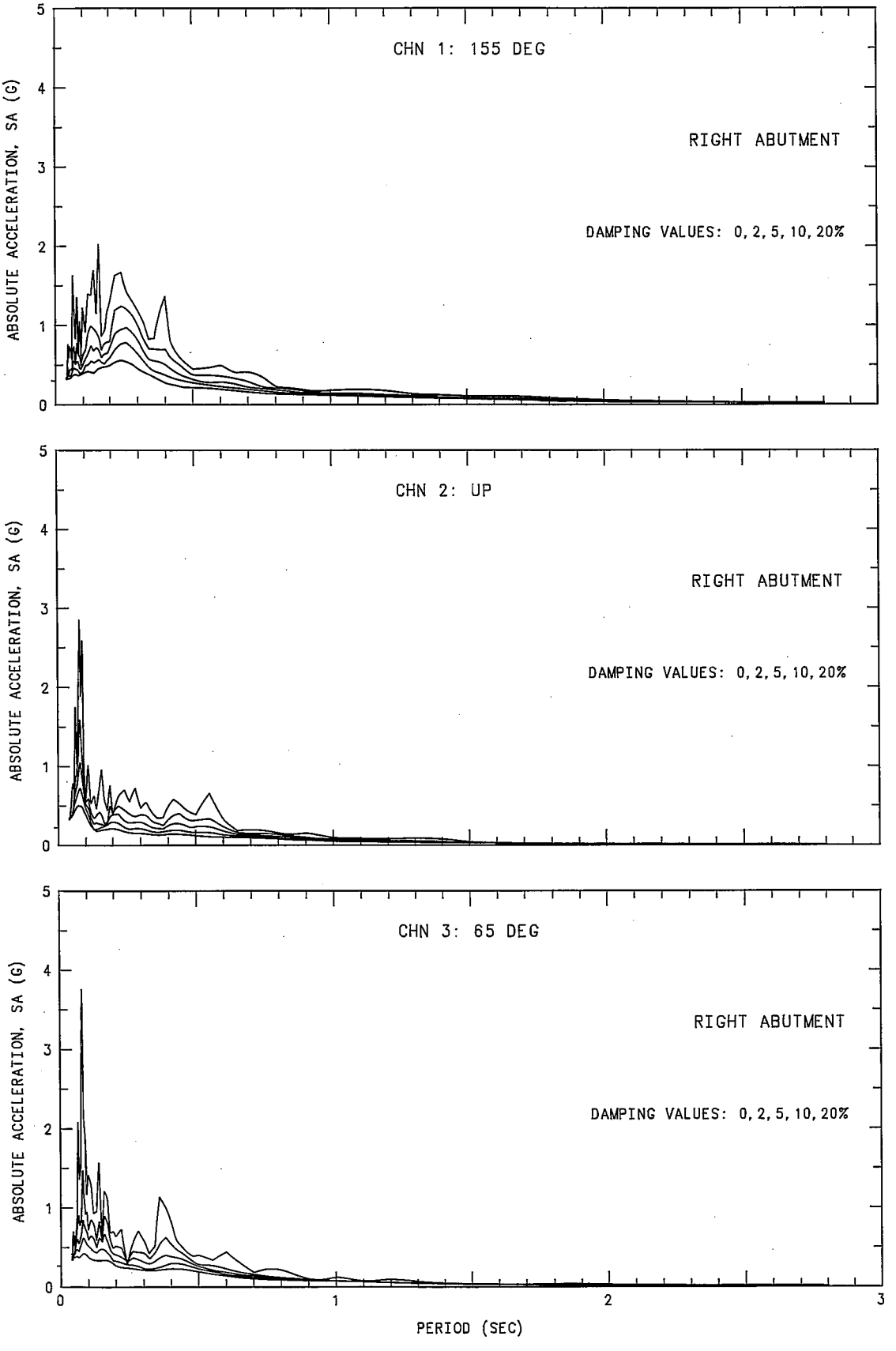


CHN 3 (STA CHN 9): 65 DEG
CENTER CREST



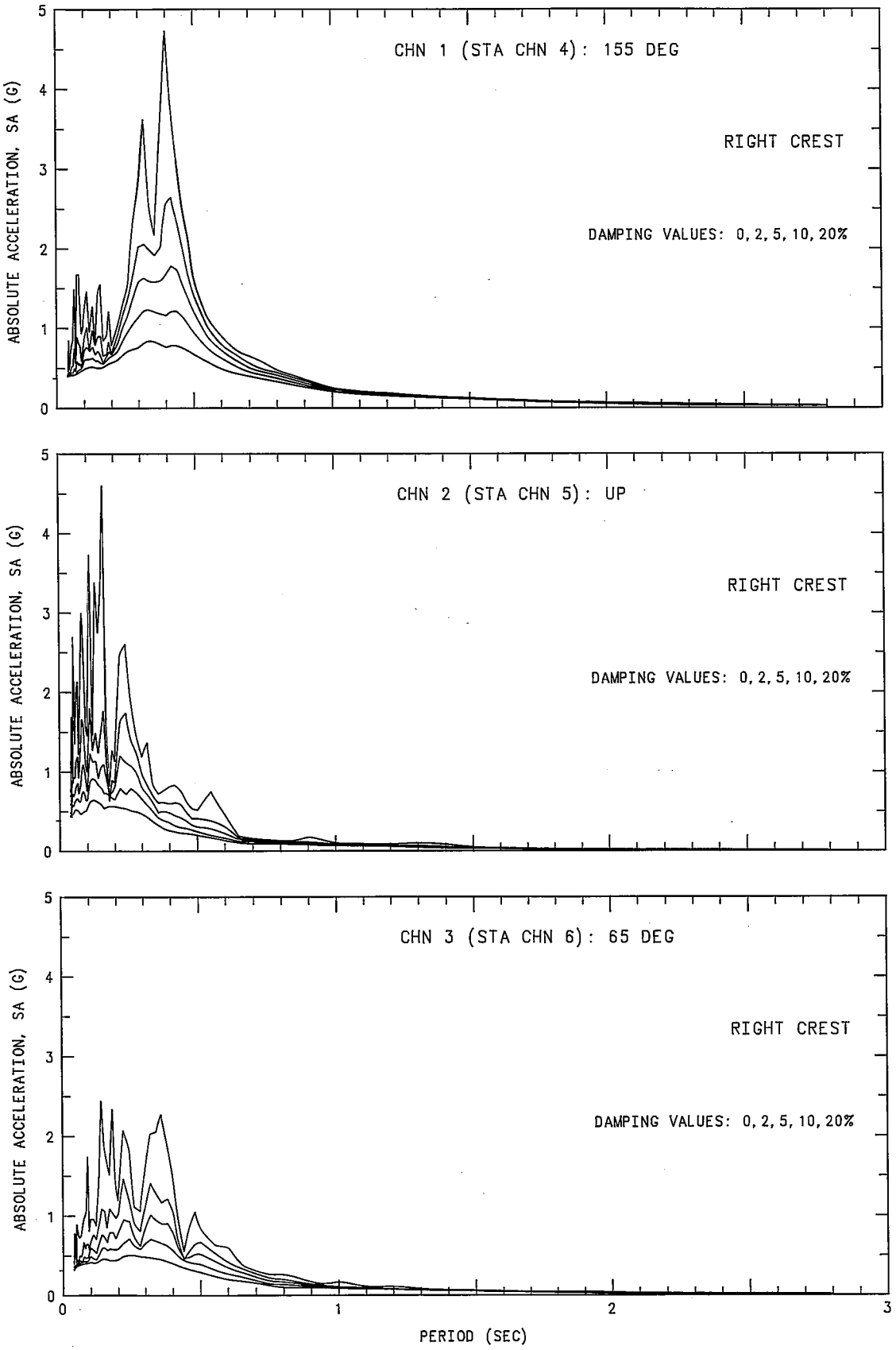
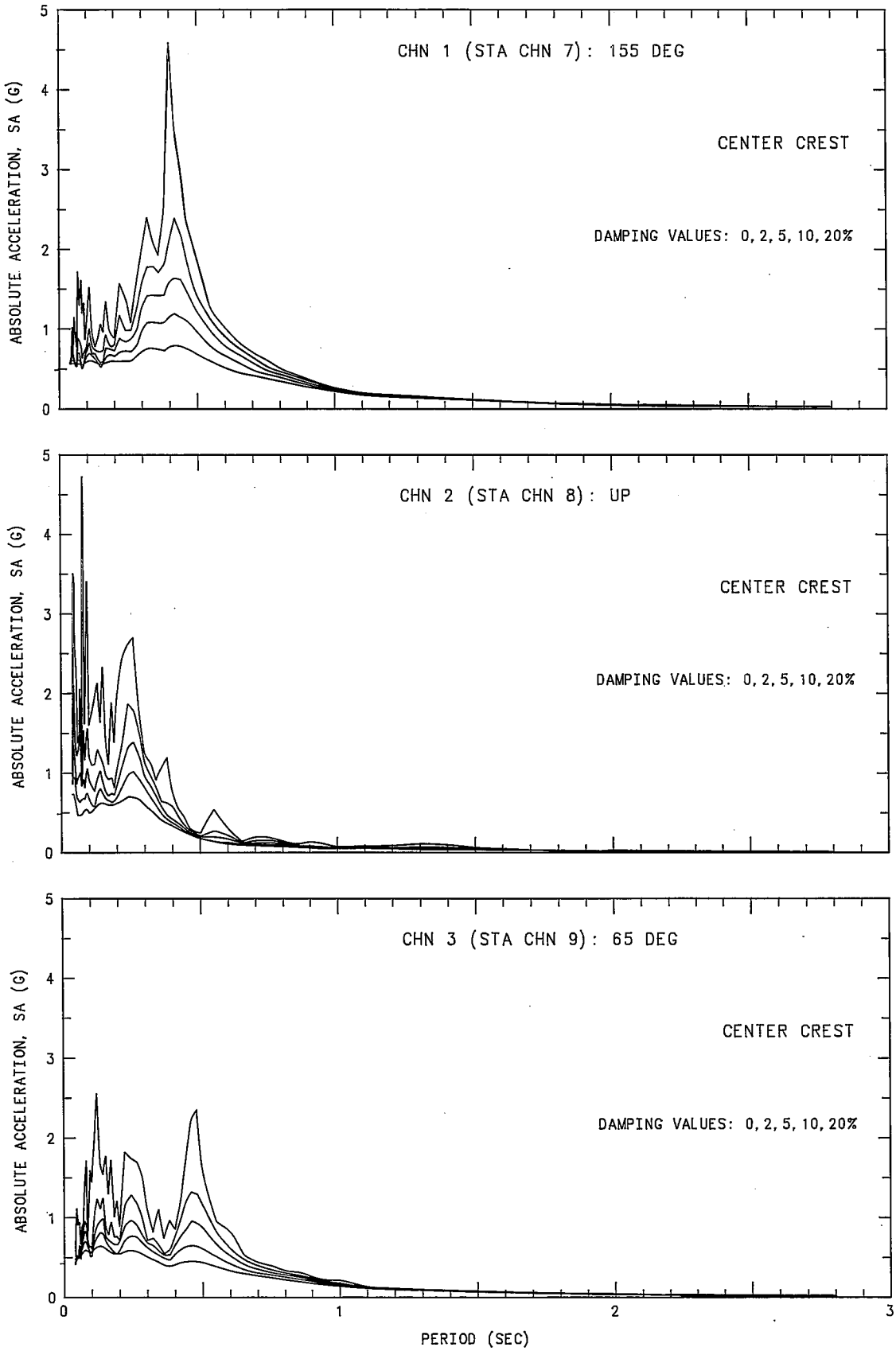
SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 23210-S1867-91184.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210

PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 23210-S1680-91184.02
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)



SIERRA MADRE EARTHQUAKE JUNE 28, 1991 07:43 PDT
COGSWELL DAM: CSMIP S/N 210
PHASE 3 DATA: RESPONSE SPECTRA RECORD ID: 23210-S1713-91184.01
USABLE DATA BANDWIDTH: 0.42 TO 23.6 HZ (0.04 TO 2.35 SEC)