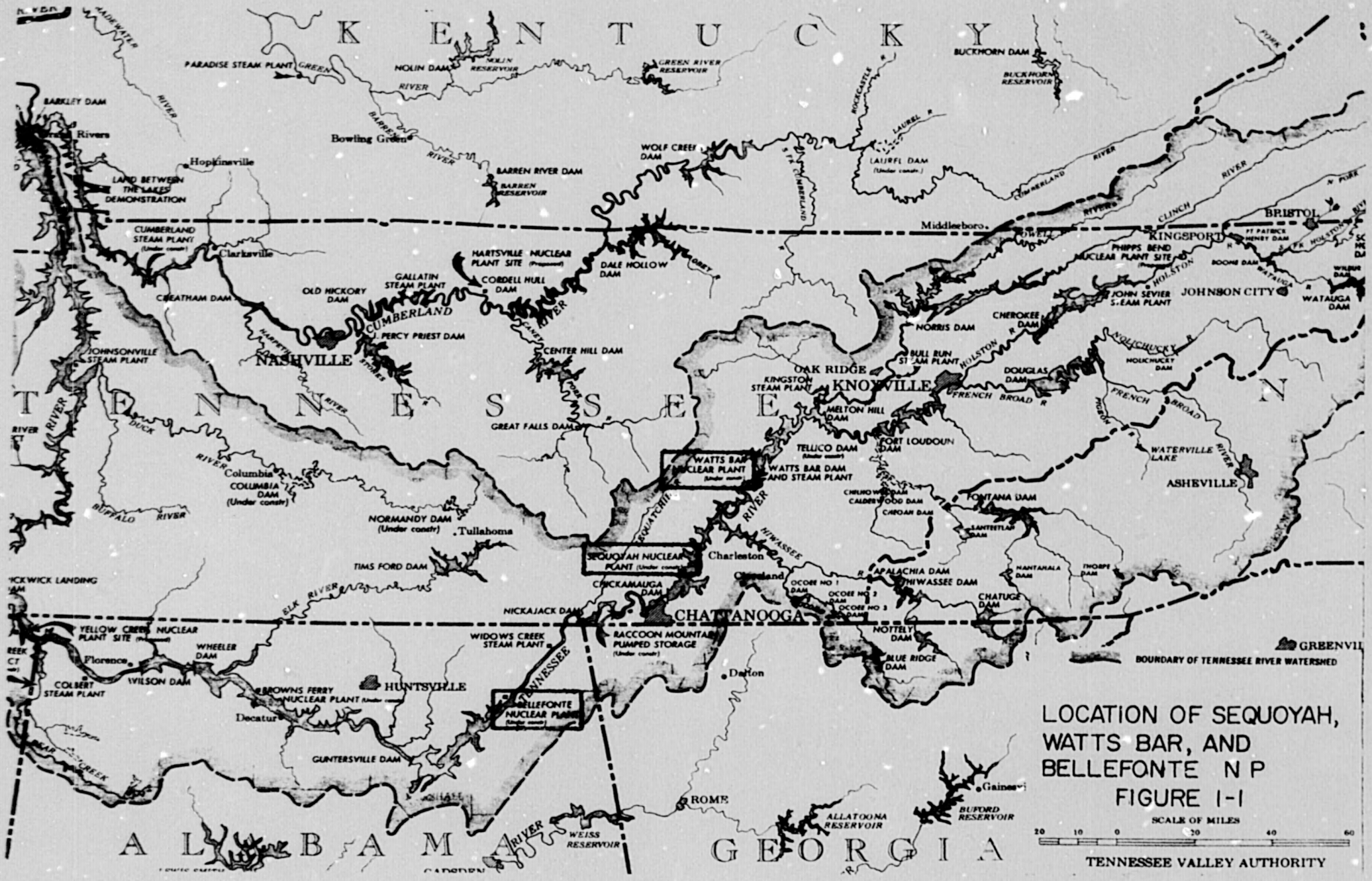
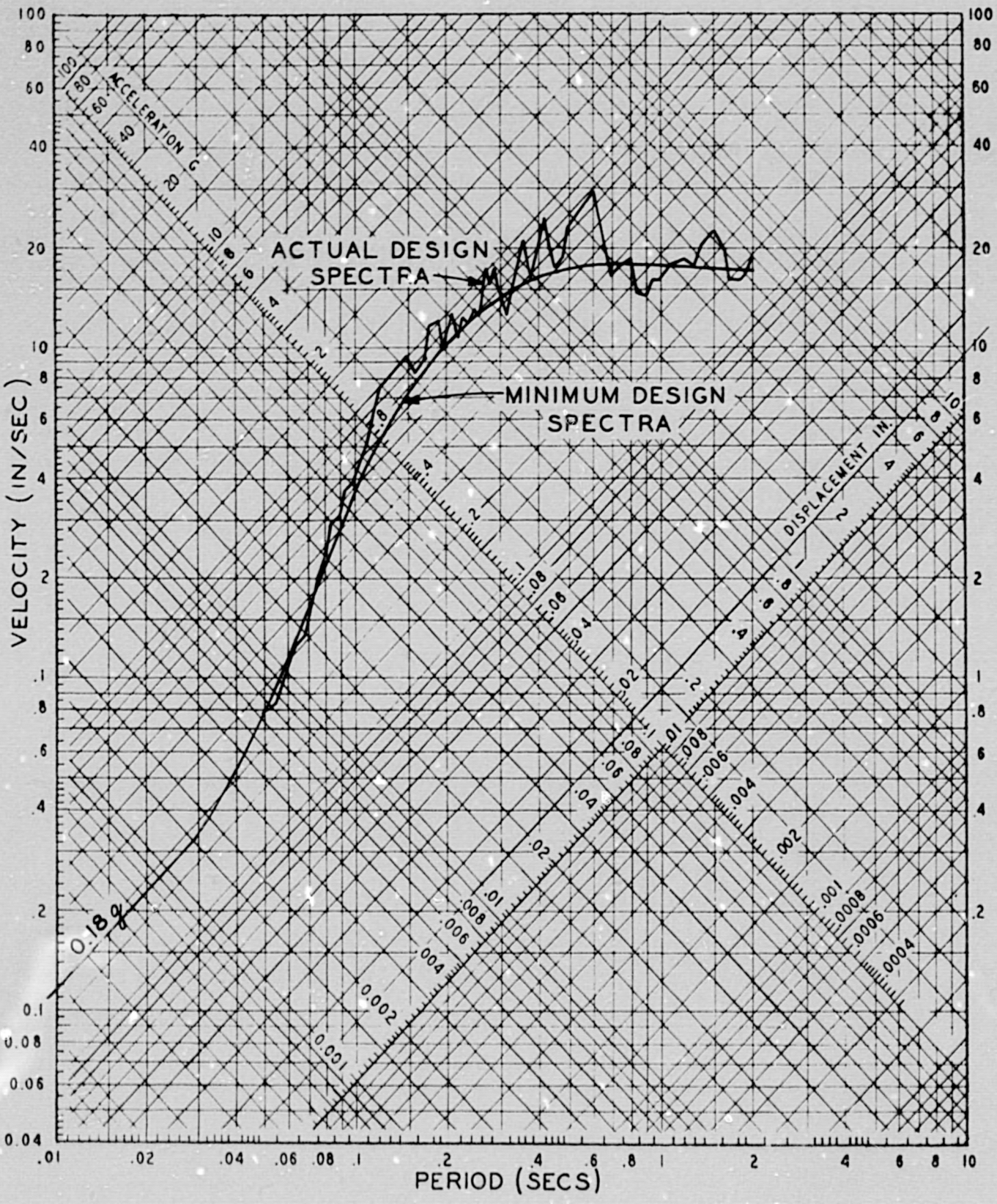
FIGURES

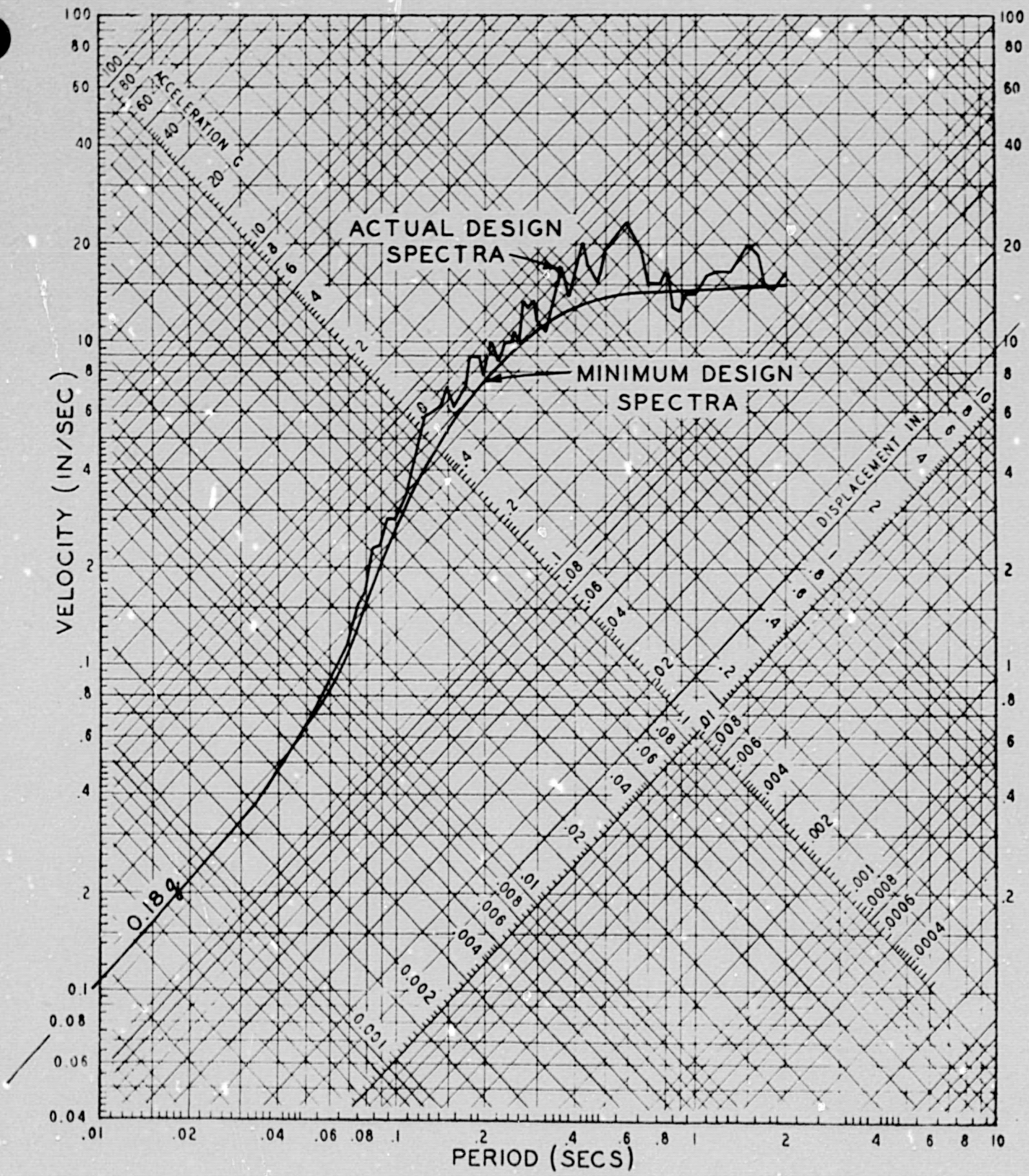

KENTUCKY
TENNESSEE
ALABAMA
GEORGIA
PARADISE STEAM PLANT
NOLIN DAM
NOLIN RESERVOIR
GREEN RIVER RESERVOIR
BUCKHORN DAM
BUCKHORN RESERVOIR
BARKLEY DAM
Kentucky Rivers
Bowling Green
Hopkinsville
BARREN RIVER DAM
BARREN RESERVOIR
WOLF CREEK DAM
LAUREL DAM
LAND BETWEEN THE LAKES DEMONSTRATION
CUMBERLAND STEAM PLANT
Clarksville
HARTSVILLE NUCLEAR PLANT SITE
CORDELL HULL DAM
DALE HOLLOW DAM
GALLATIN STEAM PLANT
OLD HICKORY DAM
CHEATHAM DAM
PERCY PRIEST DAM
NASHVILLE
CENTER HILL DAM
JOHNSONVILLE STEAM PLANT
GREAT FALLS DAM
Middlesboro
BRISTOL
KINGSPORT
PHIPPS BEND NUCLEAR PLANT SITE
JOHN SEVIER STEAM PLANT
JOHNSON CITY
WATAUGA DAM
NORRIS DAM
CHEROKEE DAM
BULL RUN STEAM PLANT
OAK RIDGE
KNOXVILLE
KINGSTON STEAM PLANT
MELTON HILL DAM
DOUGLAS DAM
HOLSTON
FRENCH BROAD
HOLSTON
HOLSTON
HOLSTON
TELLICO DAM
FORT LOUDOUN DAM
WATTS BAR NUCLEAR PLANT
WATTS BAR DAM AND STEAM PLANT
CHILHOWEE DAM
CALDERWOOD DAM
CHEOAH DAM
FONTANA DAM
WATERVILLE LAKE
ASHEVILLE
Columbia
COLUMBIA DAM (Under constr)
NORMANDY DAM (Under constr)
Tullahoma
SEQUOYAH NUCLEAR PLANT (Under constr)
Charleston
Cleveland
APALACHIA DAM
HIWASSEE DAM
OCOEE NO 1 DAM
OCOEE NO 2 DAM
OCOEE NO 3 DAM
CHATUGE DAM
NANTAHALA DAM
THORPE DAM
TIMS FORD DAM
CHICKAMAUGA DAM
NICKAJACK DAM
CHATTANOGA
RACCOON MOUNTAIN PUMPED STORAGE (Under constr)
WIDOWS CREEK STEAM PLANT
NOTTELY DAM
BLUE RIDGE DAM
YELLOW CREEK NUCLEAR PLANT SITE
WHEELER DAM
Florence
WILSON DAM
COLBERT STEAM PLANT
BROWNS FERRY NUCLEAR PLANT
HUNTSVILLE
Decatur
BELLEFONTE NUCLEAR PLANT
Dalton
GUNTERSVILLE DAM
ROME
ALLATOONA RESERVOIR
BUFORD RESERVOIR
WEISS RESERVOIR
Gainesville
GREENVILLE
BOUNDARY OF TENNESSEE RIVER WATERSHED
LOCATION OF SEQUOYAH, WATTS BAR, AND BELLEFONTE NP
FIGURE 1-1
SCALE OF MILES
20 10 0 20 40 60
TENNESSEE VALLEY AUTHORITY



COMPARISON OF RESPONSE SPECTRA FOR SAFE SHUTDOWN EARTHQUAKE 1/2% DAMPING

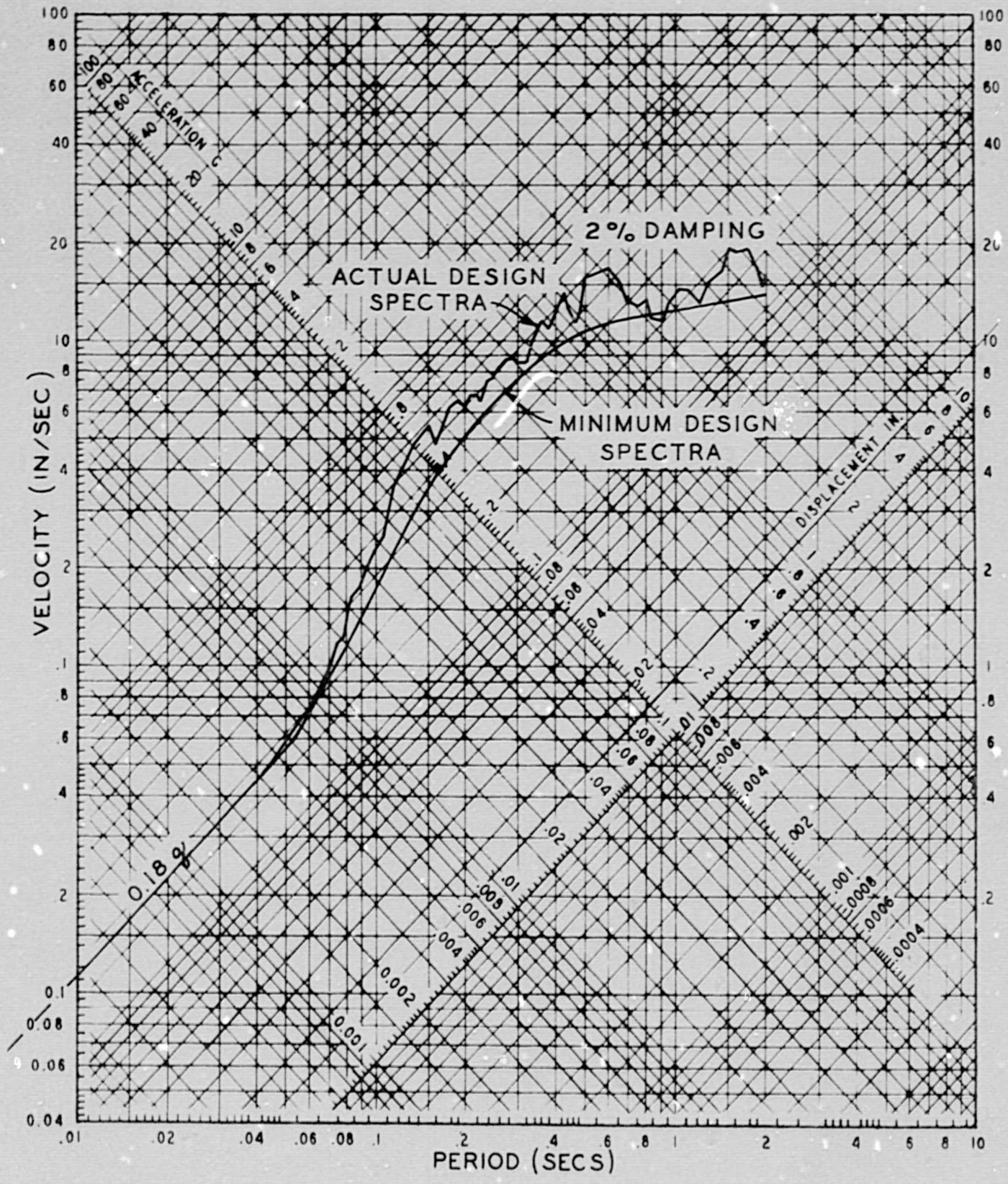
SEQUOYAH NUCLEAR PLANT

FIGURE 3-1



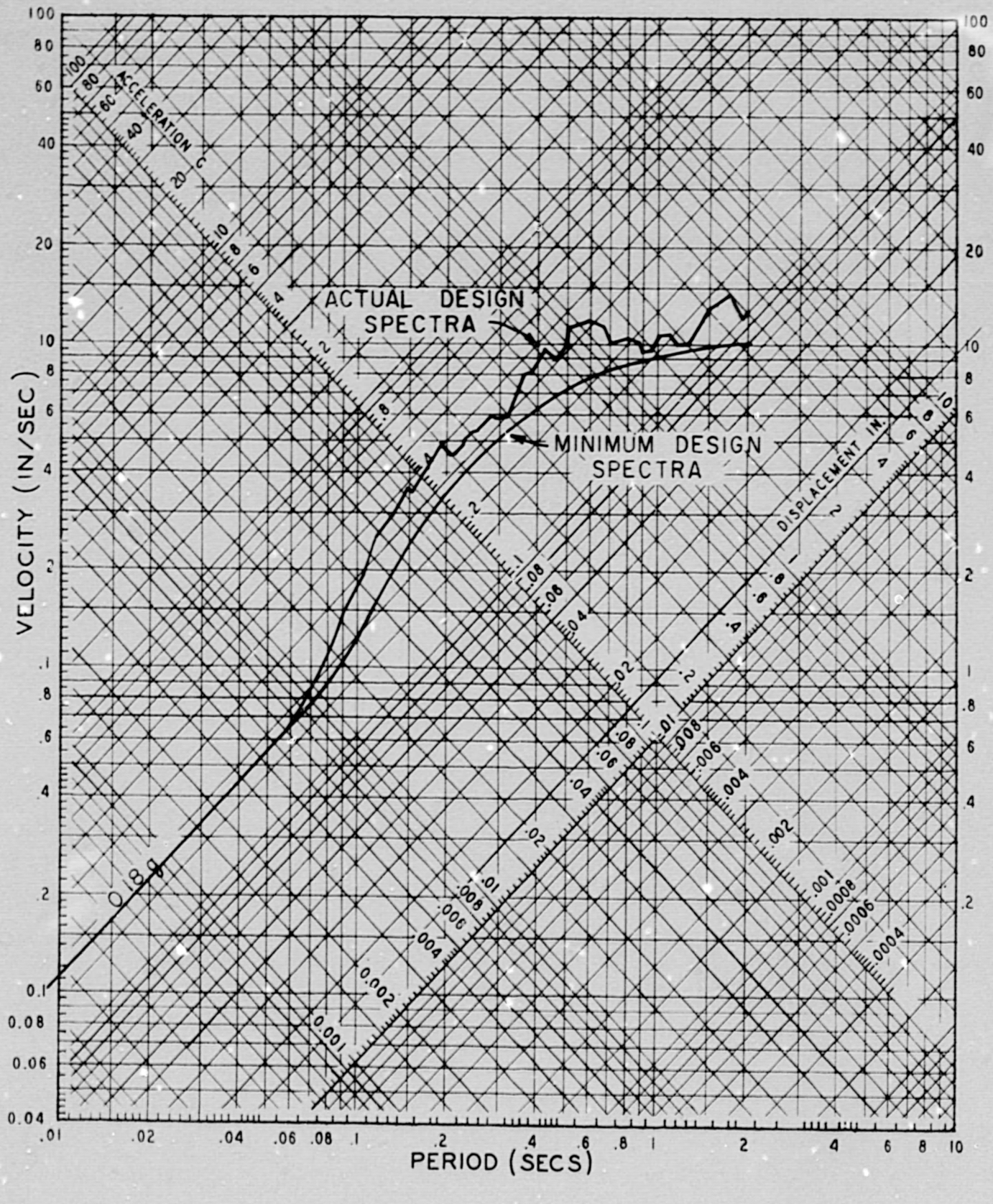
COMPARISON OF RESPONSE SPECTRA
FOR SAFE SHUTDOWN EARTHQUAKE
1% DAMPING
SEQUOYAH NUCLEAR PLANT

FIGURE 3-2



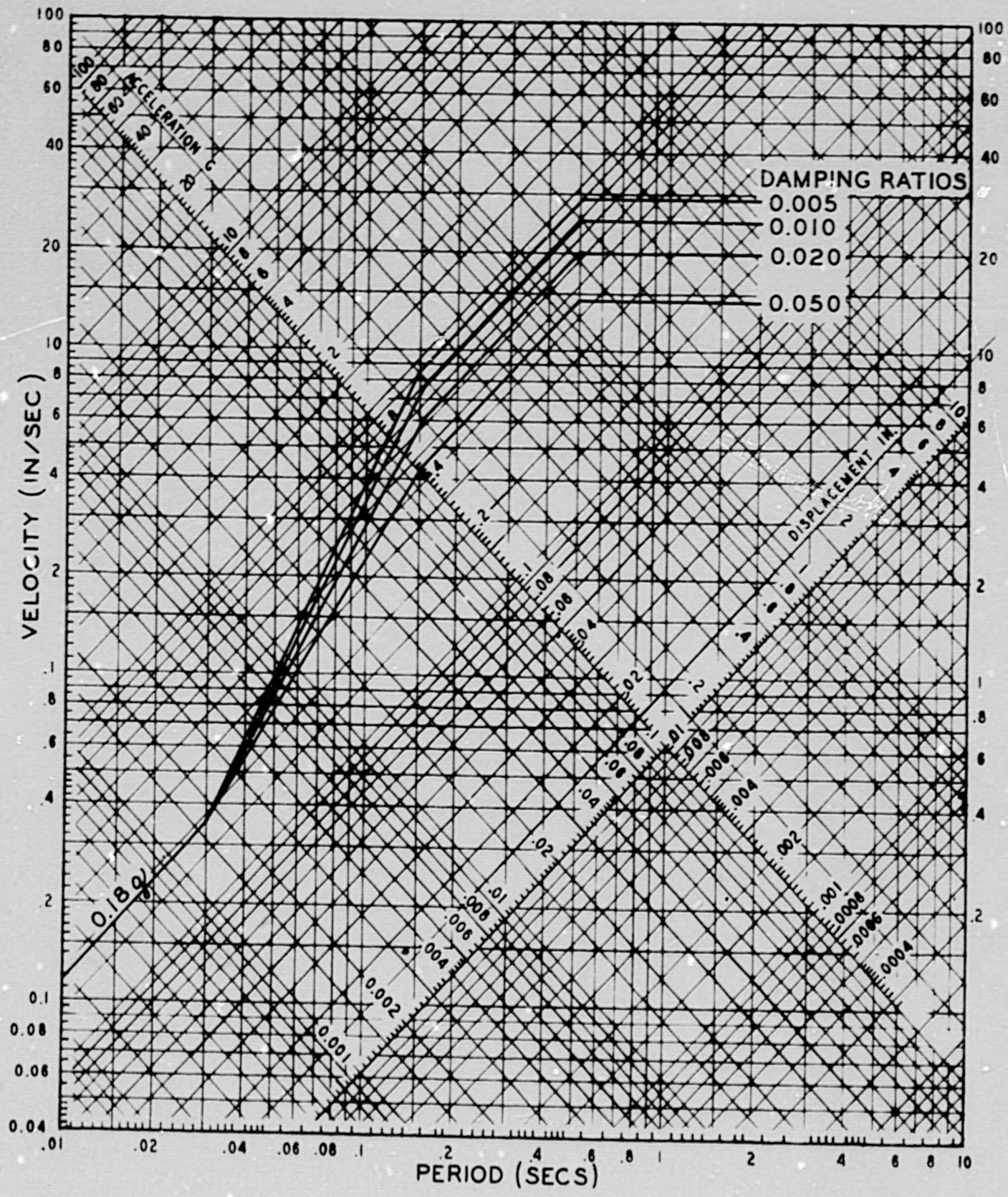
COMPARISON OF RESPONSE SPECTRA
FOR SAFE SHUTDOWN EARTHQUAKE
2% DAMPING
SEQUOYAH NUCLEAR PLANT

FIGURE 3-3



COMPARISON OF RESPONSE SPECTRA
FOR SAFE SHUTDOWN EARTHQUAKE
5% DAMPING
SEQUOYAH NUCLEAR PLANT

FIGURE 3-4

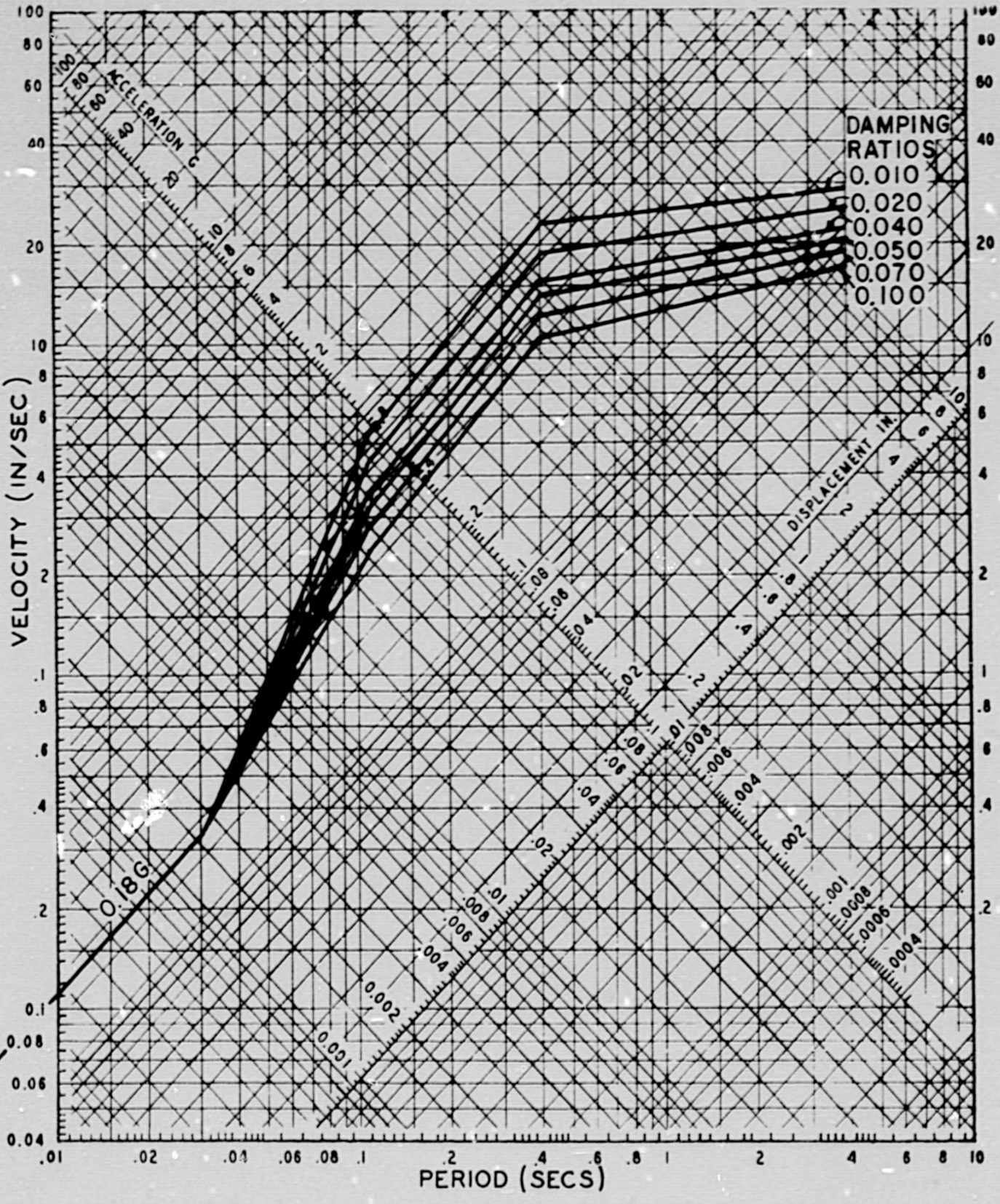


SAFE SHUTDOWN EARTHQUAKE

RESPONSE SPECTRA FOR ROCK SUPPORTED STRUCTURES

WATTS BAR NUCLEAR PLANT

FIGURE 3-5



SAFE SHUTDOWN EARTHQUAKE DESIGN RESPONSE SPECTRA HORIZONTAL MOTION ROCK-SUPPORTED STRUCTURES BELLEFONTE NUCLEAR PLANT

FIGURE 3-6

COMPARISON OF SEQUOYAH, WATTS BAR, AND BELLEFONTE NUCLEAR PLANTS TOP OF ROCK DESIGN SPECTRA FOR STEEL STRUCTURES

SEQUOYAH – 1% DAMPING
WATTS BAR – 1% DAMPING
BELLEFONTE – 4% DAMPING

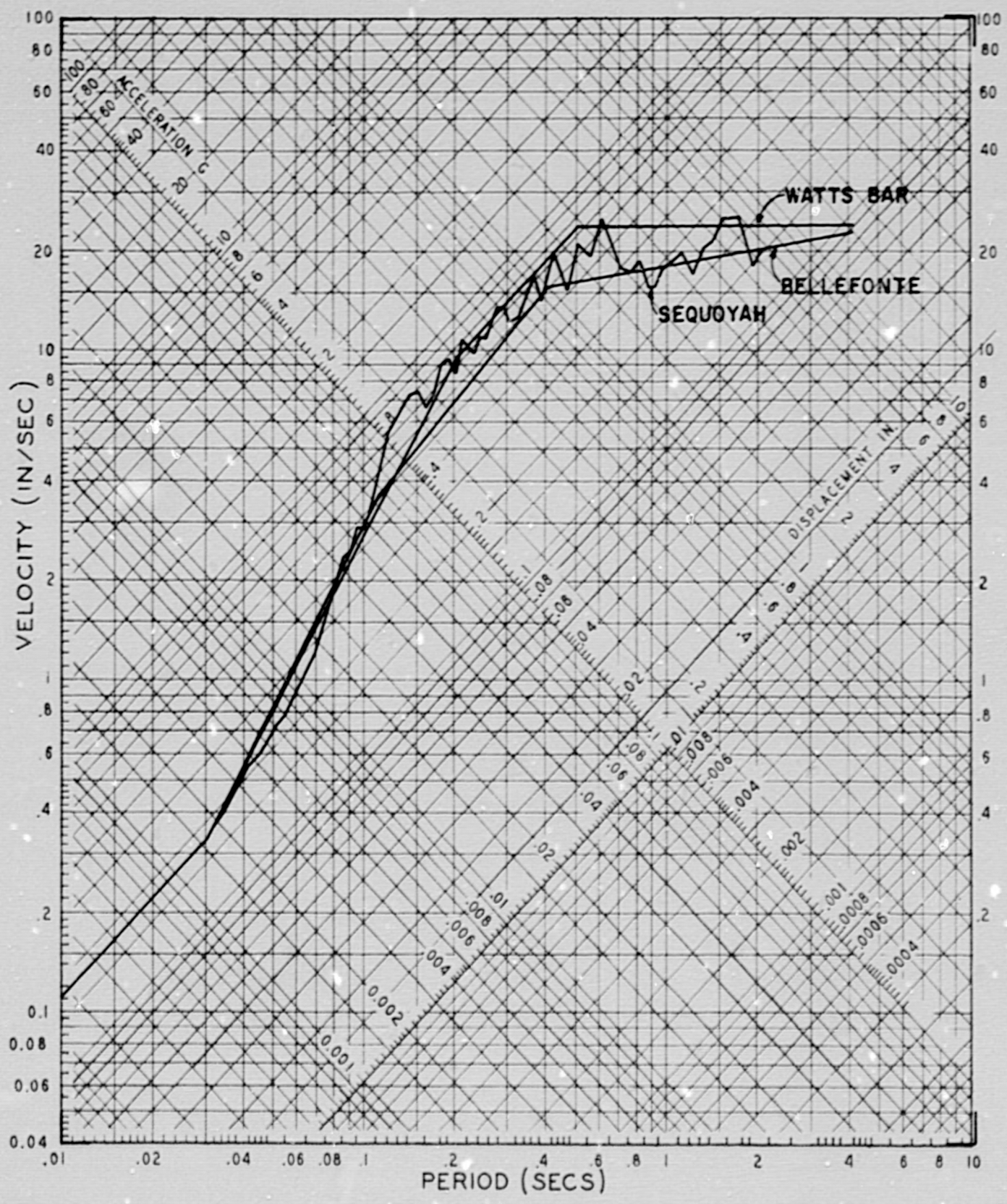


FIGURE 3-7

COMPARISON OF SEQUOYAH, WATTS BAR, AND BELLEFONTE NUCLEAR PLANTS TOP OF ROCK DESIGN SPECTRA FOR REINFORCED CONCRETE STRUCTURES

SEQUOYAH - 5% DAMPING
WATTS BAR - 5% DAMPING
BELLEFONTE - 7% DAMPING

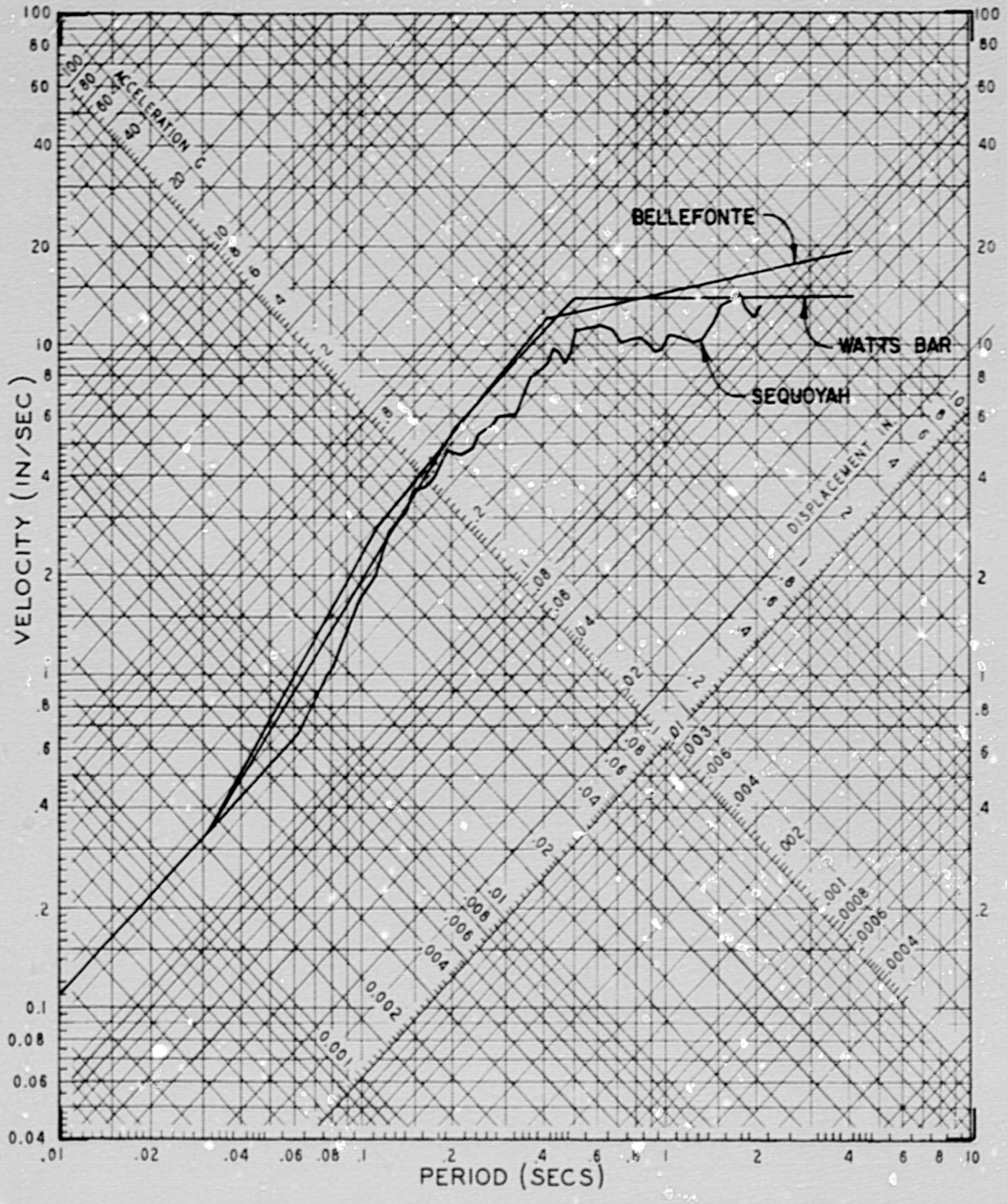


FIGURE 3-8

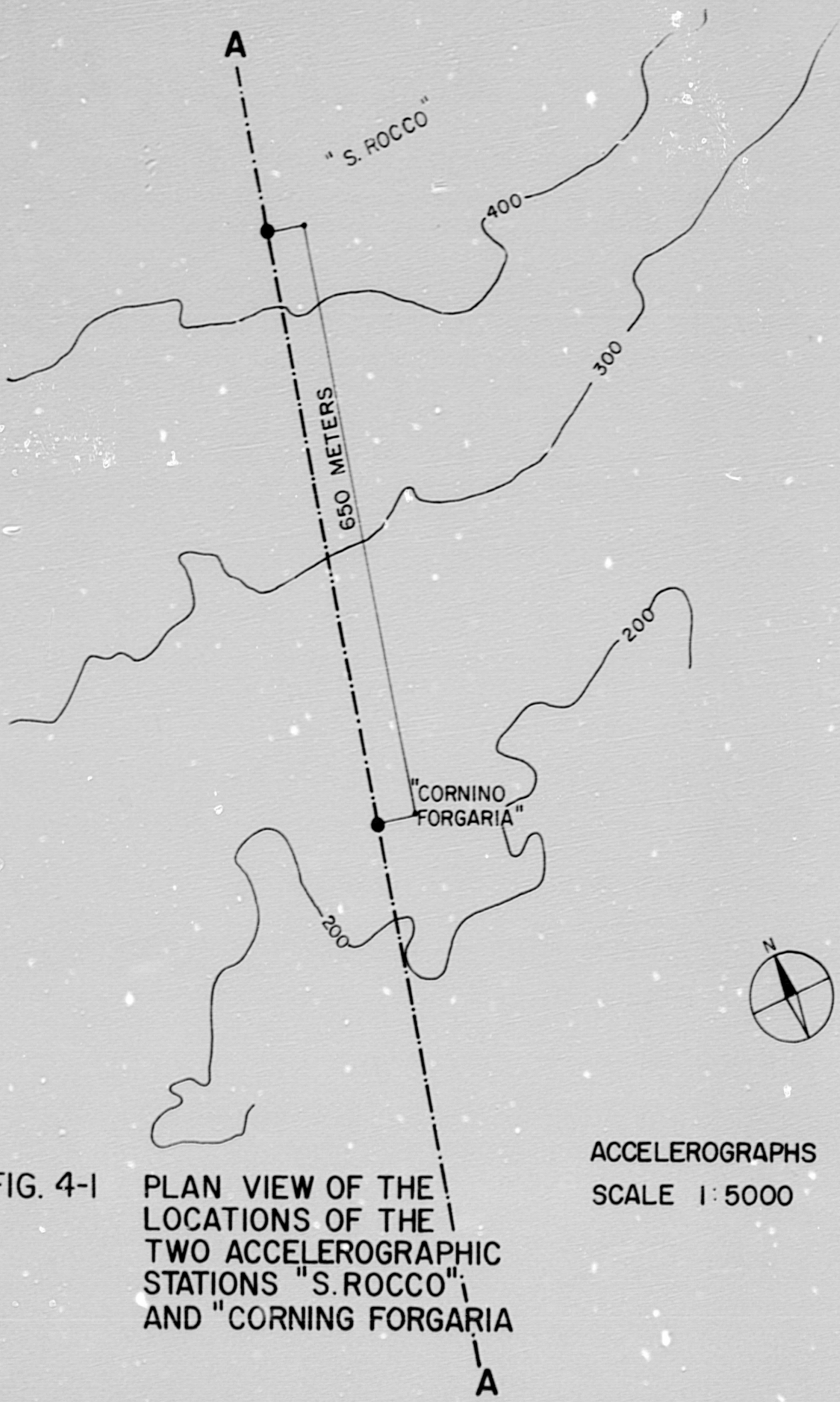


FIG. 4-1 PLAN VIEW OF THE LOCATIONS OF THE TWO ACCELEROGRAPHIC STATIONS "S. ROCCO" AND "CORNING FORGARIA

ACCELEROGRAPHS
SCALE 1:5000

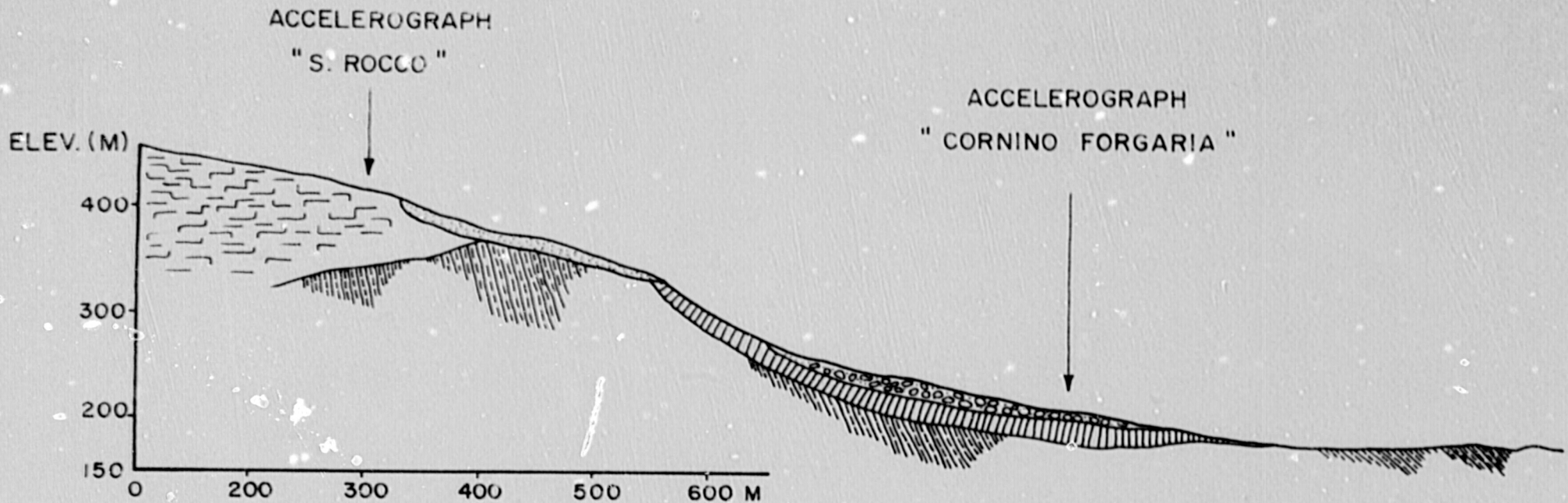


FIG. 4-2 GEOLOGICAL CROSS-SECTION PASSING THROUGH THE ACCELEROGRAPHIC STATIONS " S. ROCCO " AND " CORNINO FORGARIA "

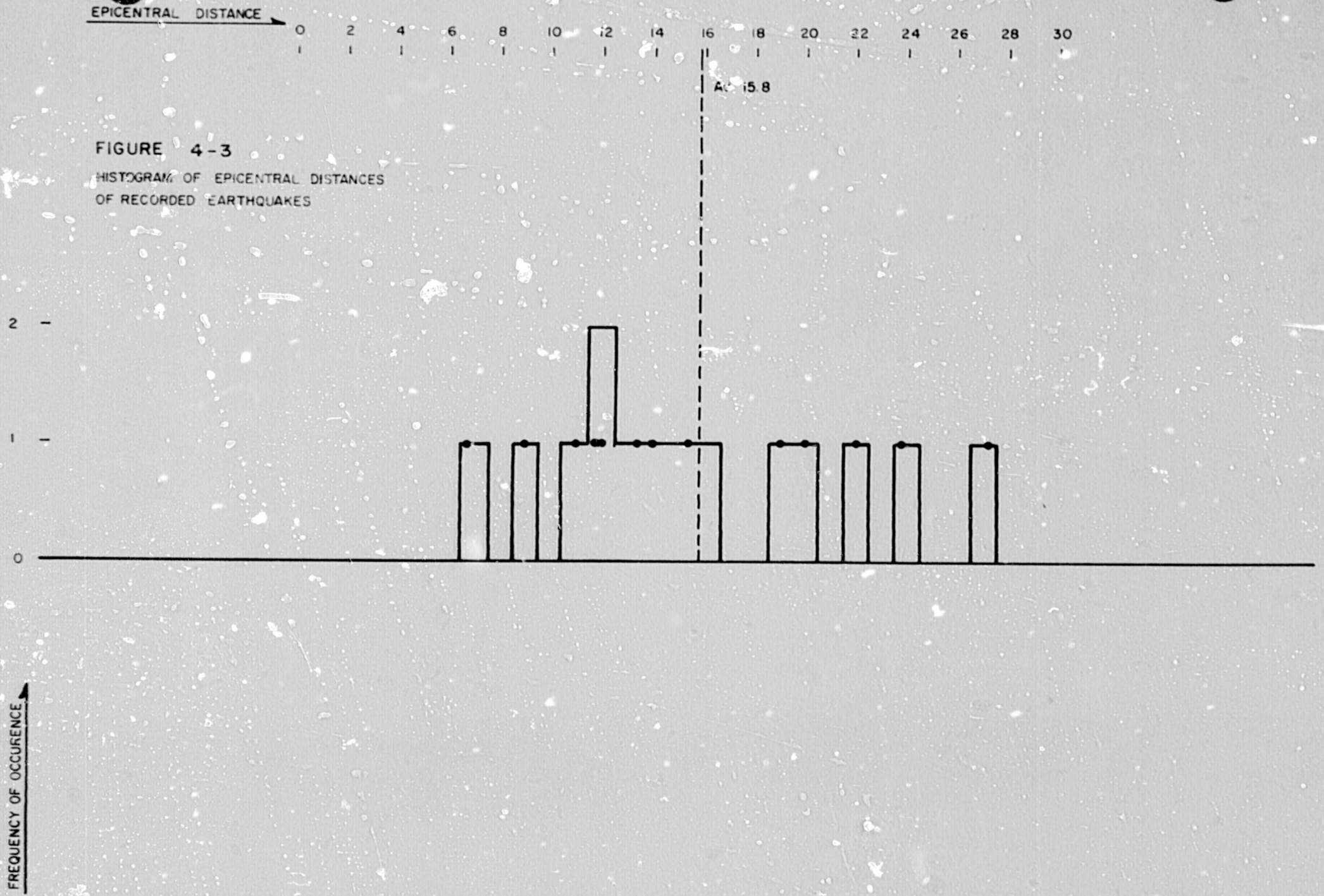
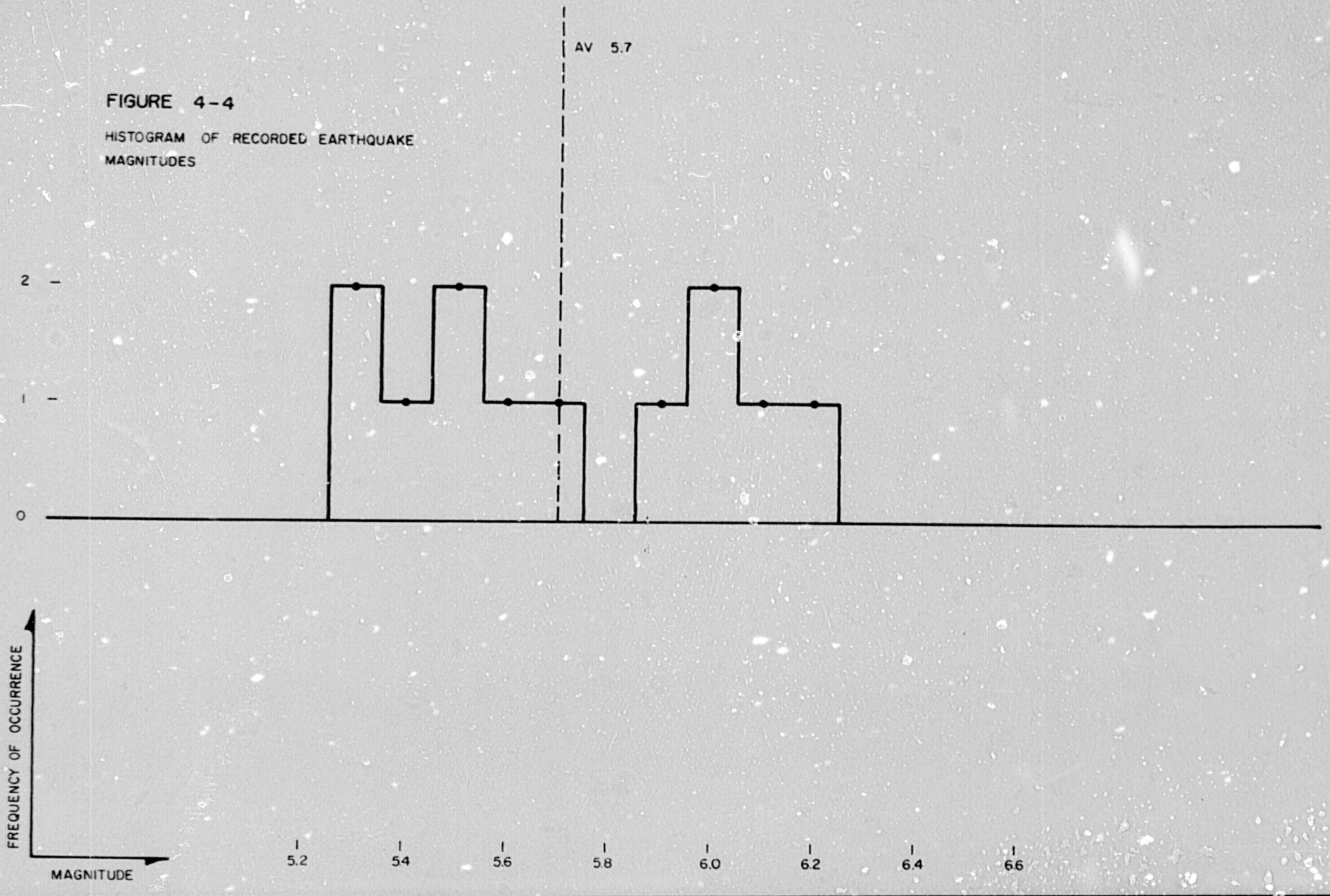


FIGURE 4-3

HISTOGRAM OF EPICENTRAL DISTANCES
OF RECORDED EARTHQUAKES

FIGURE 4-4

HISTOGRAM OF RECORDED EARTHQUAKE MAGNITUDES



COMPARISON OF SEQUOYAH, WATTS BAR, AND BELLEFONTE NUCLEAR PLANTS TOF OF ROCK DESIGN SPECTRA WITH 0.08G REGULATORY GUIDE 1.60 SPECTRUM

SEQUOYAH – 1% DAMPING
WATTS BAR – 1% DAMPING
BELLEFONTE – 4% DAMPING
REG GUIDE 1.60 – 4% DAMPING

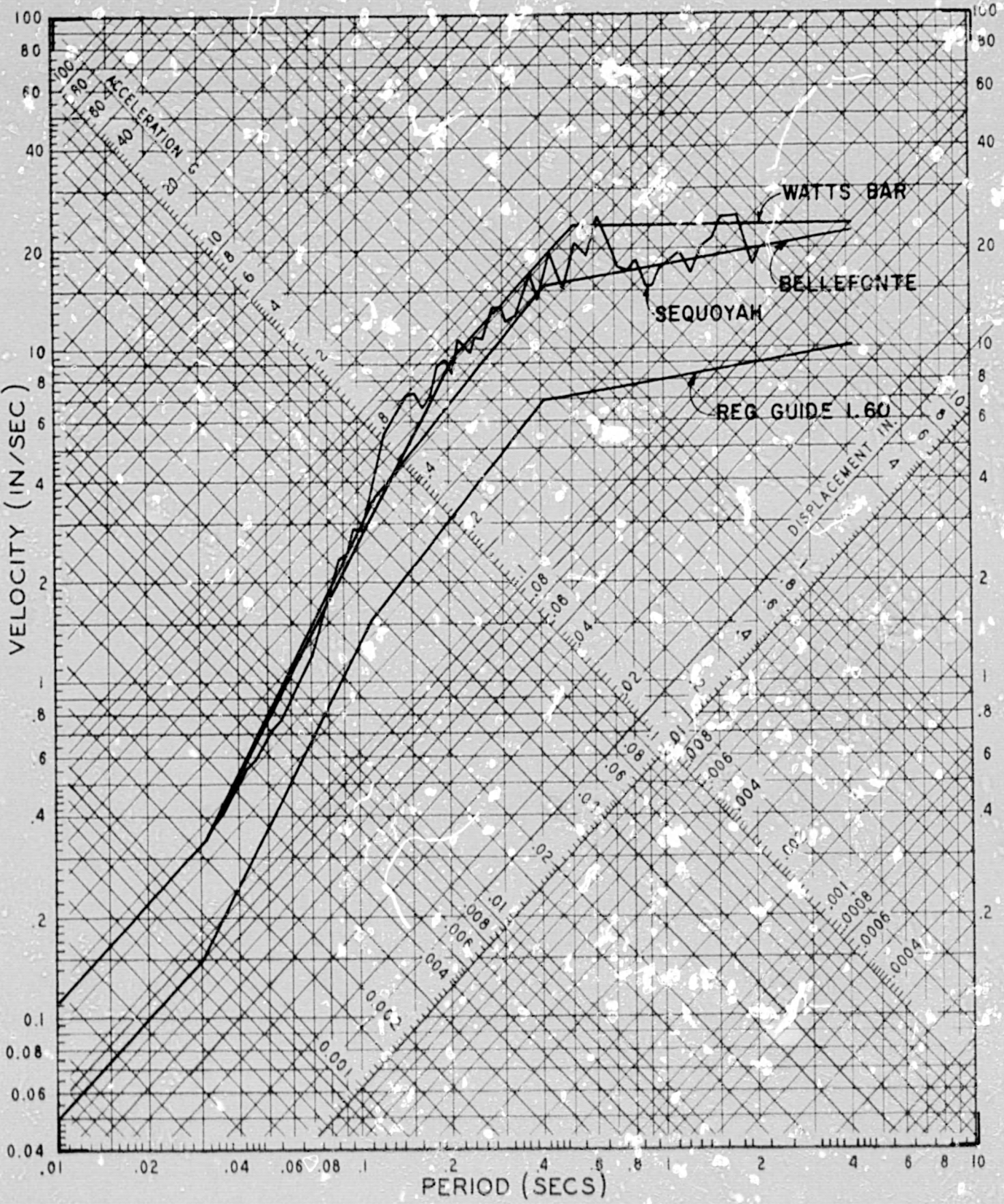


FIGURE 4-5

COMPARISON OF SEQUOYAH, WATTS BAR, AND BELLEFONTE NUCLEAR PLANTS TOP OF ROCK DESIGN SPECTRA WITH 0.08G REGULATORY GUIDE 1.60 SPECRUM

SEQUOYAH - 5% DAMPING
WATTS BAR - 5% DAMPING
BELLEFONTE - 7% DAMPING
REG GUIDE 1.60 - 7% DAMPING

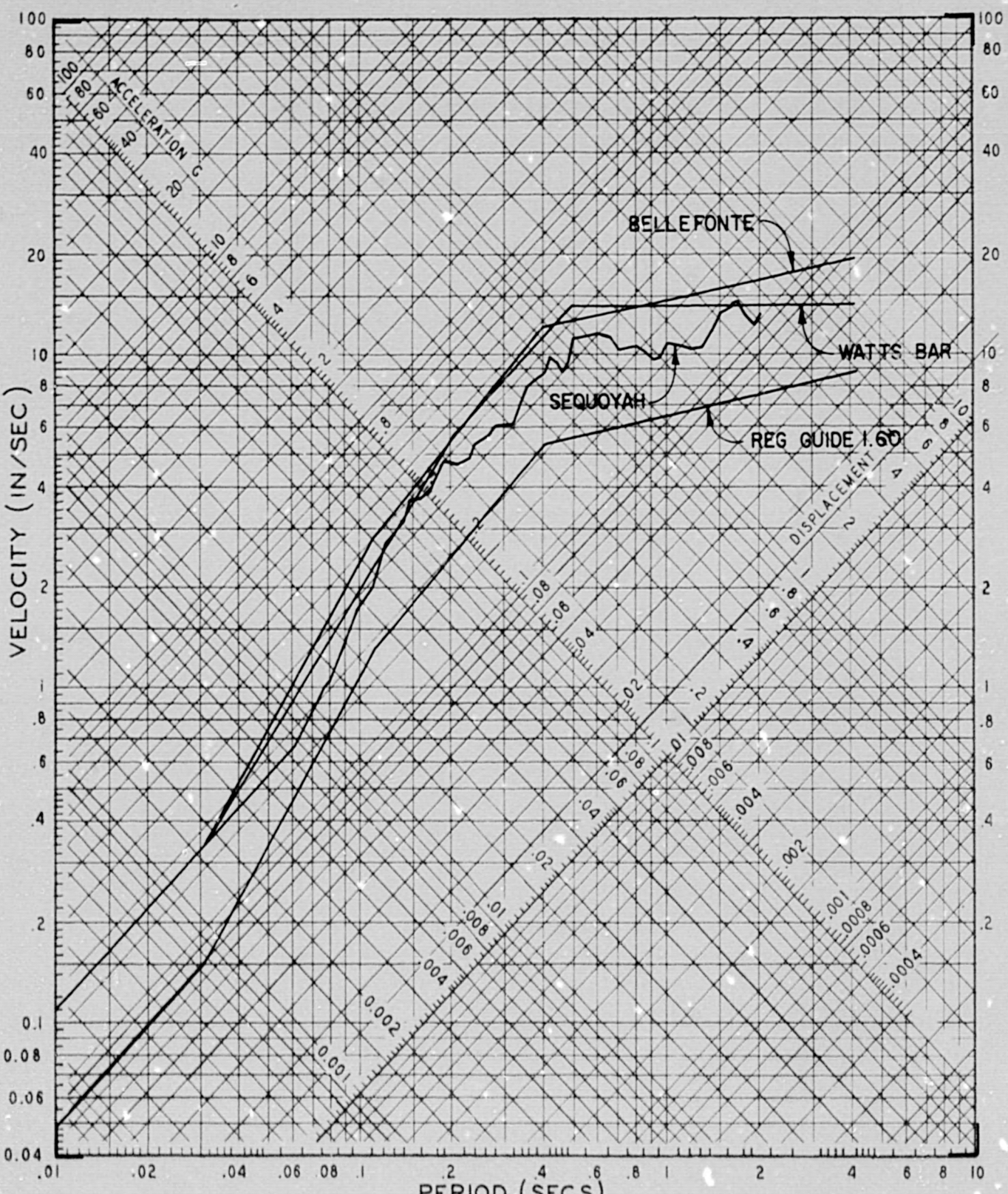


FIGURE 4-6

APPENDIX A

RESPONSE SPECTRA FOR THIRTEEN SELECTED UNITED STATES AND ITALY EARTHQUAKES

LIST OF FIGURES (FOR APPENDIX A)

A-1	Response Spectra for Helena, Montana Earthquake	October 31, 1935	Carroll College Record,	N00E
A-2	Response Spectra for Helena, Montana Earthquake	October 31, 1935	Carroll College Record,	N90E
A-3	Response Spectra for San Francisco, California Earthquake	March 22, 1957	Golden Gate Record,	N10E
A-4	Response Spectra for San Francisco, California Earthquake	March 22, 1957	Golden Gate Record,	S80E
A-5	Response Spectra for Parkfield, California Earthquake	June 27, 1966	Temblor Record,	N65W
A-6	Response Spectra for Parkfield, California Earthquake	June 27, 1966	Temblor Record,	S25W
A-7	Response Spectra for Lytle Creek, California Earthquake	Sept. 12, 1970	Allen Ranch Record,	S15W
A-8	Response Spectra for Lytle Creek, California Earthquake	Sept. 12, 1970	Allen Ranch Record	S65E
A-9	Response Spectra for Lytle Creek, California Earthquake	Sept. 12, 1970	Devils Canyon Record,	S10E
A-10	Response Spectra for Lytle Creek, California Earthquake	Sept. 12, 1970	Devils Canyon Record	S80E
A-11	Response Spectra for Oroville, California Earthquake	August 1, 1975	Oroville Dam Record,	N27E
A-12	Response Spectra for Oroville, California Earthquake	August 1, 1975	Oroville Dam Record,	N63W
A-13	Response Spectra for Friuli, Italy Earthquake	May 6, 1976	Tolmezzo Record (038)	N-S
A-14	Response Spectra for Friuli, Italy Earthquake	May 6, 1976	Tolmezzo Record (038)	E-W

A-15	Response Spectra for Friuli, Italy Earthquake	May 9, 1976	Tolmezzo Record (054)	N-S
A-16	Response Spectra for Friuli, Italy Earthquake	May 9, 1976	Tolmezzo Record (054)	E-W
A-17	Response Spectra for Friuli, Italy Earthquake	May 11, 1976	Tolmezzo Record (063)	N-S
A-18	Response Spectra for Friuli, Italy Earthquake	May 11, 1976	Tolmezzo Record (063)	E-W
A-19	Response Spectra for Friuli, Italy Earthquake	Sept. 11, 1976 (16:31)	S. Rocco Record (132)	N-S
A-20	Response Spectra for Friuli, Italy Earthquake	Sept. 11, 1976 (16:31)	S. Rocco Record (132)	E-W
A-21	Response Spectra for Friuli, Italy Earthquake	Sept. 11, 1976 (16:35)	S. Rocco Record (139)	N-S
A-22	Response Spectra for Friuli, Italy Earthquake	Sept. 11, 1976 (16:35)	S. Rocco Record (139)	E-W
A-23	Response Spectra for Friuli, Italy Earthquake	Sept. 15, 1976 (3:15)	S. Rocco Record (153)	N-S
A-24	Response Spectra for Friuli, Italy Earthquake	Sept. 15, 1976 (3:15)	S. Rocco Record (153)	E-W
A-25	Response Spectra for Friuli, Italy Earthquake	Sept. 15, 1976 (9:21)	S. Rocco Record (169)	N-S
A-26	Response Spectra for Friuli, Italy Earthquake	Sept. 15, 1976 (9:21)	S. Rocco Record (169)	E-W
A-27	Composite Response Spectra Plot of Six United States Earthquakes - 4% Damping			
A-28	Composite Response Spectra Plot of Six United States Earthquakes - 7% Damping			
A-29	Composite Response Spectra Plot of Seven Friuli, Italy Earthquakes - 4% Damping			
A-30	Composite Response Spectra Plot of Seven Friuli, Italy Earthquakes - 7% Damping			
A-31	Composite Response Spectra Plot of Thirteen Unites and Italy Earthquakes - 4% Damping			
A-32	Composite Response Spectra Plot of Thirteen United States and Italy Earthquakes - 7% Damping			

A-33 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Six United States Earthquakes - 4% Damping

A-34 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Six United States Earthquakes - 7% Damping

A-35 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Seven Friuli, Italy Earthquakes - 4% Damping

A-36 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Seven Friuli, Italy Earthquakes - 7% Damping

A-37 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Thirteen United States and Italy Earthquakes - 4% Damping

A-38 Mean, Mean plus One Standard Deviation, Maximum, and Minimum Response Spectra for Thirteen United States and Italy Earthquakes - 7% Damping

HELENA, MONTANA EARTHQUAKE 10-31-35 1138 HRS

STATION: CARROLL COLLEGE RECORD ID: B025 DURATION: 50.920 SEC

COMPONENT: N00E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

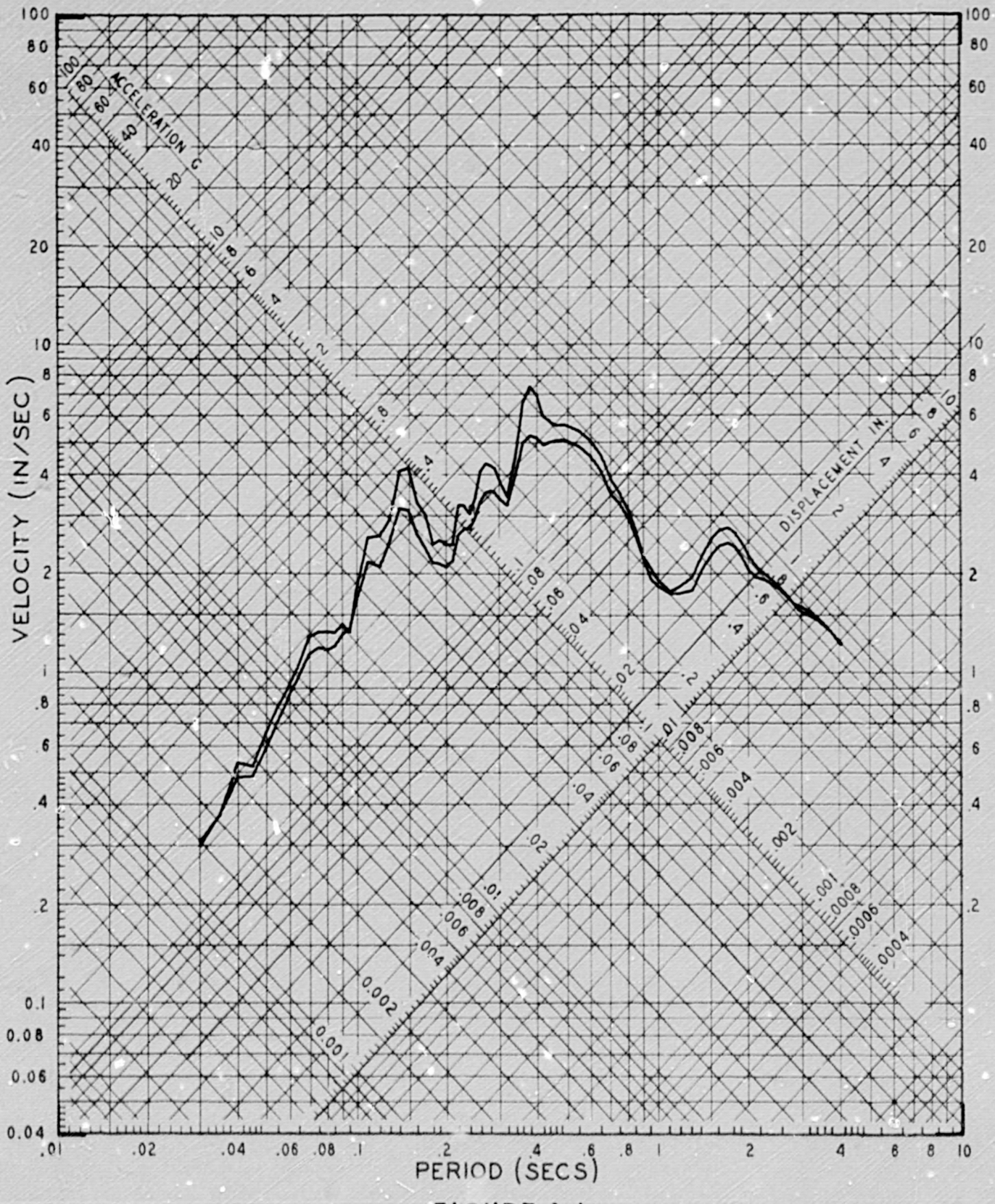


FIGURE A-I

HELENA, MONTANA EARTHQUAKE 10-31-35 1138 HRS

STATION: CARROLL COLLEGE RECORD ID: B025 DURATION: 51.020 SEC

COMPONENT: N90E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

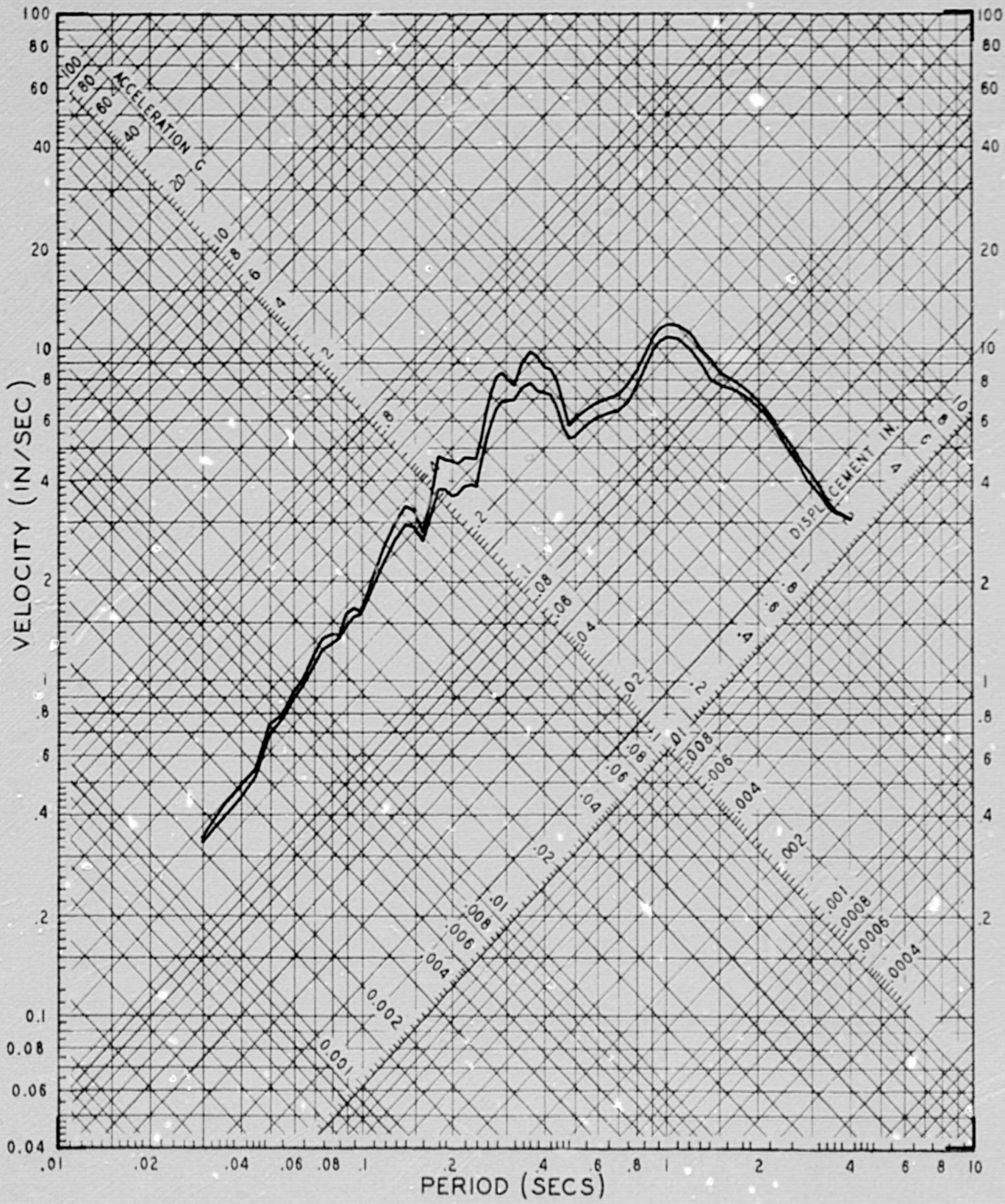


FIGURE A-2

SAN FRANCISCO EARTHQUAKE 3-22-57 1144 HRS

STATION: GOLDEN GATE PARK RECORD ID: A015 DURATION: 39.880 SEC

COMPONENT: N10E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

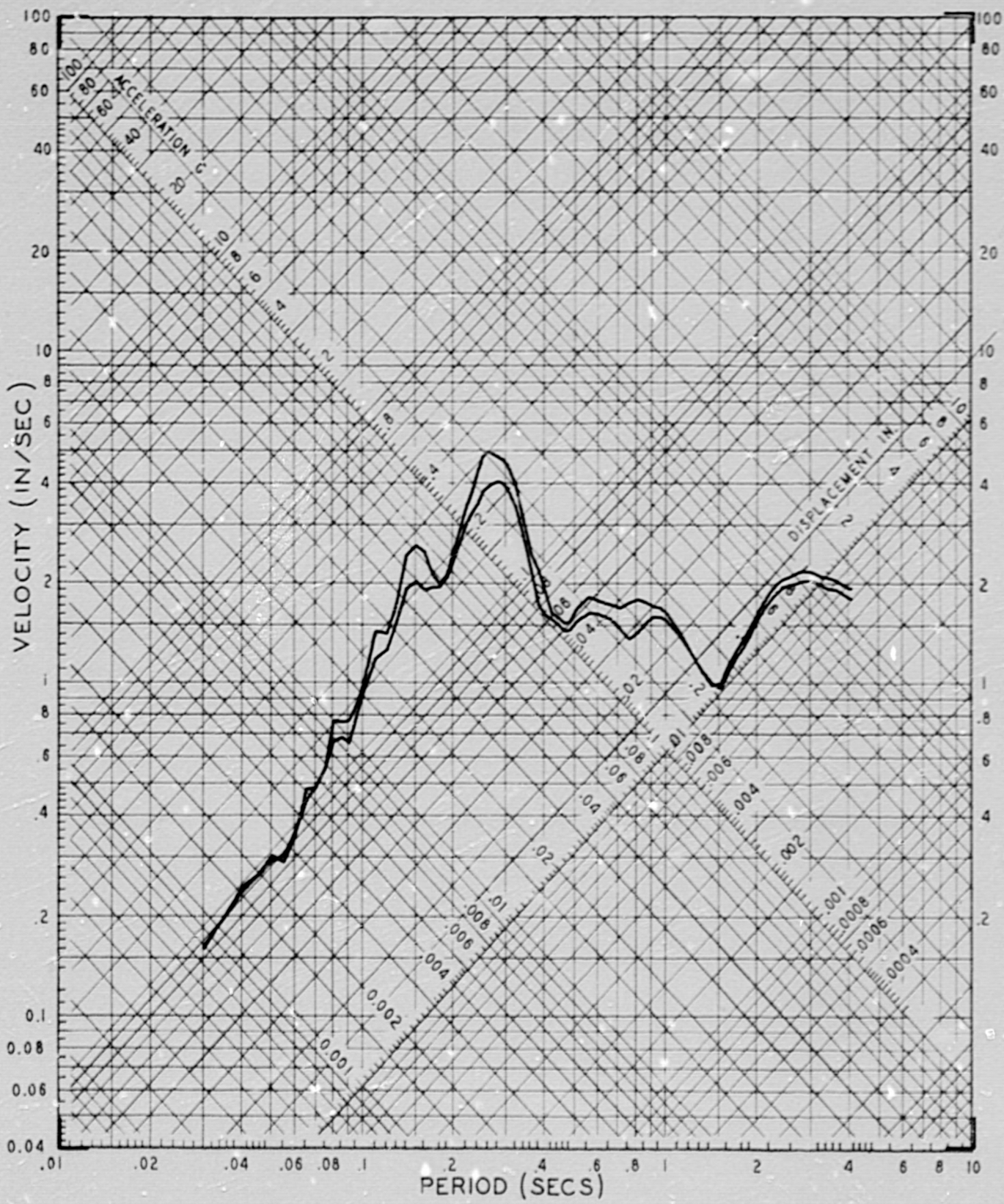


FIGURE A-3

SAN FRANCISCO EARTHQUAKE 3-22-57 1144 HRS

STATION: GOLDEN GATE PARK RECORD ID: A015 DURATION: 39.880 SEC

COMPONENT: S80E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

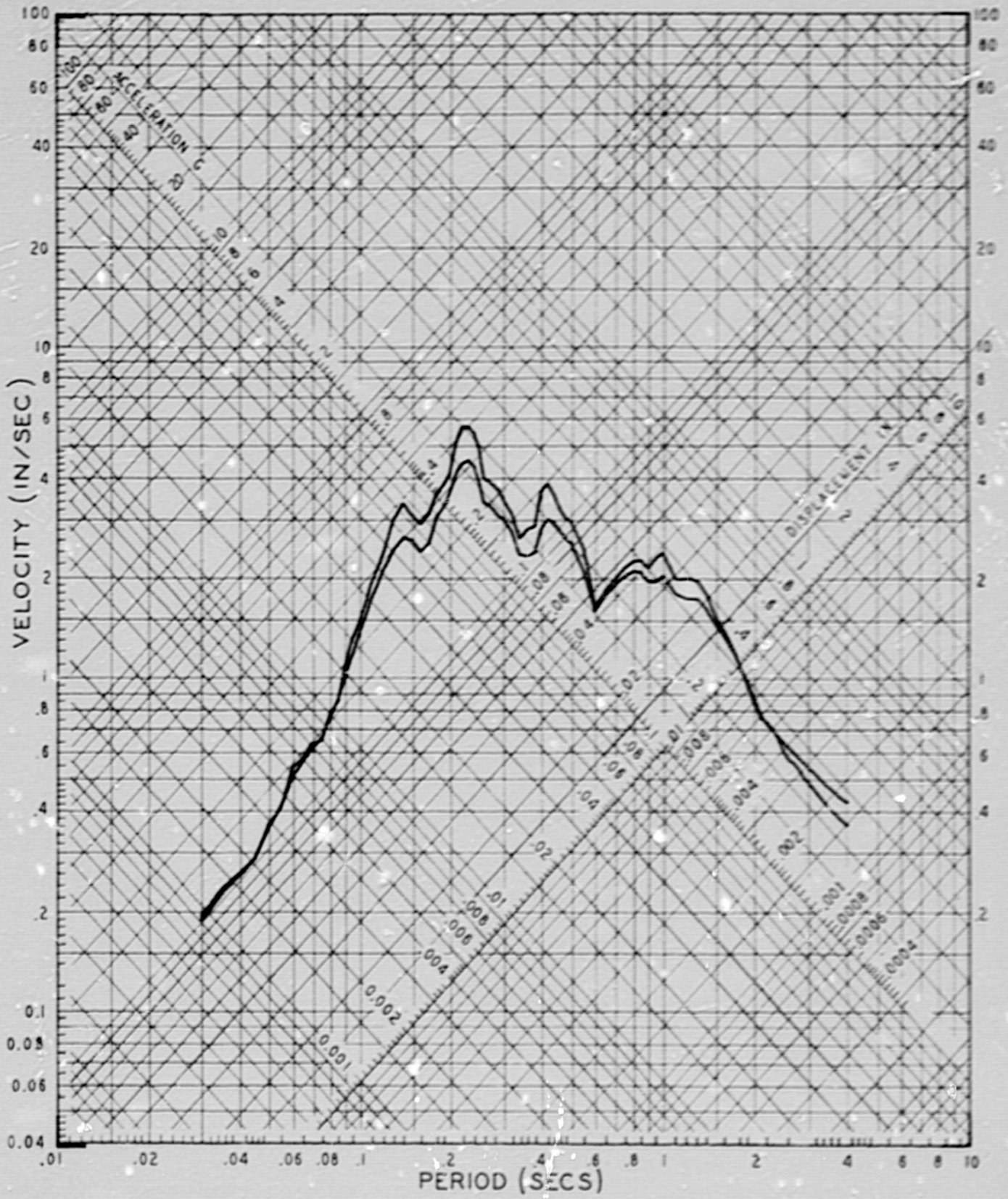


FIGURE A-4

PARKFIELD, CALIFORNIA EARTHQUAKE 6-27-66 2026 HRS

STATION: TEMBLOR RECORD ID: B037 DURATION: 30.360 SEC

COMPONENT: N65W TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

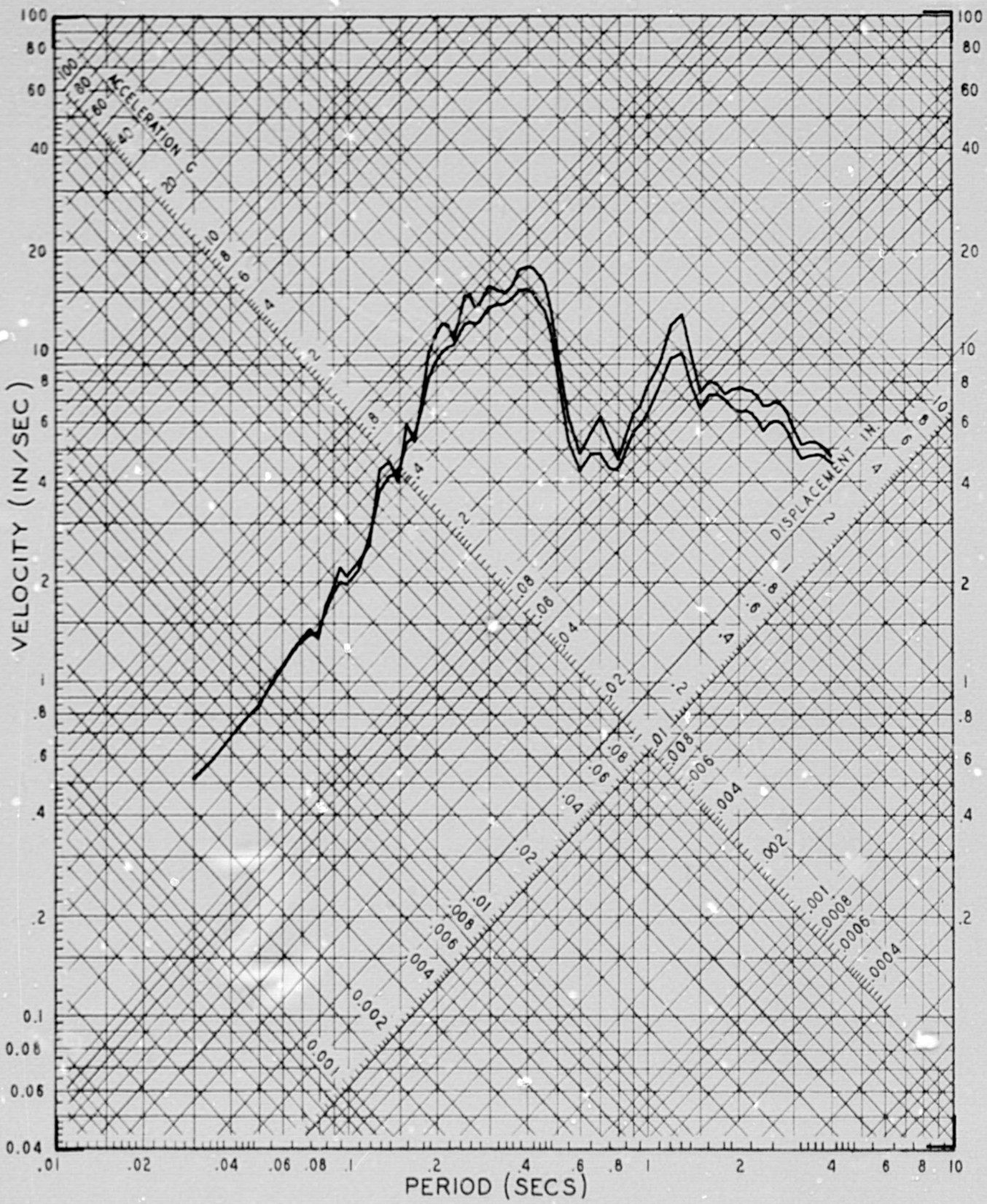


FIGURE A-5

PARKFIELD, CALIFORNIA EARTHQUAKE 6-27-66 2026 HRS

STATION: TEMBLOR RECORD ID: B037 DURATION: 30.400 SEC

COMPONENT: S25W TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

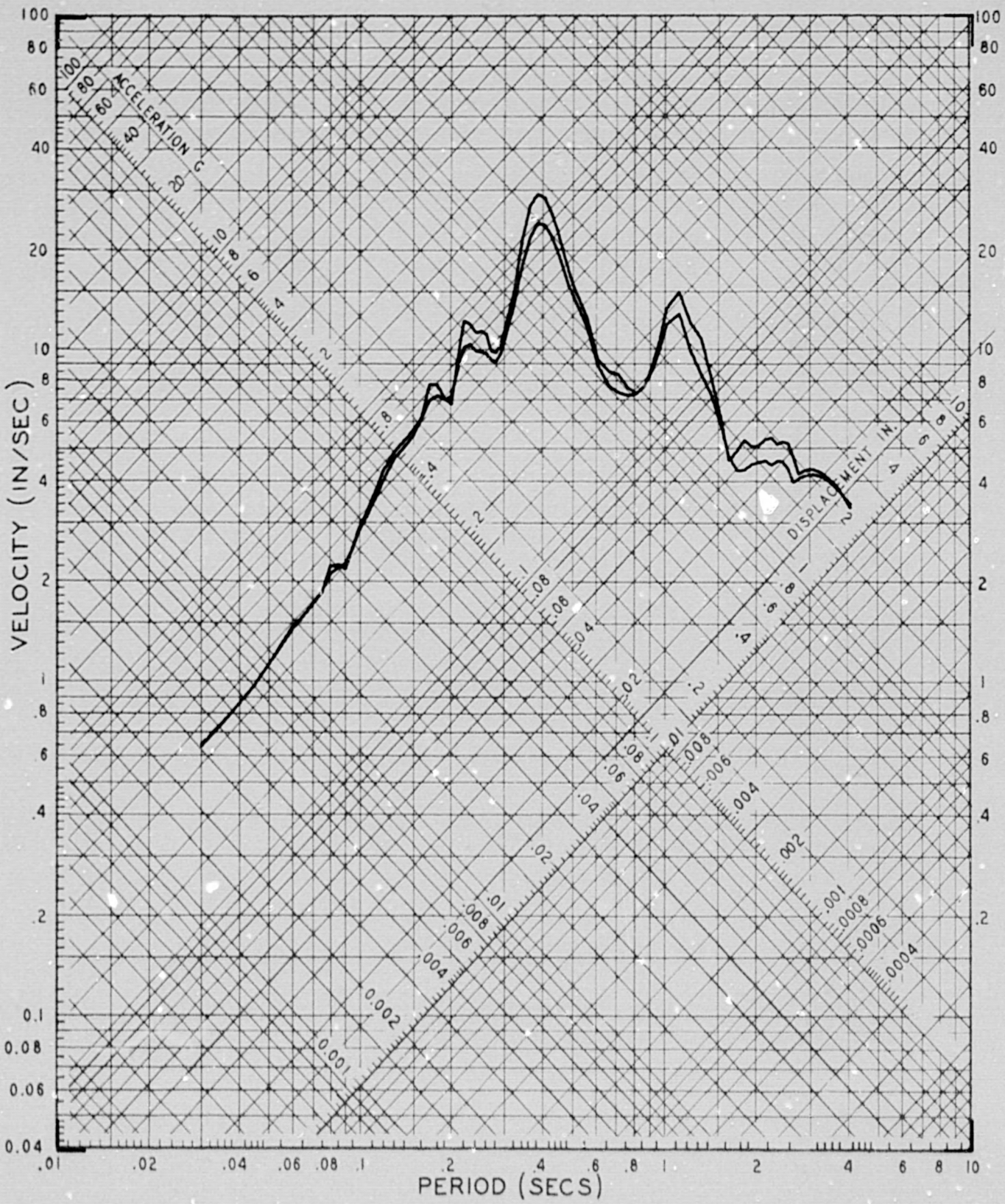


FIGURE A-6

LYTLE CREEK EARTHQUAKE 9-12-70 0600 HRS

STATION: ALLEN RANCH RECORD ID: W335 DURATION: 38.140 SEC

COMPONENT: S05W TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

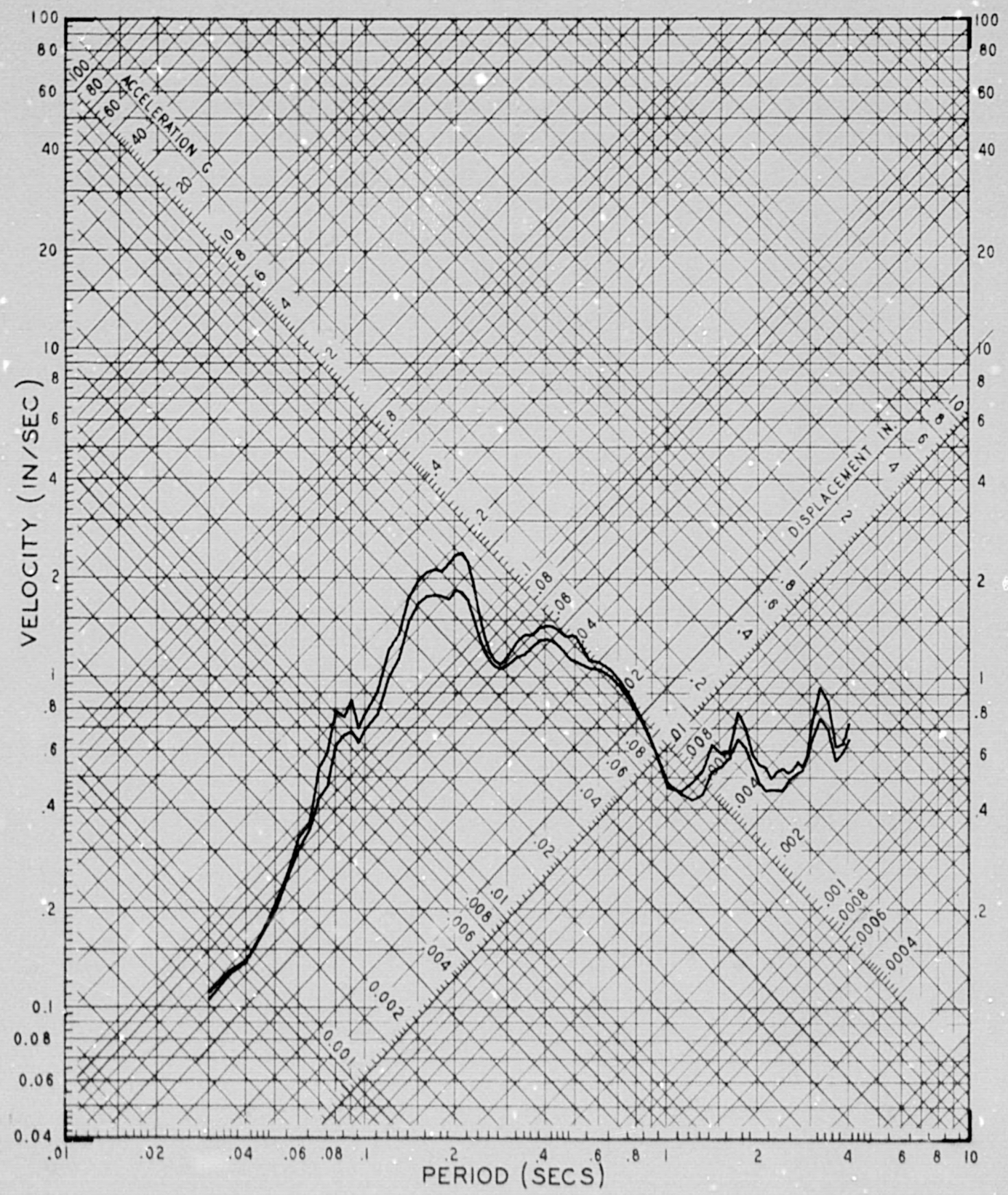


FIGURE A-7

LYTLE CREEK EARTHQUAKE 9-12-70 0600 HRS

STATION: ALLEN RANCH RECORD ID: W335 DURATION: 38.140 SEC

COMPONENT: S85E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

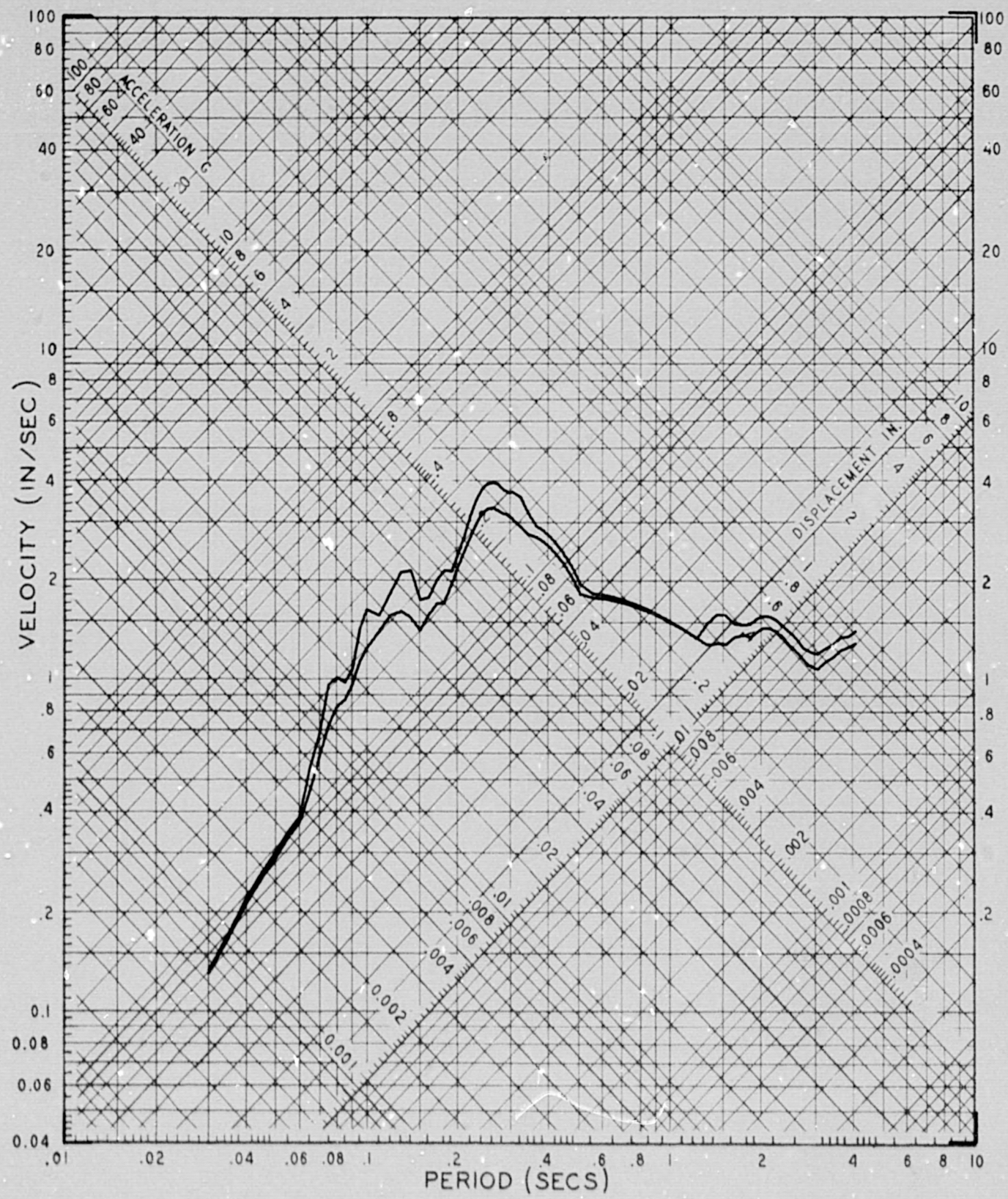


FIGURE A-8

LYTLE CREEK EARTHQUAKE 09-12-70 0600 HRS

STATION: DEVILS CANYON RECORD ID: W337 DURATION: 13.620 SEC

COMPONENT: SOUTH TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

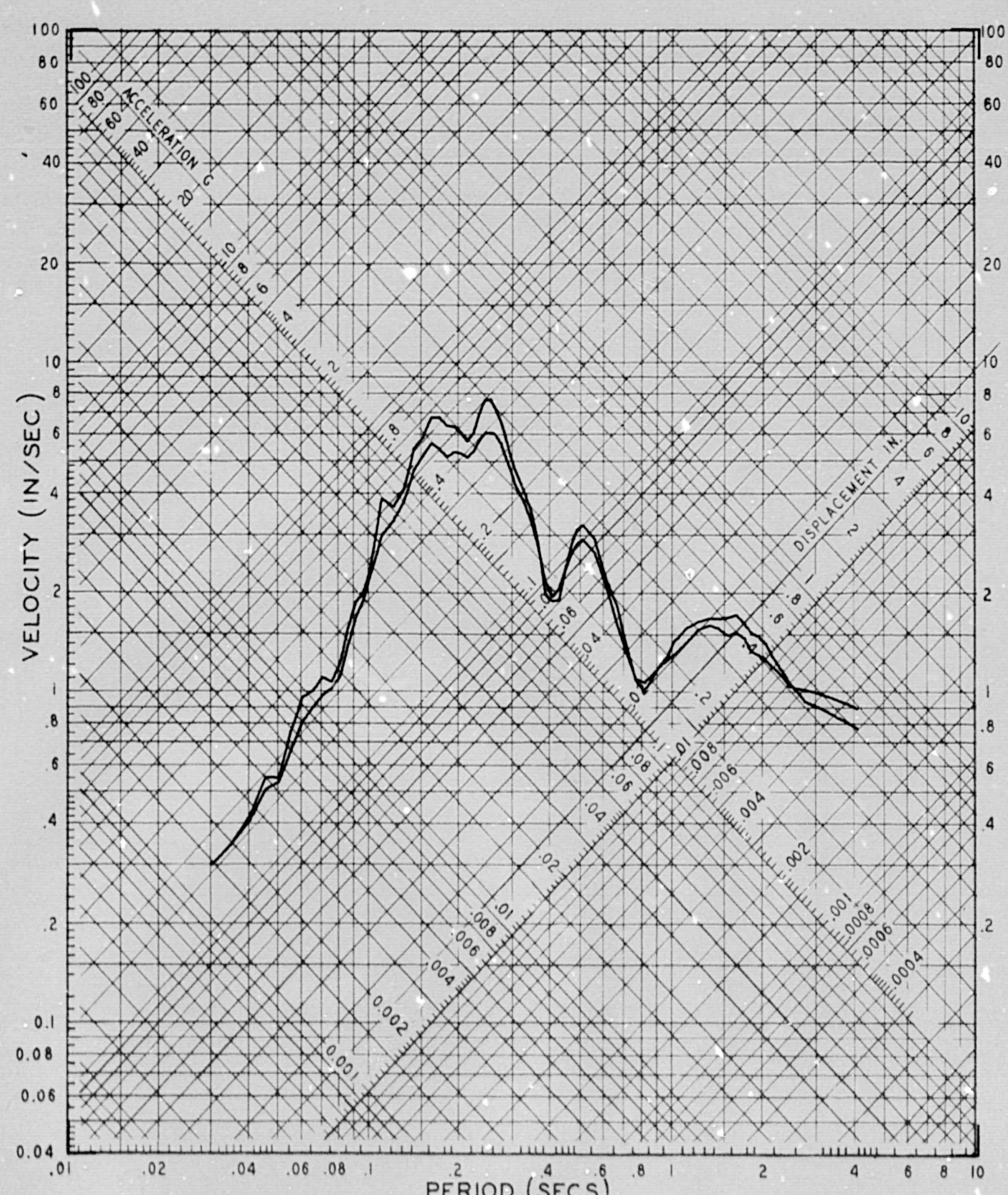


FIGURE A-9

LYTLE CREEK EARTHQUAKE 09-12-70 0600 HRS

STATION: DEVILS CANYON RECORD ID: W337 DURATION: 13.630 SEC

COMPONENT: EAST TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

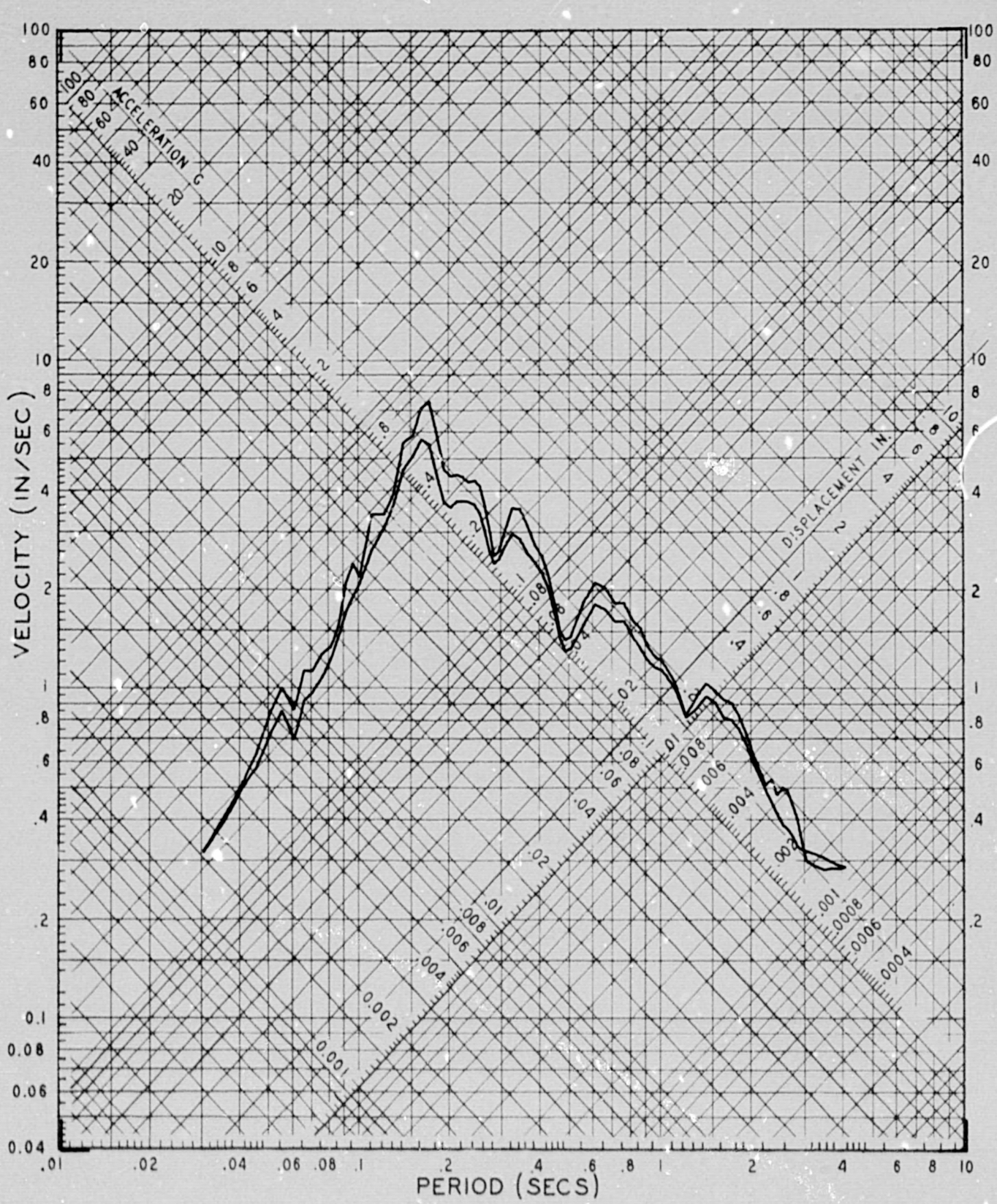


FIGURE A-10

OROVILLE, CALIFORNIA EARTHQUAKE 8-1-75 2020 HRS

STATION: OROVILLE DAM RECORD ID: DURATION: 12.195 SEC

COMPONENT: N37E TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

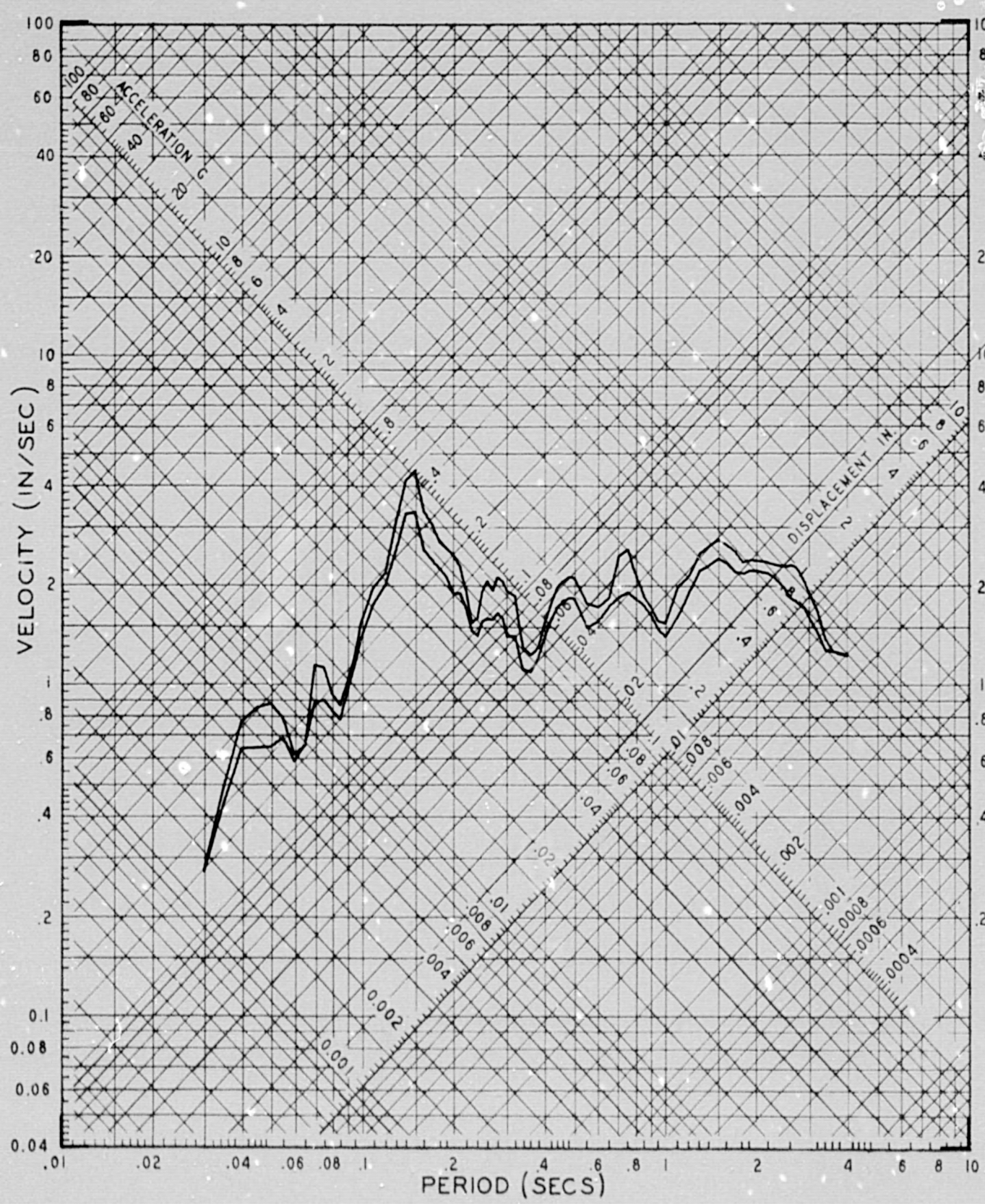


FIGURE A-11

OROVILLE, CALIFORNIA EARTHQUAKE 8-1-75 2020 HRS

STATION: OROVILLE DAM RECORD ID: DURATION: 12.225 SEC

COMPONENT: N53W TIME STEP: 0.005 SEC

DAMPING RATIOS: 0.04 0.07

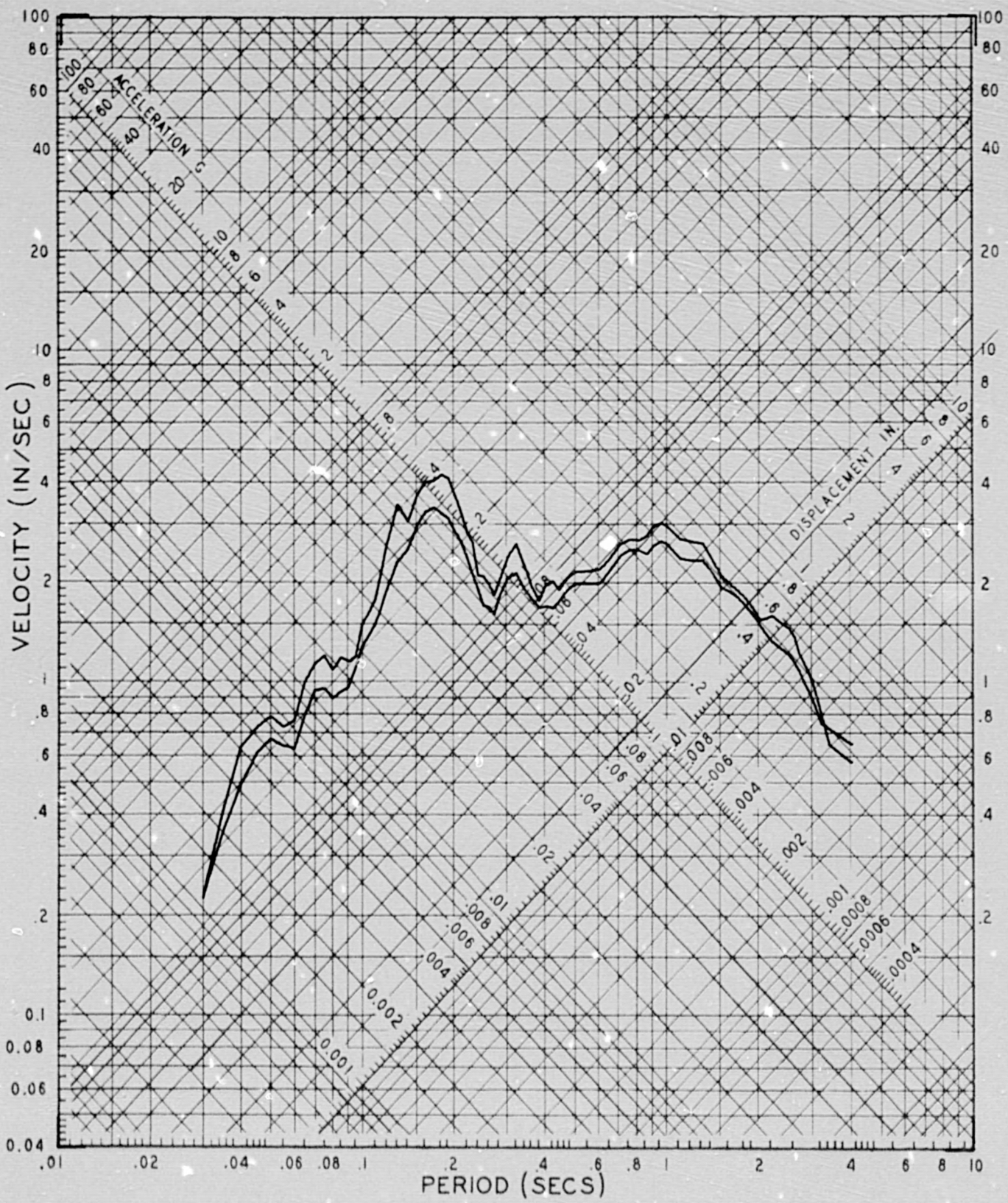


FIGURE A-12

FRIULI, ITALY EARTHQUAKE SERIES 05-06-76 2000 HRS

STATION: TOLMEZZO RECORD ID: 038 DURATION: 36.590 SEC

COMPONENT: N-S TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

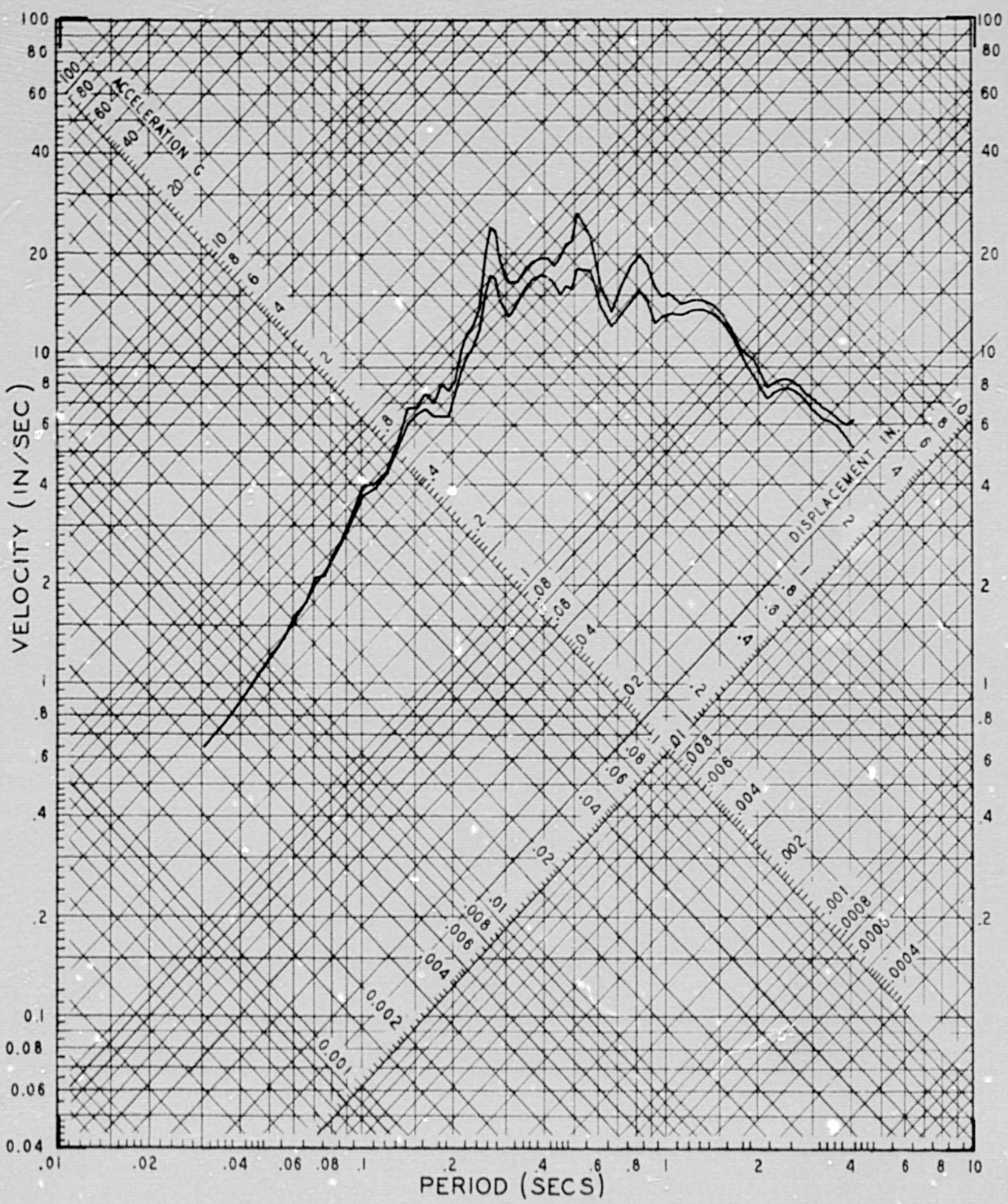


FIGURE A-13

FRIULI, ITALY EARTHQUAKE SERIES 05-06-76 2000 HRS

STATION: TOLMEZZO RECORD ID: 038 DURATION: 35.500 SEC

COMPONENT: E-W TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

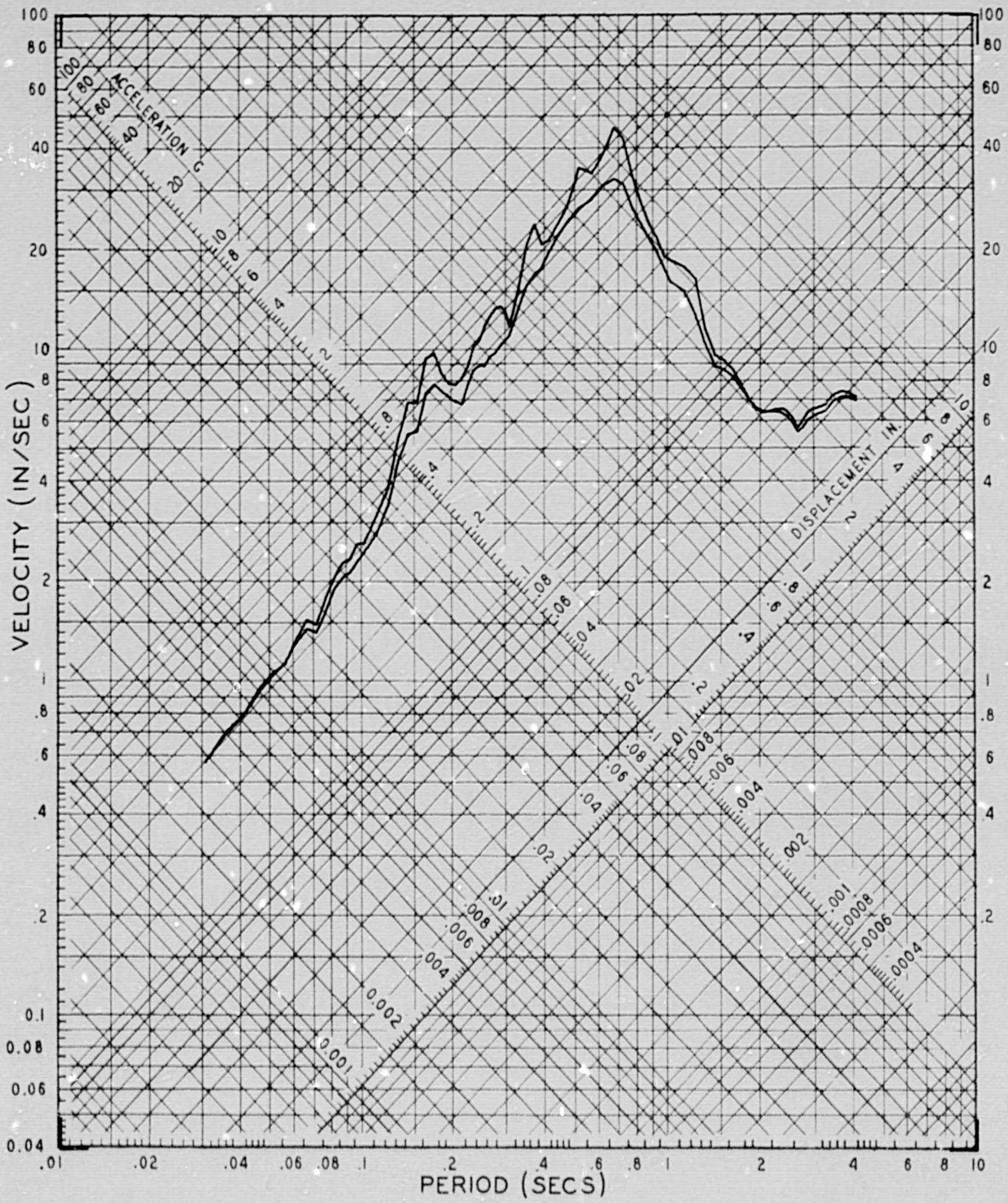


FIGURE A-14

FRIULI, ITALY EARTHQUAKE SERIES 05-09-76 0053 HRS

STATION: TOLMEZZO RECORD ID: 054 DURATION: 11.060 SEC

COMPONENT: N-S TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

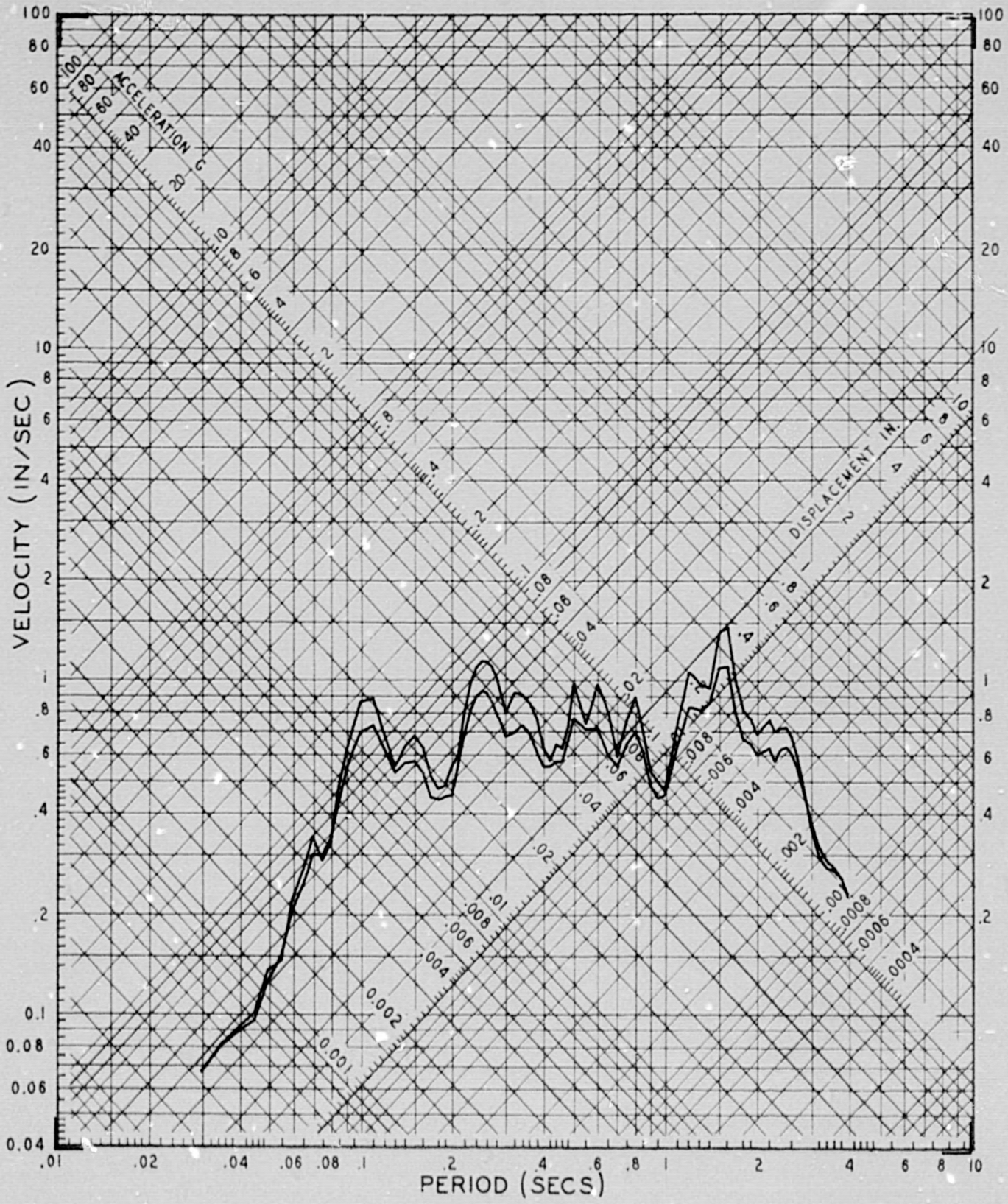


FIGURE A-15

FRIULI, ITALY EARTHQUAKE SERIES 05-09-76 0053 HRS

STATION: TOLMEZZO RECORD ID: 054 DURATION: 13.650 SEC

COMPONENT: E-W TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

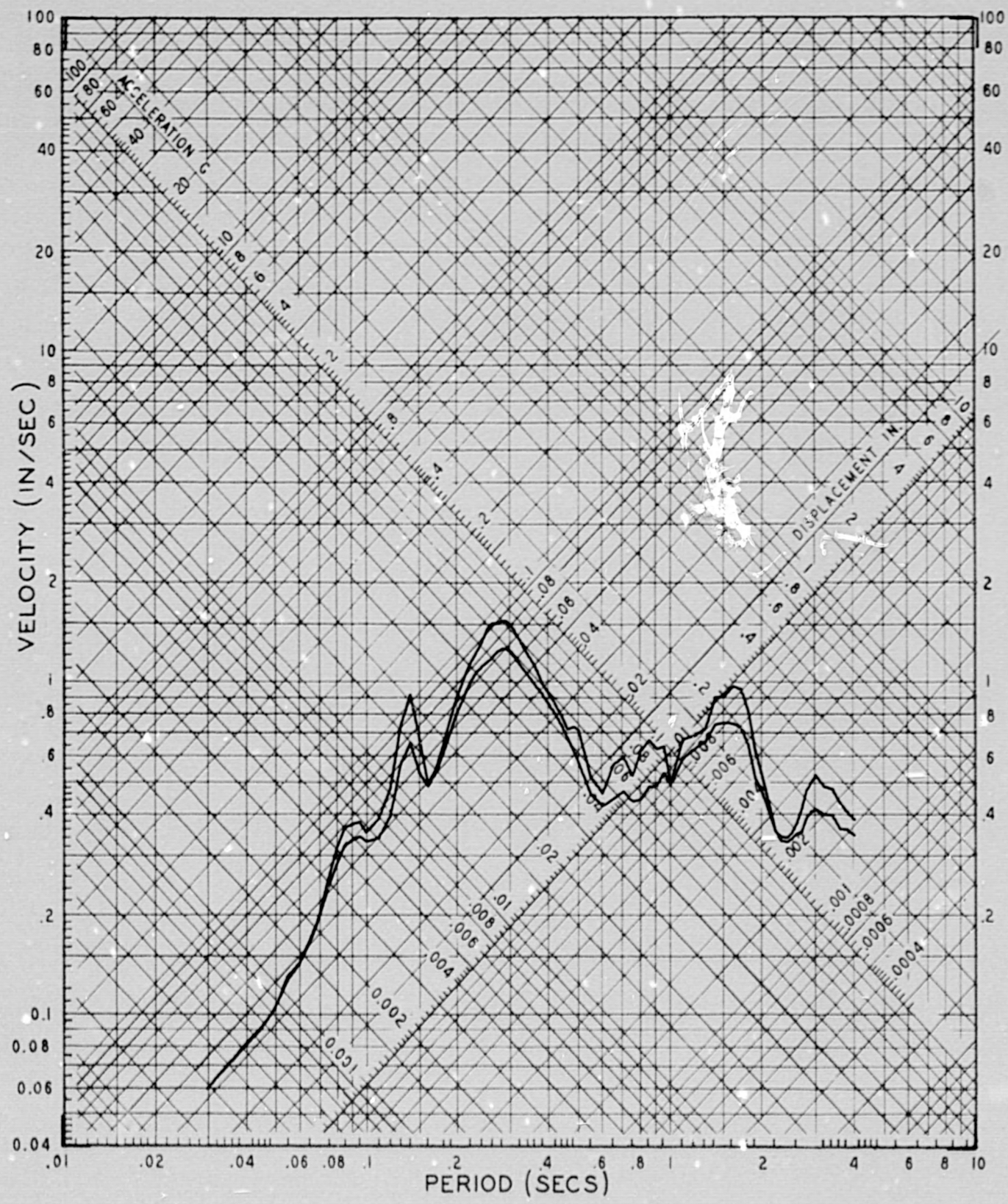


FIGURE A-16

FRIULI, ITALY EARTHQUAKE SERIES 05-11-76 2244 HRS

STATION: TCLMEZZO RECORD ID: 063 DURATION: 17.560 SEC

COMPONENT: N-S TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

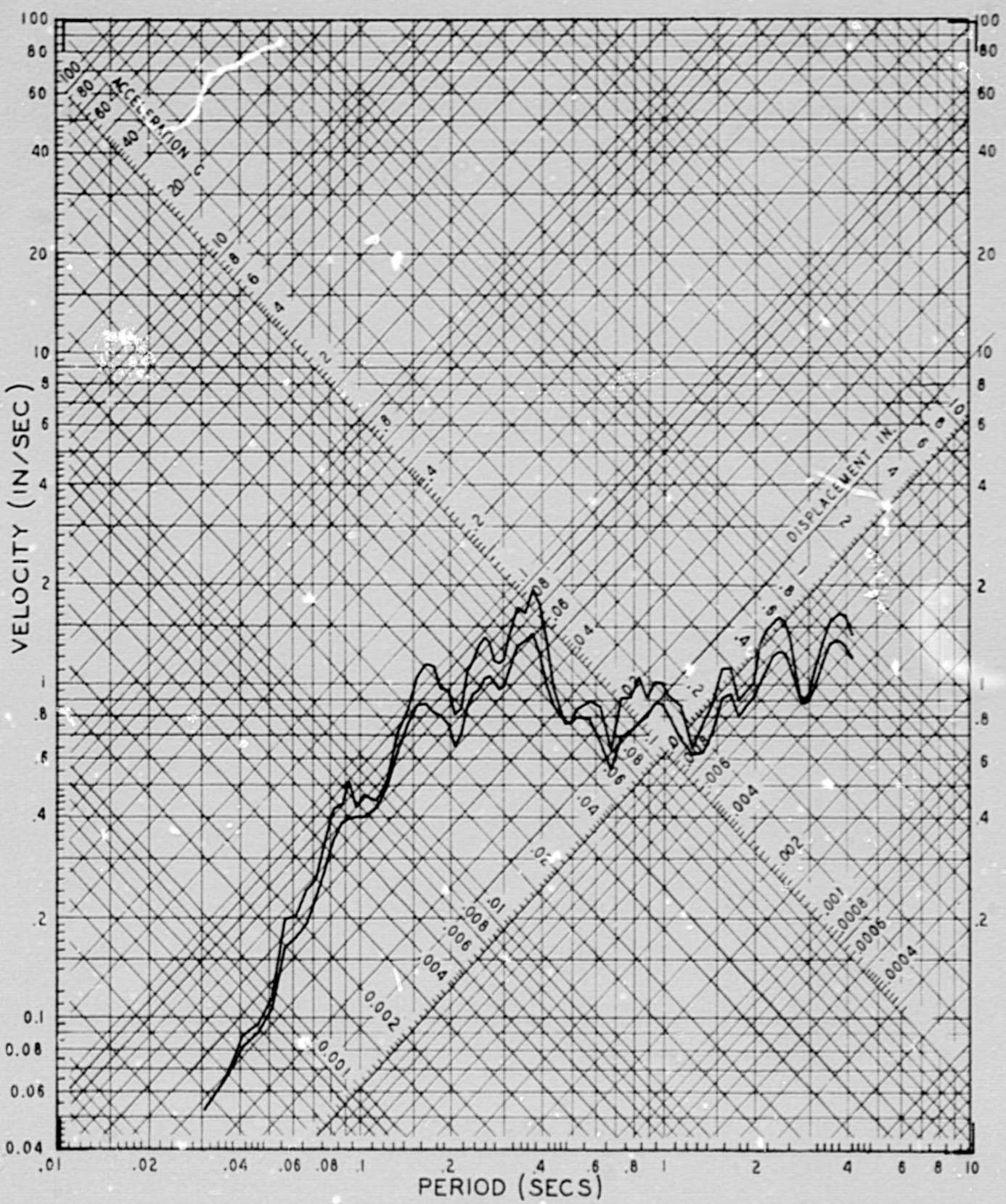


FIGURE A-17

FRIULI, ITALY EARTHQUAKE SERIES 05-11-76 2244 HRS

STATION: TOLMEZZO RECORD ID: 063 DURATION: 17.560 SEC

COMPONENT: E-W TIME STEP: 0.010 SEC

DAMPING RATIOS: 0.04 0.07

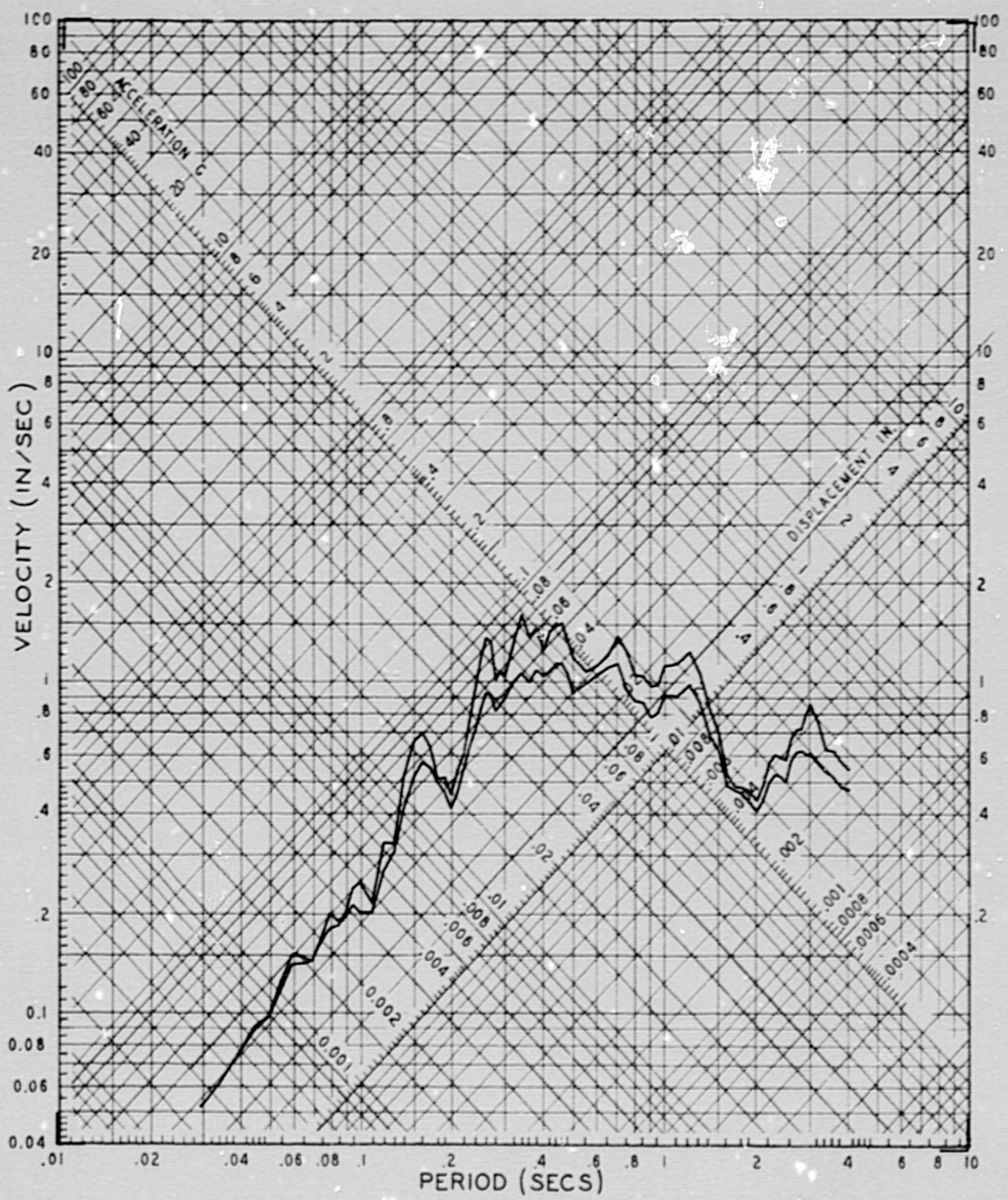


FIGURE A-18