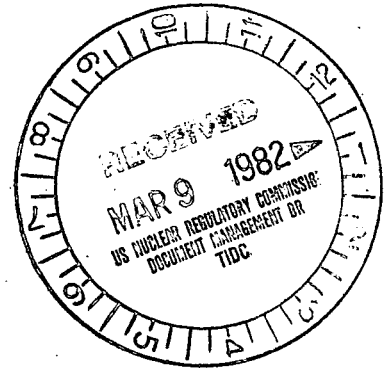




UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 3, 1982

Docket No. 50-206
LS05-82-03-014



LICENSEE: SOUTHERN CALIFORNIA EDISON COMPANY
FACILITY: SAN ONOFRE NUCLEAR GENERATING STATION UNIT NO. 1
SUBJECT: SUMMARY OF MEETING OF FEBRUARY 16, 1982

On February 16, 1982 the NRC staff met with representatives of Southern California Edison Company (SCE) and their consultants. This meeting was requested by SCE so that they could present the results of some additional work that they have done regarding the site specific spectra applicable to the seismic reevaluation of San Onofre Unit 1. Enclosure 1 is a list of attendees. Enclosure 2 are copies of the viewgraphs used during the presentation.

SCE's consultant discussed the instrumental and design forms of the reanalysis spectra. Comparisons were made with exceptionally strong recordings (1976-1981), the Imperial Valley earthquake of October, 1979, calculated spectra, other SEP plants and California critical structures, and other spectra.

SCE indicated that a formal submittal would be made soon to document this additional information.

Walter A. Paulson

Walter A. Paulson, Project Manager
Operating Reactors Branch #5
Division of Licensing

SEO/
1/1
DSU USE (18)

Enclosures:
As stated

cc w/enclosures:
See next page

OFFICE	DL ORB #5	DL ORB #5					
SURNAME	WPaulson;cc	DCr...field	8203100361	820303			
DATE	3-3-82	3/2/82	PDR	ADOCK 05000206	PDR		

March 3, 1982

cc

Charles R. Kocher, Assistant
General Counsel
James Beoletto, Esquire
Southern California Edison Company
Post Office Box 800
Rosemead, California 91770

David R. Pigott
Orrick, Herrington & Sutcliffe
6600 Montgomery Street
San Francisco, California 94111

Harry B. Stoehr
San Diego Gas & Electric Company
P. O. Box 1831
San Diego, California 92112

Resident Inspector/San Onofre NPS
c/o U. S. NRC
P. O. Box 4329
San Clemente, California 92672

Mission Viejo Branch Library
24851 Chrisanta Drive
Mission Viejo, California 92676

Mayor
City of San Clemente
San Clemente, California 92672

Chairman
Board of Supervisors
County of San Diego
San Diego, California 92101

California Department of Health
ATTN: Chief, Environmental
Radiation Control Unit
Radiological Health Section
714 P Street, Room 498
Sacramento, California 95814

U. S. Environmental Protection Agency
Region IX Office
ATTN: Regional Radiation Representative
215 Fremont Street
San Francisco, California 94111

Robert H. Engelken, Regional Administrator
Nuclear Regulatory Commission, Region V
Office of Inspection and Enforcement
1450 Maria Lane
Walnut Creek, California 94596

Mr. R. Dietch
Vice President
Nuclear Engineering and Operations
Southern California Edison Company
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

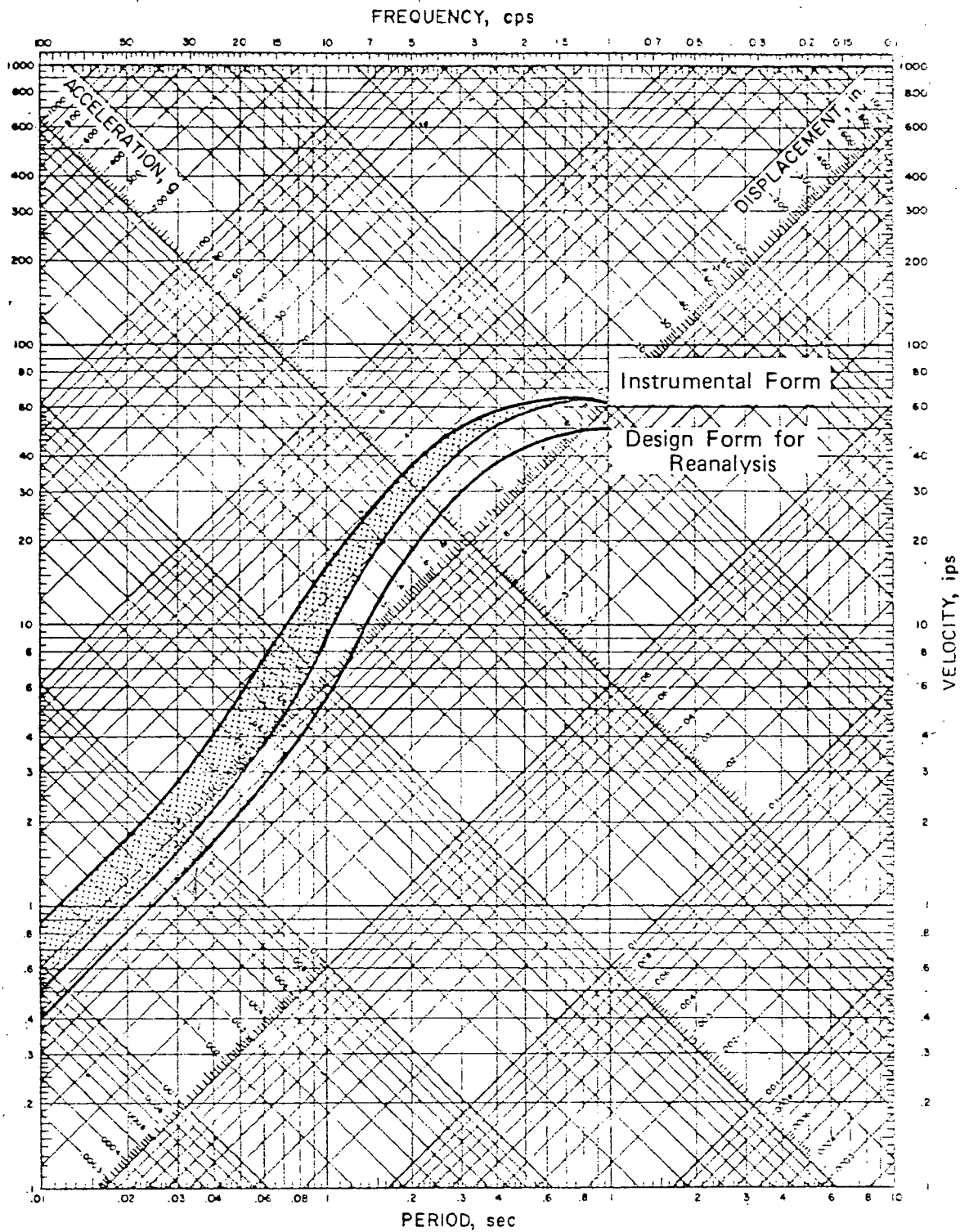
LIST OF ATTENDEES

W. Paulson	NRC
P. West	SCE
H. Hawkins	SCE
D. Hadley	Sierra Geophysics
T. Cheng	NRC
J. King	NRC
A. Ibrahim	NRC
R. Rothman	NRC
P. Y. Chen	NRC
R. Krieger	SCE
J. Rainsberry	SCE
L. Wight	TERA
J. Barneich	WCC
R. Sadigh	WCC
G. Frazier	TERA
L. Reiter	NRC
R. Jackson (part time)	NRC
R. McNeill	Consultant

AGENDA
FOR
MEETING WITH NRC GEOSCIENCES BRANCH
SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 1

9:00 A.M.
February 16, 1982

- 1.0 Introduction
- 2.0 Deterministic Spectra Comparisons
 - 2.1 Instrumental Reanalysis Spectra
 - 2.2 Comparisons to Exceptionally Strong Recordings
 - 2.3 Comparisons to Imperial Valley Earthquake of October, 1979
 - 2.4 Comparisons to Calculated Spectra
 - 2.5 Comparisons to Regulatory Spectra
- 3.0 Probabilistic Spectra Comparisons
- 4.0 Comparisons to Other SEP Plants & California Critical Structures
- 5.0 Summary and Conslusions



INSTRUMENTAL AND DESIGN FORMS
OF UNIT 1 REANALYSIS SPECTRUM, DAMPING = 2%

FIGURE

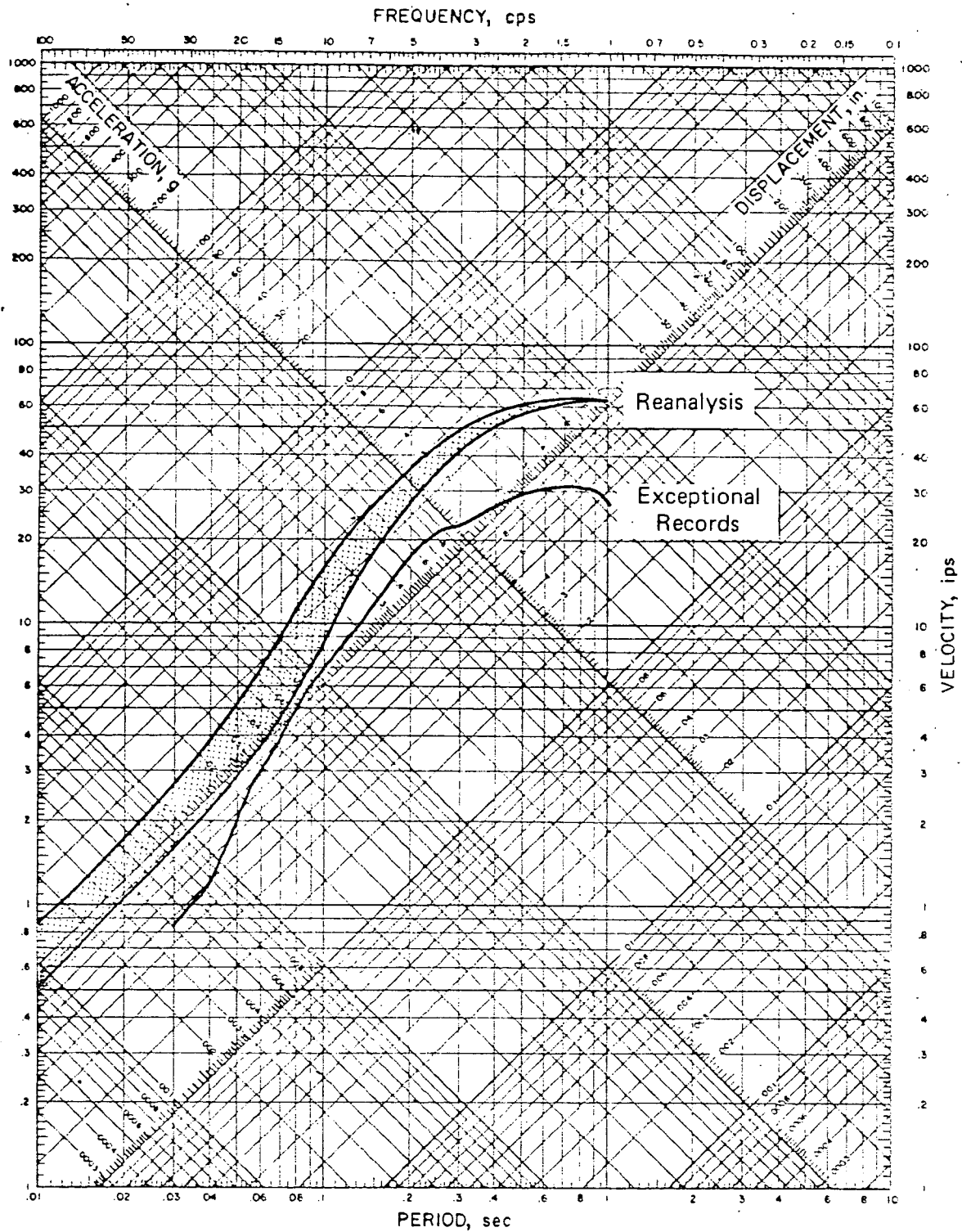
TABLE 1

STUDY OF EXCEPTIONAL RECORDINGS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Date	Identification	M	R, km	Faulting Style	Measured IPGA Mi, Ri	TERA msd IPGA Mi, Ri	Scaled IPGA M7, R8
17 May 76	Gazli, USSR, EW NS	7.2	5	Thrust	0.74	0.60	0.60
		7.2	5	Thrust	0.64	0.60	0.52
16 Sep 78	Tabas, Iran, Trans Long	7.7	3	Thrust	0.78g	0.71g	0.54g
		7.7	3	Thrust	0.83	0.71	0.58
15 Oct 79	IV-79 942/230 942/140 5054/230 5054/140 958/230 958/140 955/230 955/140 5165/360 5165/270 5115/230 5115/140 5058/230 5058/140	6.9	1	Strike-S	0.45	0.74	0.30
		6.9	1	Strike-S	0.72	0.74	0.48
		6.9	2	Strike-S	0.81	0.69	0.58
		6.9	2	Strike-S	0.66	0.69	0.47
		6.9	4	Strike-S	0.50	0.60	0.41
		6.9	4	Strike-S	0.64	0.60	0.52
		6.9	4	Strike-S	0.38	0.60	0.31
		6.9	4	Strike-S	0.61	0.60	0.50
		6.9	5	Strike-S	0.51	0.57	0.44
		6.9	5	Strike-S	0.37	0.57	0.32
		6.9	10	Strike-S	0.43	0.42	0.50
		6.9	10	Strike-S	0.33	0.42	0.39
		6.9	13	Strike-S	0.38	0.36	0.52
6.9	13	Strike-S	0.38	0.36	0.52		
09 Jun 80	Victoria, BC, N15W	6.3	2	Strike-S	0.85	0.64	0.53
23 Nov 80	Italian; ST-NS ST-EW	6.5	18*	Normal#	0.24	0.22	0.53
		6.5	18*	Normal#	0.35	0.22	0.78
27 May 81.	Mammoth 99/180 99/90 3679, Long Trans 3754, Long Trans	6.3	10	Normal##	0.33	0.32	0.50
		6.3	10	Normal##	0.27	0.32	0.41
		6.3	10	Normal##	0.38	0.32	0.58
		6.3	10	Normal##	0.17	0.32	0.26
		6.3	8	Normal##	0.76	0.38	0.98
		6.3	8	Normal##	0.47	0.38	0.64

Average = 0.51g

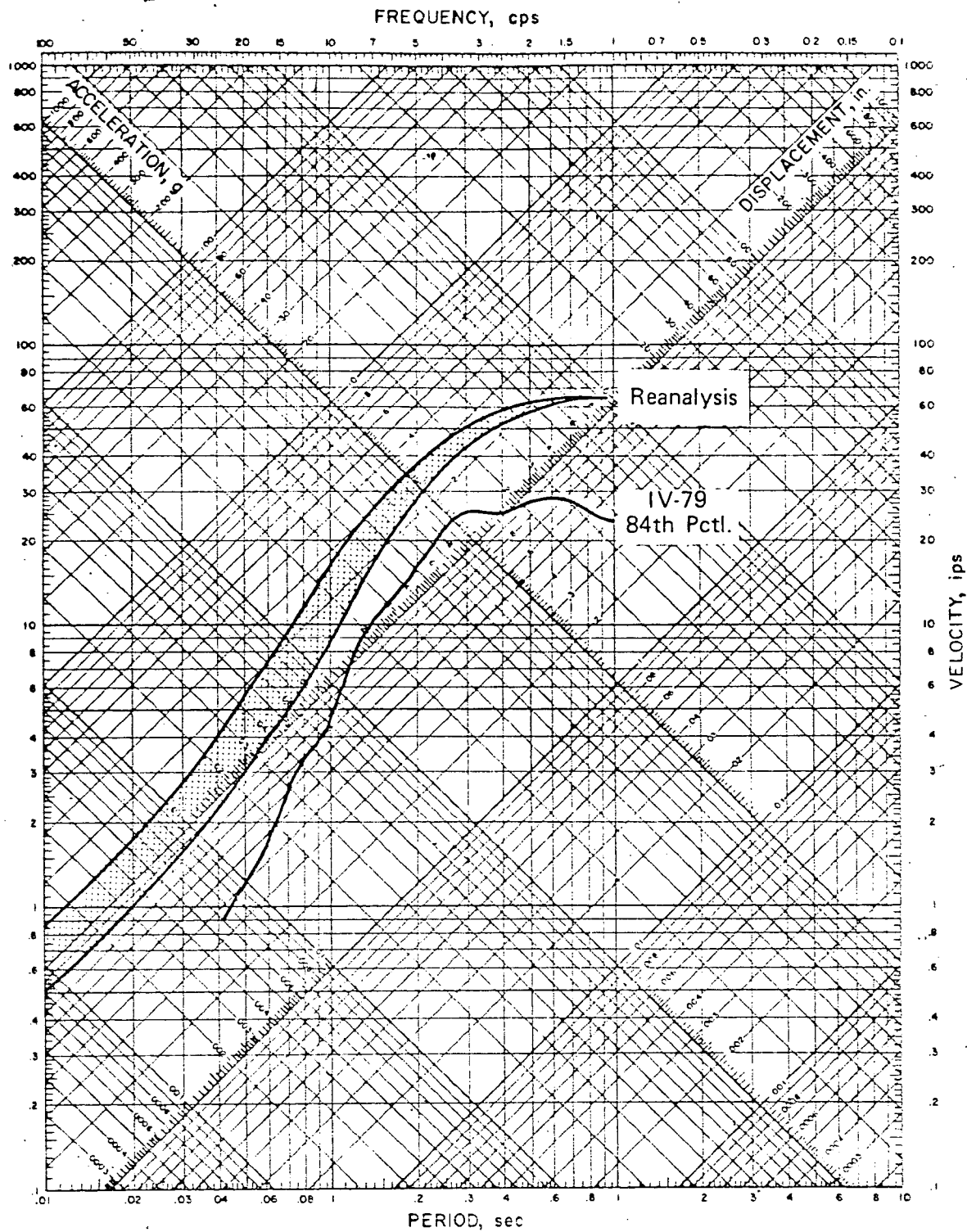
- * Epicentral distance, used incorrectly but conservatively, for purposes of study.
 # Reported dip-slip, conservatively assumed to be normal for purposes of study.
 ## Or strike-slip.



EXCEPTIONAL RECORDS: One or more components exceeded Tera 84th percentile prediction. Curve is average of 23 exceptional recordings from five earthquakes.

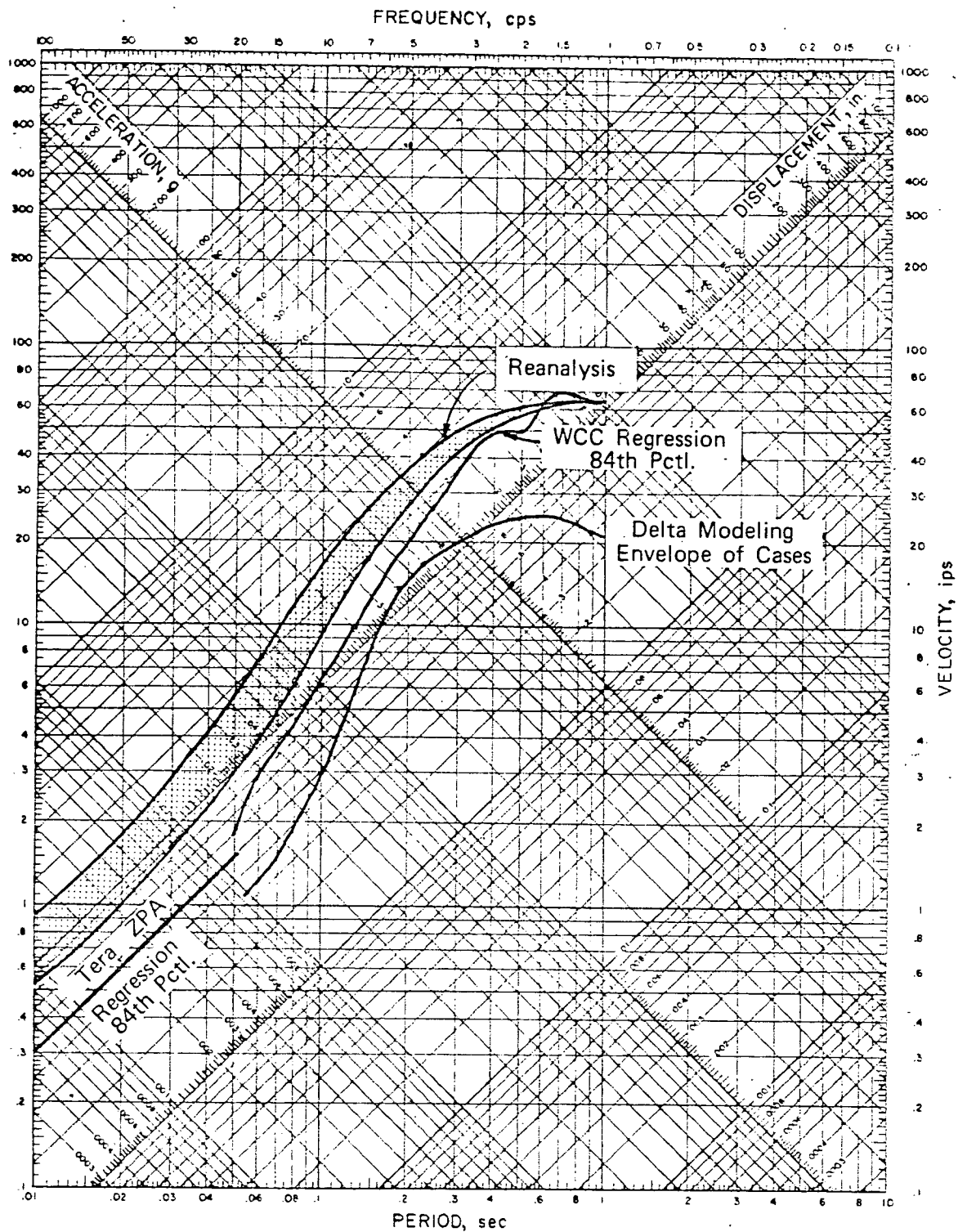
INSTRUMENTAL REANALYSIS SPECTRUM COMPARED TO
EXCEPTIONALLY STRONG RECORDED INSTRUMENTAL MOTIONS,
DAMPING = 2%

FIGURE



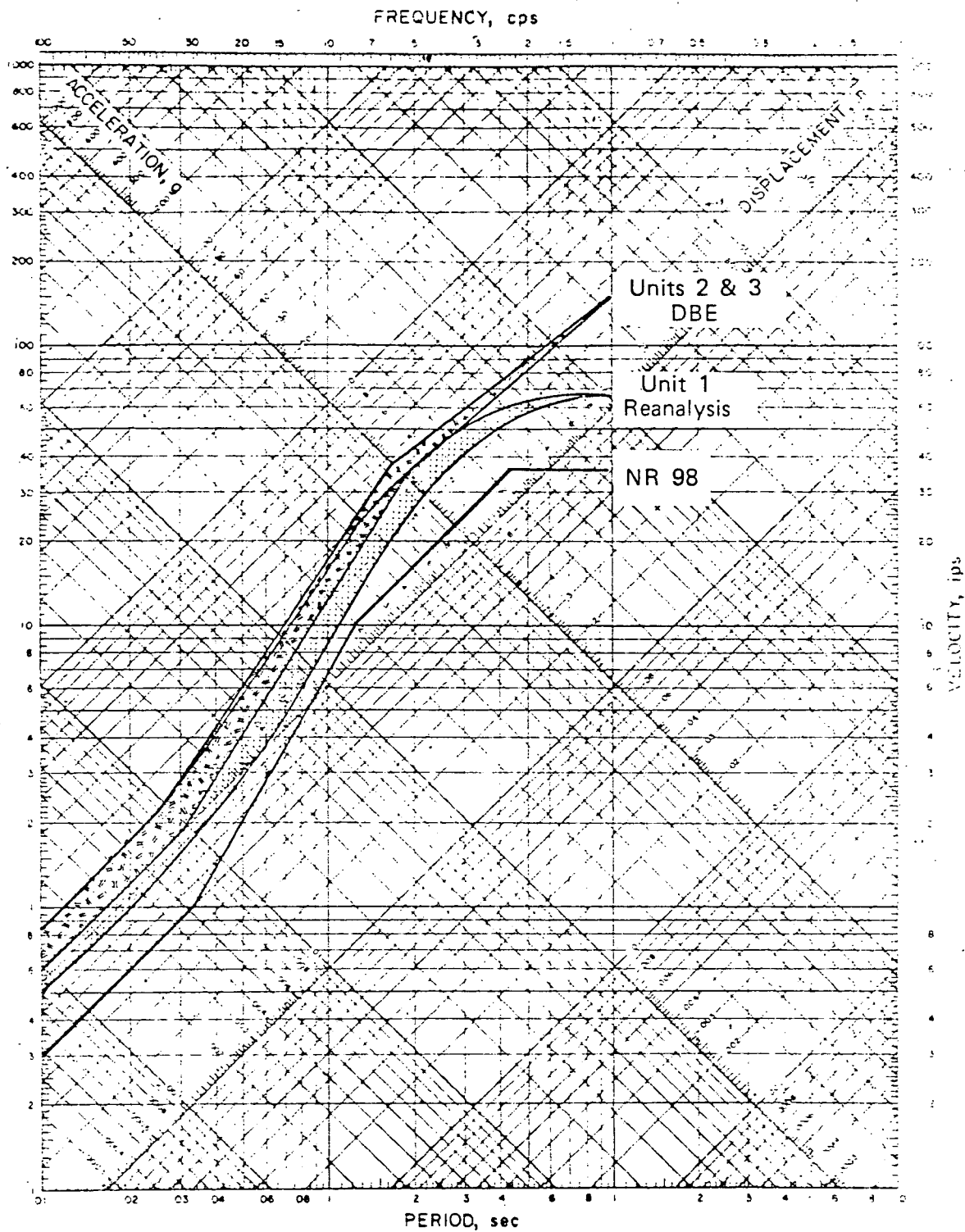
INSTRUMENTAL REANALYSIS SPECTRUM COMPARED TO
INSTRUMENTAL IV-79 SPECTRA, 6-13 km, DAMPING = 2%

FIGURE



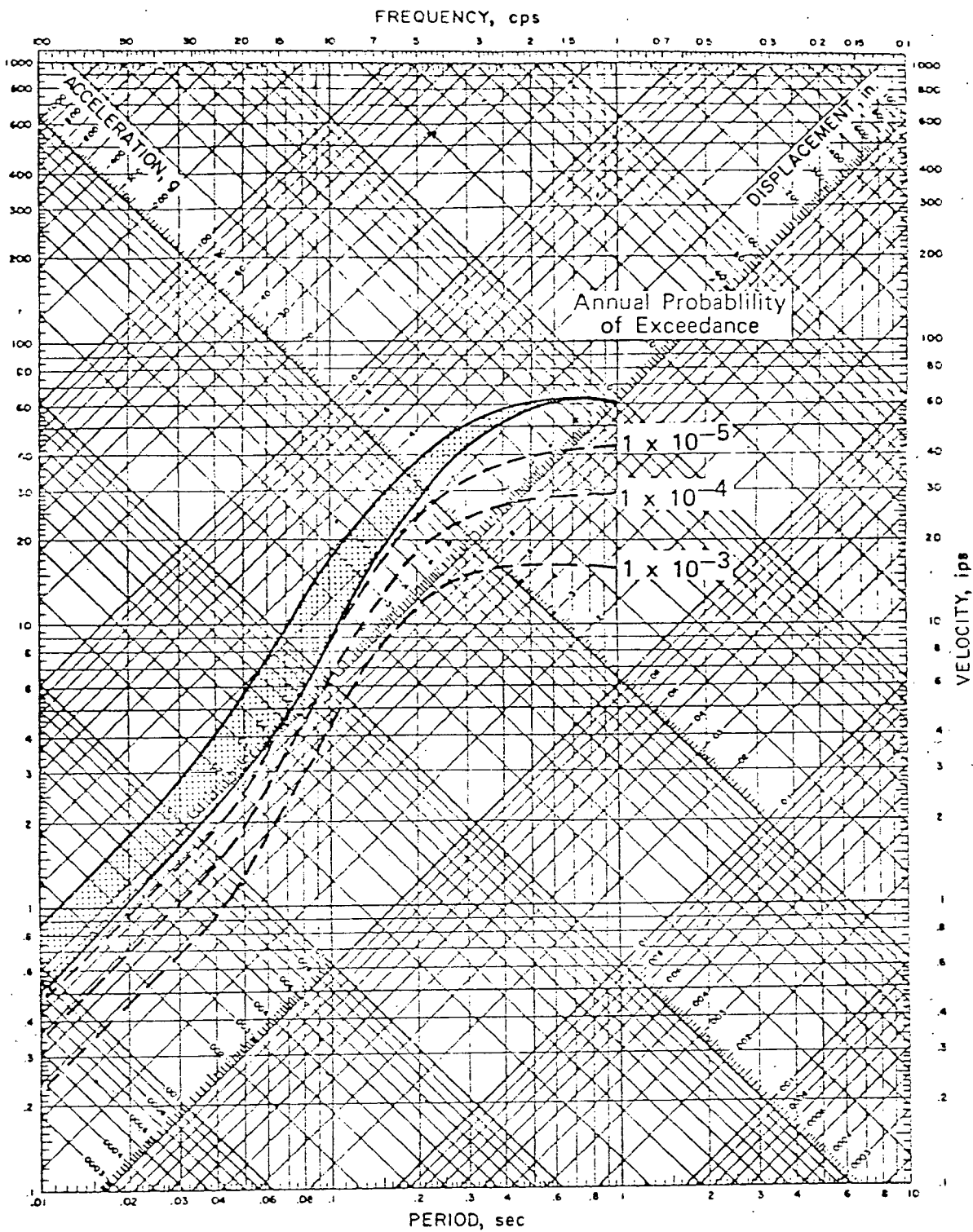
INSTRUMENTAL REANALYSIS SPECTRUM COMPARED TO
 INSTRUMENTAL CALCULATED SPECTRA DAMPING = 2%

FIGURE



INSTRUMENTAL REANALYSIS SPECTRUM COMPARED TO INSTRUMENTAL REGULATORY SPECTRA, DAMPING = 2%

FIGURE



INSTRUMENTAL REANALYSIS SPECTRUM COMPARED TO
INSTRUMENTAL EQUAL PROBABILITY SPECTRA, DAMPING = 2%

FIGURE

EASTERN U.S. SEP COMPARISON

The three seismic analysis approaches implemented for Eastern U.S. SEP sites form an important basis for comparison:

- o Probabilistic Seismic Hazard Analysis
- o Historical Seismic Hazard Analysis
- o Realistic Time History

CONFIDENCE COMPARISON

SONGS I VERSUS SEP

o Ground Motion Model

Great confidence due to availability of

- 1) extensive and relevant ground motion data
- 2) thoroughly reviewed and accepted analysis techniques.

o Source Models

Greater confidence due to more accurate and better understood seismotectonics.

o Seismicity Models

OZD occurrence model conservative compared to historical record.

o Hazard Model

- 1) Data uncertainty models (σ , b-value, and M_U) used both at SONGS and in the SEP.
- 2) Zonation uncertainty conservatively bounded compared to range of alternative opinions.

o Use of Results

Results based on conservatively and confidently selected parameters as opposed to consensus.

SONGS SRA 10-100 less likely than SEP exceedences.

SONGS result does not account for SSI effects.

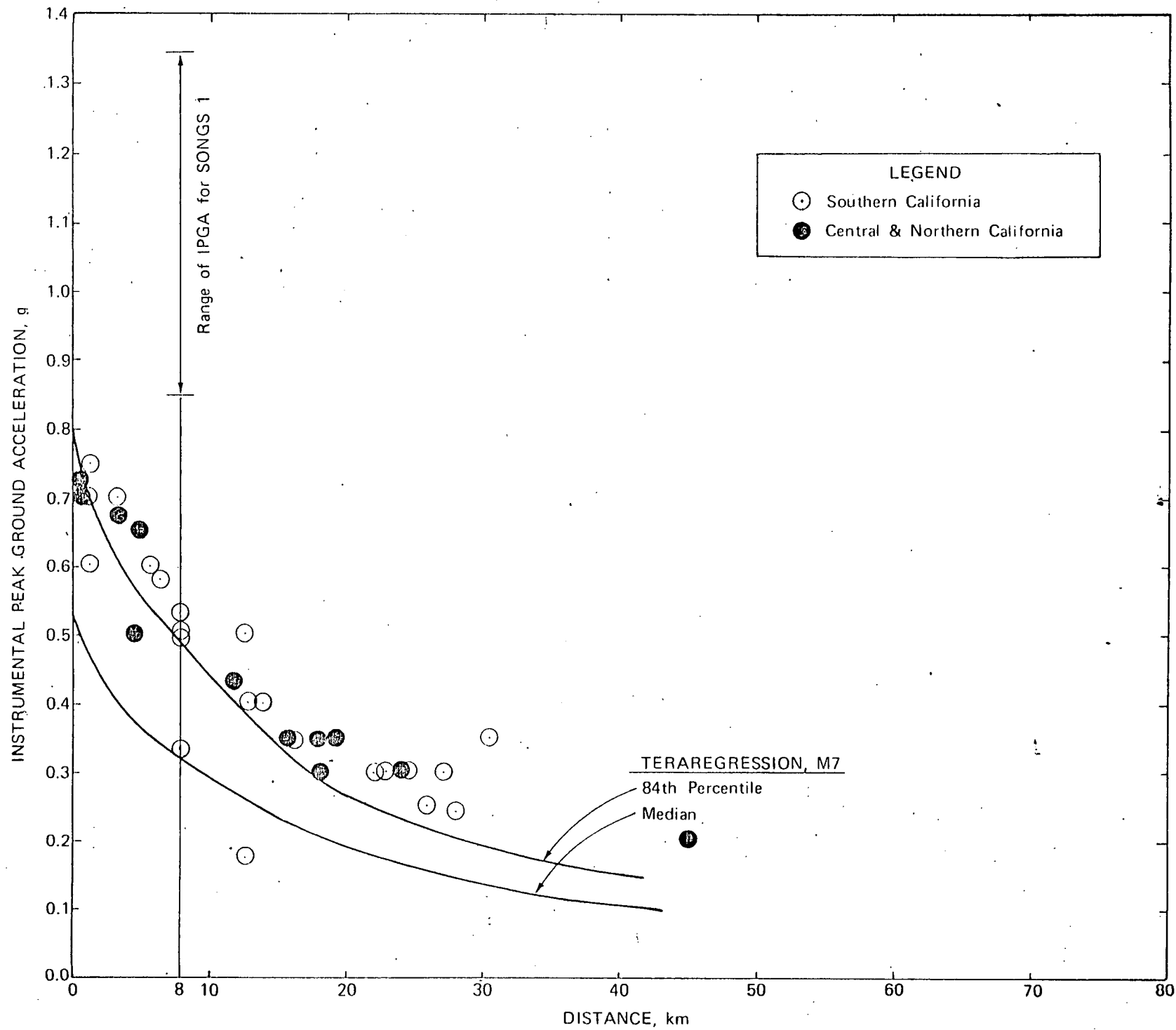


COMPARISON OF RESULTS OF SONGS "APPENDIX A" APPROACH
WITH TYPICAL SEP RECOMMENDATIONS

SSE Design Parameters	SONGS	Typical SEP Recommendations	Comments
Earthquake Magnitude	7.0 M_S	5.3 M_L	SEP value represents the center of the range M_L 4.8-5.8 used to select real time histories; 7.0 M_S for SONGS is consistent with an M_L of 6.7
Source-to-Site Distance (km)	8	12	SEP value represents average distance of 33 selected real time histories.
Percentile (%)	98	50-84	SONGS 0.67 g seismic reanalysis acceleration provides a greater level of protection than that the acceptable limits recommended for SEP plants

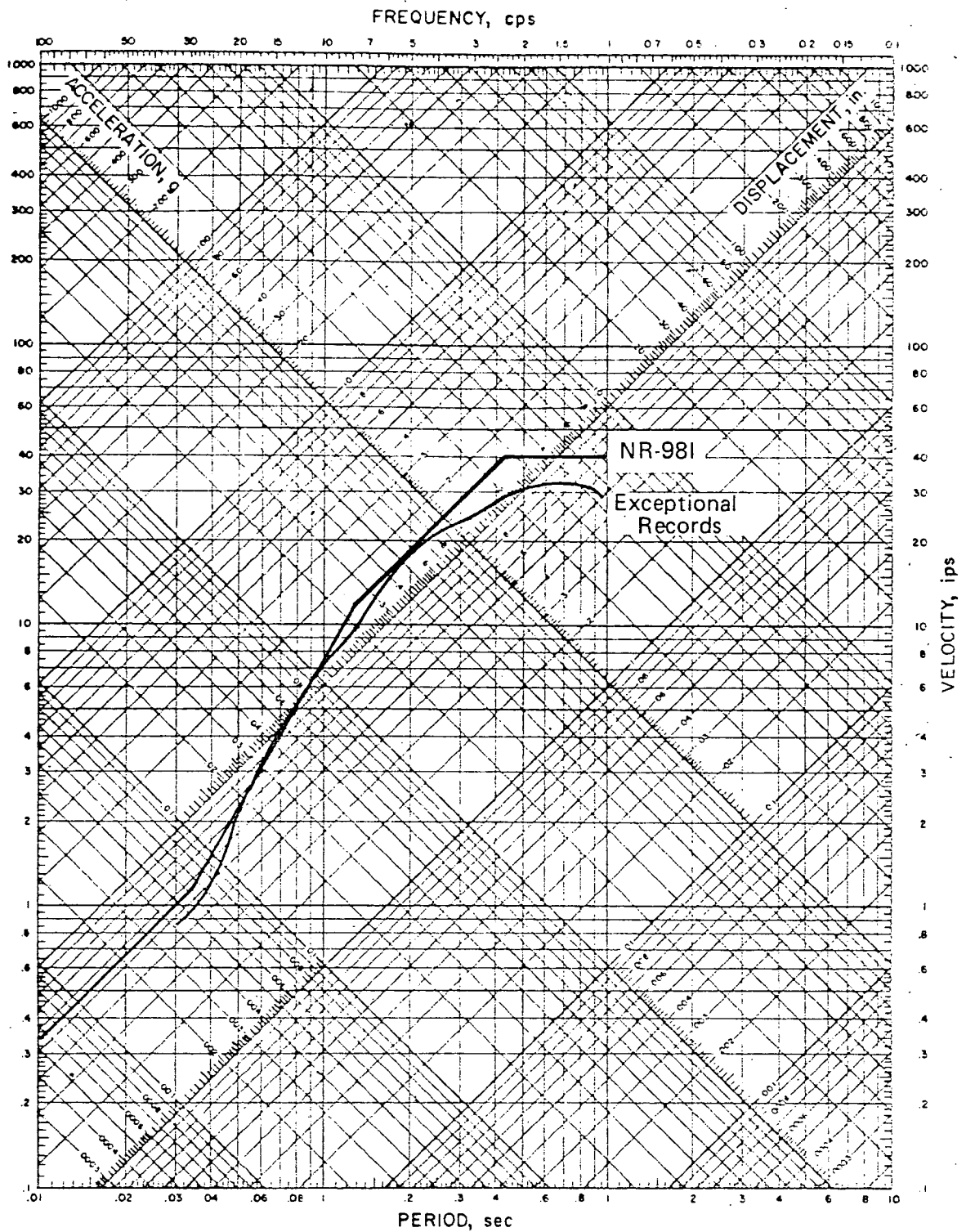
COMPARISON OF RESULTS OF SONGS SEISMIC
HAZARD ANALYSIS WITH TYPICAL
SEP RECOMMENDATIONS

Type of Analysis	Return Period (Years)	
	SONGS (0.67 g)	Typical SEP Recommendation
Conventional Hazard Analysis	10,000 - 100,000	1,000 - 10,000
Historical Hazard Analysis	$\gg 100,000$	$\approx 5,000$



INSTRUMENTAL PEAK GROUND ACCELERATION VS. DISTANCE
M7

FIGURE

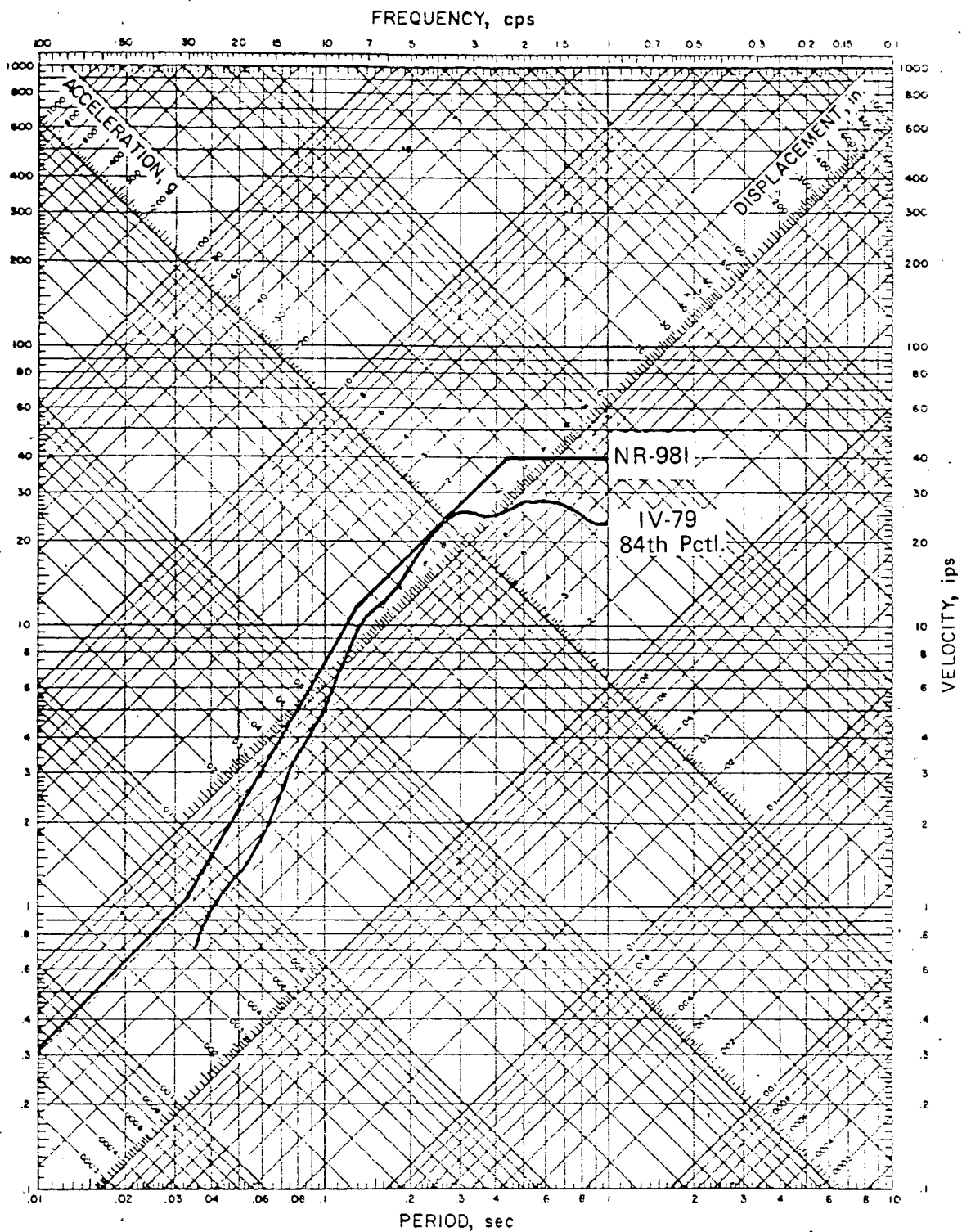


NOTES

1. See Fig. 3, for description of exceptional records.
2. NR-981 anchored to 0.55g.

NR-98 INSTRUMENTAL SPECTRUM ENVELOPES
EXCEPTIONALLY STRONG RECORDS, DAMPING = 2%

FIGURE

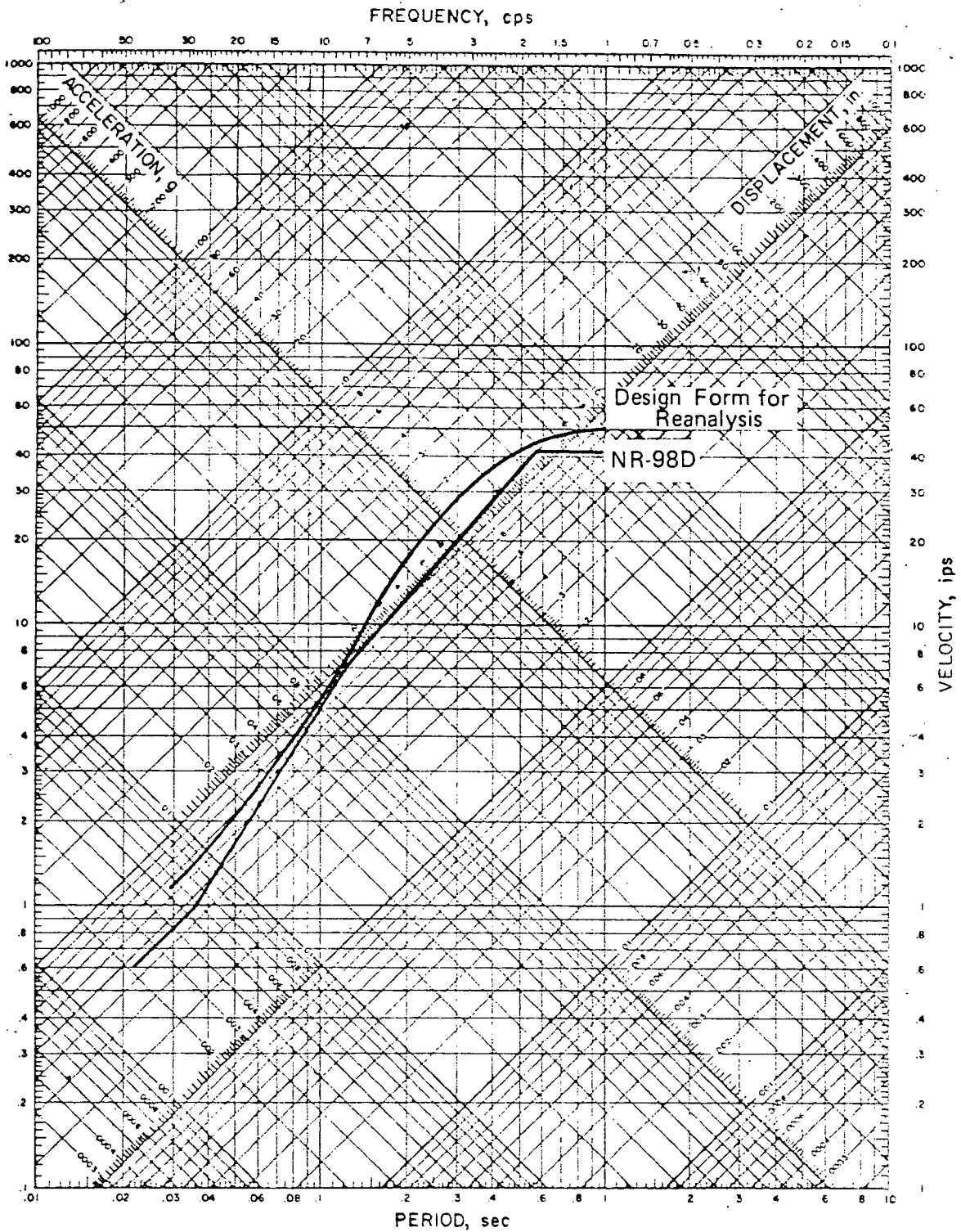


NOTES

1. See Fig. 5 for description of IV-79.
2. NR-981 anchors anchored to 0.55g.

NR-981 INSTRUMENTAL SPECTRUM LIES ABOVE IV-79,
84TH PERCENTILE, INSTRUMENTAL SPECTRUM, DAMPING = 2%

FIGURE



NOTES

- NR-98D: Soil factor = 1.0, Ductility = 1.3, Soil Structure Interaction Factor = 0.8.

DESIGN REANALYSIS SPECTRUM COMPARED TO NR-98 DESIGN SPECTRUM SPECTRUM, DAMPING = 2%

FIGURE