



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

Docket No. 50-412

APPLICANT: Duquesne Light Company (DLC)

FACILITY: Beaver Vallley Power Station, Unit 2

SUBJECT: Meeting Summary - Soil Structure Interaction (SSI) Analysis

On June 19 and 20, 1985, the NRC staff and its consultants met with the applicants and its representatives at the Sone & Webster Office in Boston to discuss the confirmatory issue on the soil-structure interaction and audit the SSI related calculations. The meeting notice and the attendance roster are enclosed (Enclosures 1 and 2 respectively).

The applicant made a brief presentation on the site specific spectrum study (Enclosure 3) and the finite element SSI analysis using the PLAXLY and FLUSH codes. A somewhat more detailed presentation on the 3-step SSI analysis was also made. Based on the presentations, the staff and its consultants selected several specific calculations for audit review. During the review, the applicant and its representatives were available for discussions and clarifications as necessary.

During this meeting, the following specific information was requested from the applicant:

- (a) A plot showing comparison of various response spectra. These response spectras were: (1) mean and mean plus one standard deviation (MJD) site specific spectra at foundation level; (2) Translational spectra after kinematic instruction (from KINACT output); (3) response spectra from FLUSH at free-filed in foundation level; and (4) Beaver Valley 2 broad based design spectra.

All of the above spectra correspond to 5% damping. Correspondingly digitized data were also to be provided.

- (b) A response spectra plot (with associated digitized data for the basemat level of containment containing the following spectra 5% damping): (1) Beaver Valley 2 design envelope; (2) translational spectrum from 3-step analysis; and (3) site-specific MSD spectra.

The applicant agreed to provide NRC staff the schedule for the above submittals at a later date.

The overall impressions formed and expressed at the meeting by the staff was that pending the satisfactory completion of the review of the site-specific spectra and barring any unforeseen information, the SSI analysis for

8508010255 850708
PDR ADOCK 05000412
A PDR

Beaver Valley 2 appears to be adequate and consistent with the intent of the NRC staff acceptance criteria. The staff will report its final conclusions regarding this issue in the forthcoming SER.

/S/

B. K. Singh, Project MaNAGER
Licensing Branch No. 3
Division of Licensing

Enclosures:
As stated

cc: See next page

DISTRIBUTION

Docket File

NRC PDR

Local PDR

PRC System

NSIC

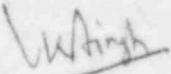
LB#3 Reading

Attorney, OELD

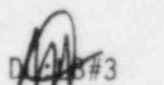
GKnighton

BKSingh

JLee

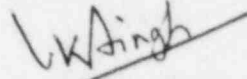


DL:LB#3
BKSingh/es
7/ 8/85


DL:LB#3
GKnighon
7/ 8/85

- 2 -

Beaver Valley 2 appears to be adequate and consistent with the intent of the NRC staff acceptance criteria. The staff will report its final conclusions regarding this issue in the forthcoming SER.



B. K. Singh, Project Manager
Licensing Branch No. 3
Division of Licensing

Enclosures:
As stated

cc: See next page

Duquesne Light Company

Beaver Valley 2 Power Station

cc:

Gerald Charnoff, Esq.
Jay E. Silberg, Esq.
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, DC 20036

Mr. R. E. Martin, Manager Engineering
Beaver Valley Two Project
Duquesne Light Company
Robinson Plaza Building No. 2, Suite 110
PA Route 60
Pittsburgh, Pennsylvania 15205

Mr. C. W. Ewing, Quality Assurance
Manager
Quality Assurance Department
Duquesne Light Company
P. O. Box 186
Shippingport, Pennsylvania 15077

Zori Ferkin
Assistant Counsel
Governor Energy Council
1625 N. Front Street
Harrisburg, PA 15105

Mr. John J. Carey
Vice President, Nuclear
Duquesne Light Company
P. O. Box 4
Shippingport, Pennsylvania 15077

Director, Pennsylvania Emergency
Management Agency
Room B-151
Transportation & Safety Building
Harrisburg, Pennsylvania 17120

Mr. T. J. Lex
Westinghouse Electric Corporation
Power Systems
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Mr. Thomas Gerusky
Bureau of Radiation Protection
PA Department of Environmental
Resources
P. O. Box 2063
Harrisburg, Pennsylvania 17120

Mr. P. RaySircar
Stone & Webster Engineering Corporation
P. O. Box 2325
Boston, Massachusetts 02107

BVPS-2 Records Management Supervisor
Duquesne Light Company
Post Office Box 4
Shippingport, Pennsylvania 15077

Mr. Glenn Walton
U. S. NRC
P. O. 181
Shippingport, Pennsylvania 15077

John A. Lee, Esq.
Duquesne Light Company
1 Oxford Centre
301 Grant Street
Pittsburgh, Pennsylvania 15279

Mr. Thomas E. Murley, Regional Admin.
U. S. NRC, Region I
631 Park Avenue
King of Prussia, Pennsylvania 15229

Duquesne Light Company

- 2 -

Beaver Valley 2 Power Station

cc:

Mr. E. F. Kurtz, Jr., Manager
Regulatory Affairs
Beaver Valley Two Project
Duquesne Light Company
Robinson Plaza Building No. 2
Suite #210
PA Route 60
Pittsburgh, Pennsylvania 15205



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

Enclosure 1

Docket No.: 50-412

MEMORANDUM FOR: George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

FROM: B. K. Singh, Project Manager
Licensing Branch No. 3
Division of Licensing

SUBJECT: FORTHCOMING MEETING BETWEEN THE NRC AND DUQUESNE LIGHT
COMPANY

DATE & TIME: June 19, 1985
1:00 p.m. - 4:30 p.m.
June 20, 1985
9:00 a.m. - 4:00 p.m.

LOCATION: Stone & Webster Engineering Corporation
245 Summer Street
Boston, Massachusetts

PURPOSE: To discuss soil structure interaction issue

PARTICIPANTS: NRC

J. Knight, G. Lear, B. K. Singh, et al.

Duquesne Light Company

E. Kurtz, E. Eilmann, J. O'Neil, et al.

Stone & Webster

J. Sutton, et al.

B. K. Singh, Project Manager
Licensing Branch No. 3
Division of Licensing

cc: See next page

~~8506270330~~
1 p.

BEAVER VALLEY POWER STATION - UNIT NO. 2
DUQUESNE LIGHT COMPANY
SOIL STRUCTURE INTERACTION ANALYSIS AUDIT AGENDA

<u>Date</u>	<u>Item</u>
June 19, 1985 from 9:30 am	<ol style="list-style-type: none">1. Objective & Purposes of Audit (NRC)2. Brief Overview of Site Specific Spectra Study and Results (Applicant)3. Chronology of SSI Analysis for BV2 & Brief Description of Various Analysis (Applicant)4. Detailed Description of 3-step Analysis (Applicant): Assumptions, Methodology, Results, etc: Detailed audit of calculations and computer input/output of the following items:<ol style="list-style-type: none">1. Input Motion & Input Parameters (soil properties, site characteristics, structural properties, etc:)2. Brief Review of Plaxly/Flush input & results
June 20, 1985	<p>Continuation of Audit</p> <ol style="list-style-type: none">1. Kinematic Interaction (KINACT)2. Impedance Function (REFUND + EMBED)3. Overall SSI Analysis (FRIDAY)4. Site Specific Spectra5. Staff Caucus6. Exit, Conclusions

Attendance List
SSI Meeting

6/19/85

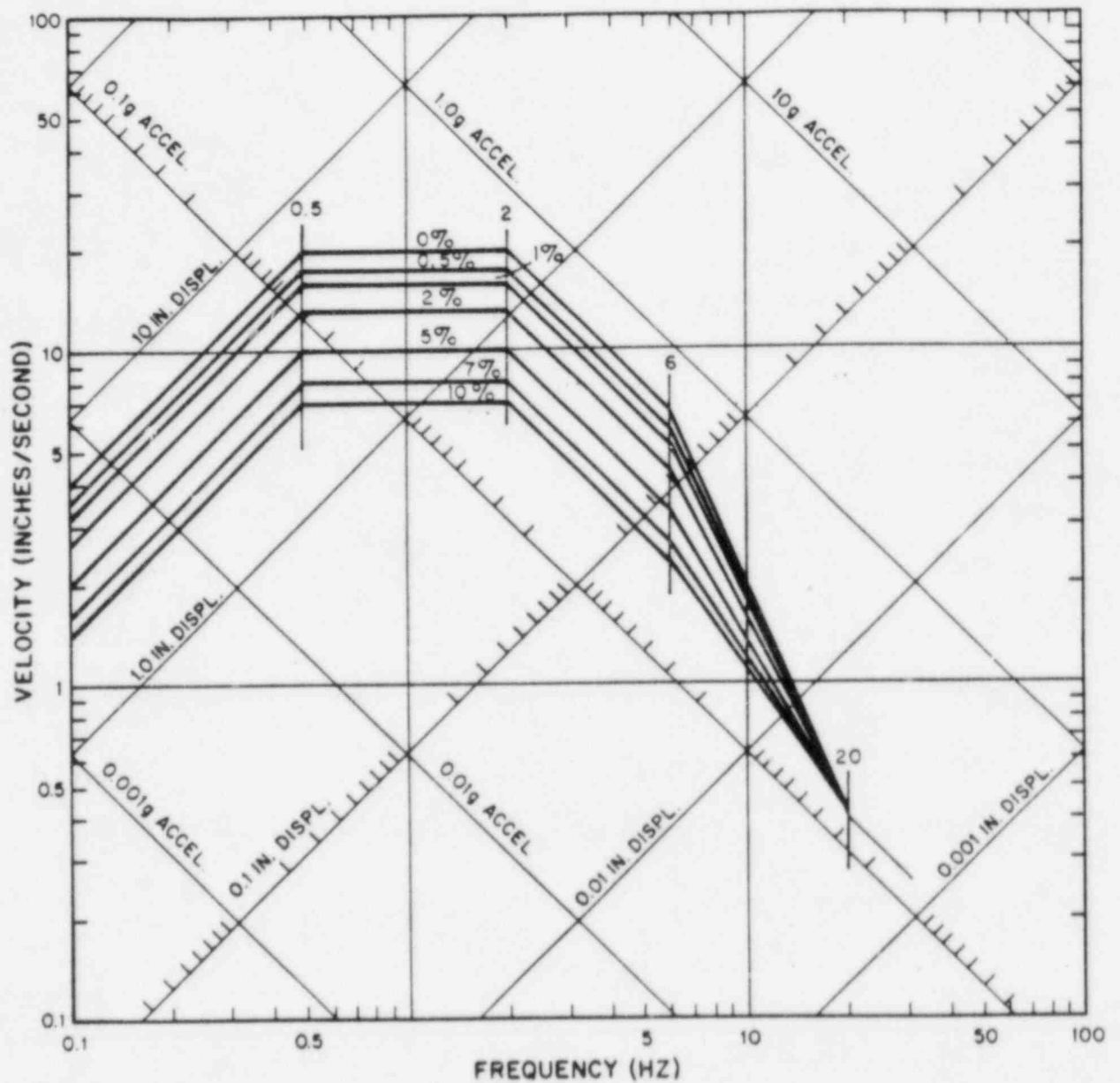
Enclosure 2

NAME	ORGANIZATION	TITLE
Donald Hunt	SWEC	LEAD GEOTECHNICAL ENG'R.
P. A. CADENA	DLC	SR. PROJ. ENG'R.
Nuri T. GEORGES	SWEC	Assist Chief Eng - GEOTECH
Gene R. Tilton	SWEC	Principal Structural Engineer
Jack O'Neil	DLC	Project Engineer
A. J. PHILIPPAPOULOS	BNL	F. SCIENTIST
C. J. Costantino	BNL/CCNY	Consultant
C. A. MILLER	BNL/CCNY	Consultant
M B Statson	SWEC	Assistant Chief Structural Engineer
A. Y. C. WONG	SWEC	LEAD STRUCTURAL ENG.
NILESH CHOKSHI	NRC/SGEB	STRUCTURAL ENGINEER
HERMAN GRAVES	NRC/RES	STRUCTURAL ENG.
J P KNIGHT	NRC/DE	Act Dir. Div Eng.
EDWARD KAUSCH	MIT	ASSOC. PROF OF CIV. ENG.
George Lear	NRC-DE	Chf, SGEB, DE, NRC
JOHN T. CHRISTIAN	SWEC	SENIOR CONSULTING ENGINEER
MORRIS REICH	BNL	STRUCTURAL ANALYSIS DIV.
J. D. Sutton	SWEC	ASST. PROJECT ENGINEER
E. KURTZ	DLC	MR. REG AFFAIRS
Leon Reiter	NRC	Leader, Seismology Section
Lyman Heller	NRC	Ldr. Geotech Engrg Sec.
T R Sengupta	DLC/BNL	Reg Affairs
B. K. Singh	NRC/DL	Project manager

SITE DEPENDENT RESPONSE SPECTRA

**BEAVER VALLEY POWER STATION -
UNIT 2**

Enclosure 3



NOTE
SAFE SHUTDOWN EARTHQUAKE: $a_R = 0.125g$.

FIGURE 2-1
HORIZONTAL RESPONSE SPECTRA
BEAVER VALLEY POWER STATION-UNIT 2
STONE & WEBSTER ENGINEERING CORPORATION

DESIGN EARTHQUAKE

$$I_o = VI (MM)$$

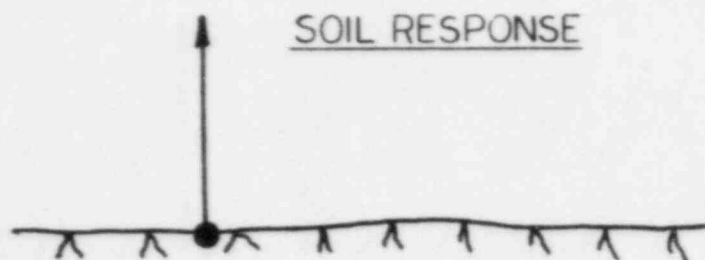
$$m_b = 4.75 \pm 0.5$$

$$M_L = 4.95 \pm 0.5$$

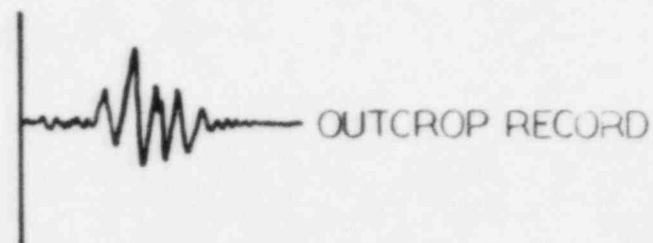
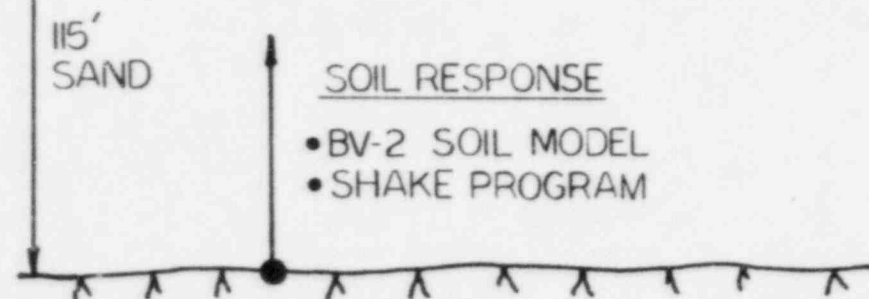
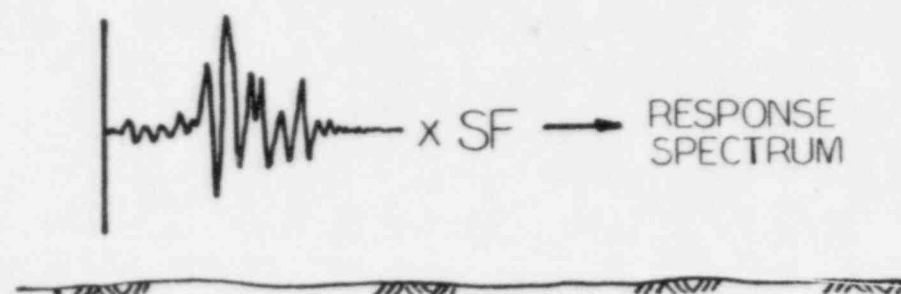
SITE DEPENDENT RESPONSE SPECTRA

- **SITE MATCHED ANALYSIS**
- **SOIL RESPONSE ANALYSIS**

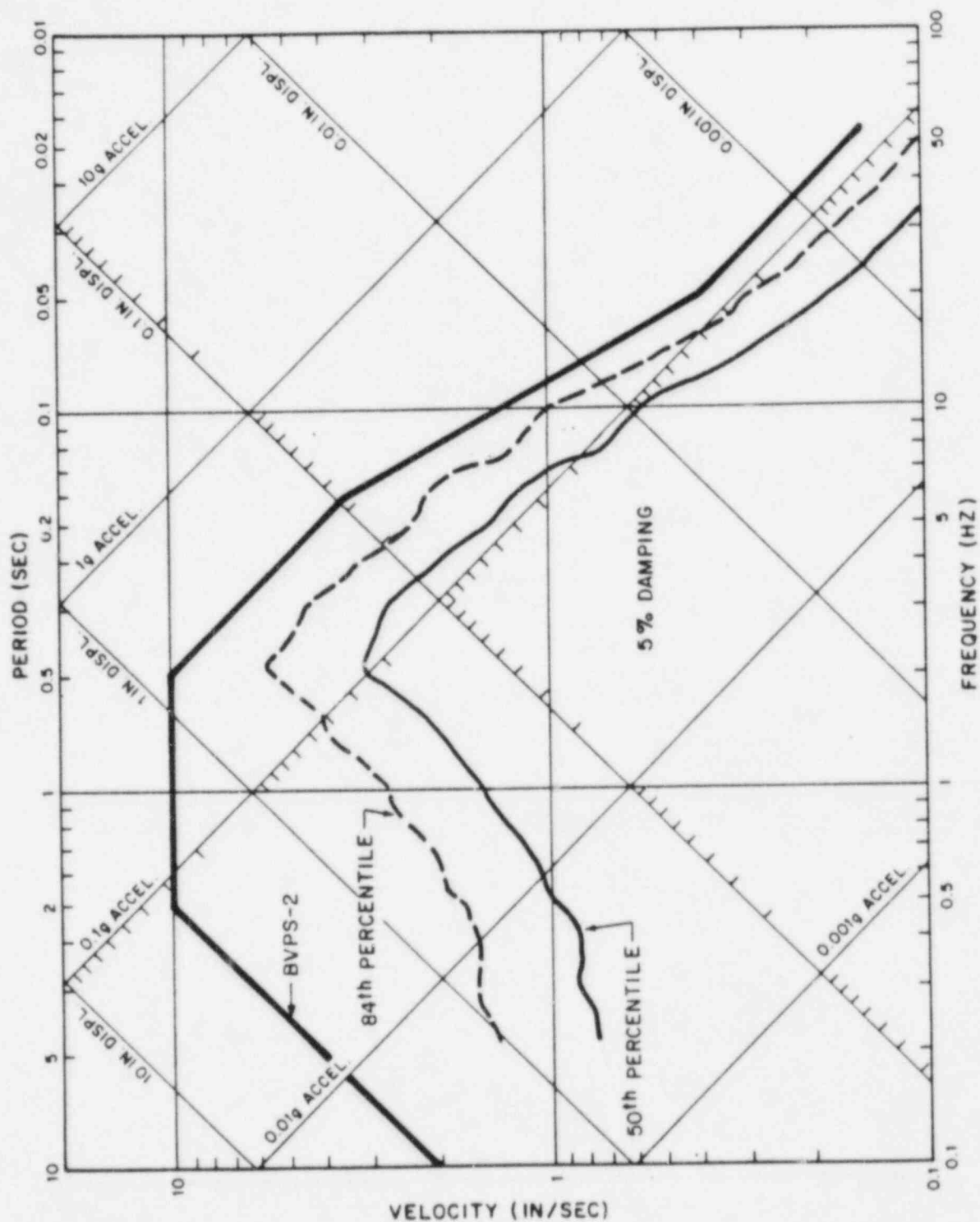
SITE MATCHED ANALYSIS



SOIL RESPONSE ANALYSIS

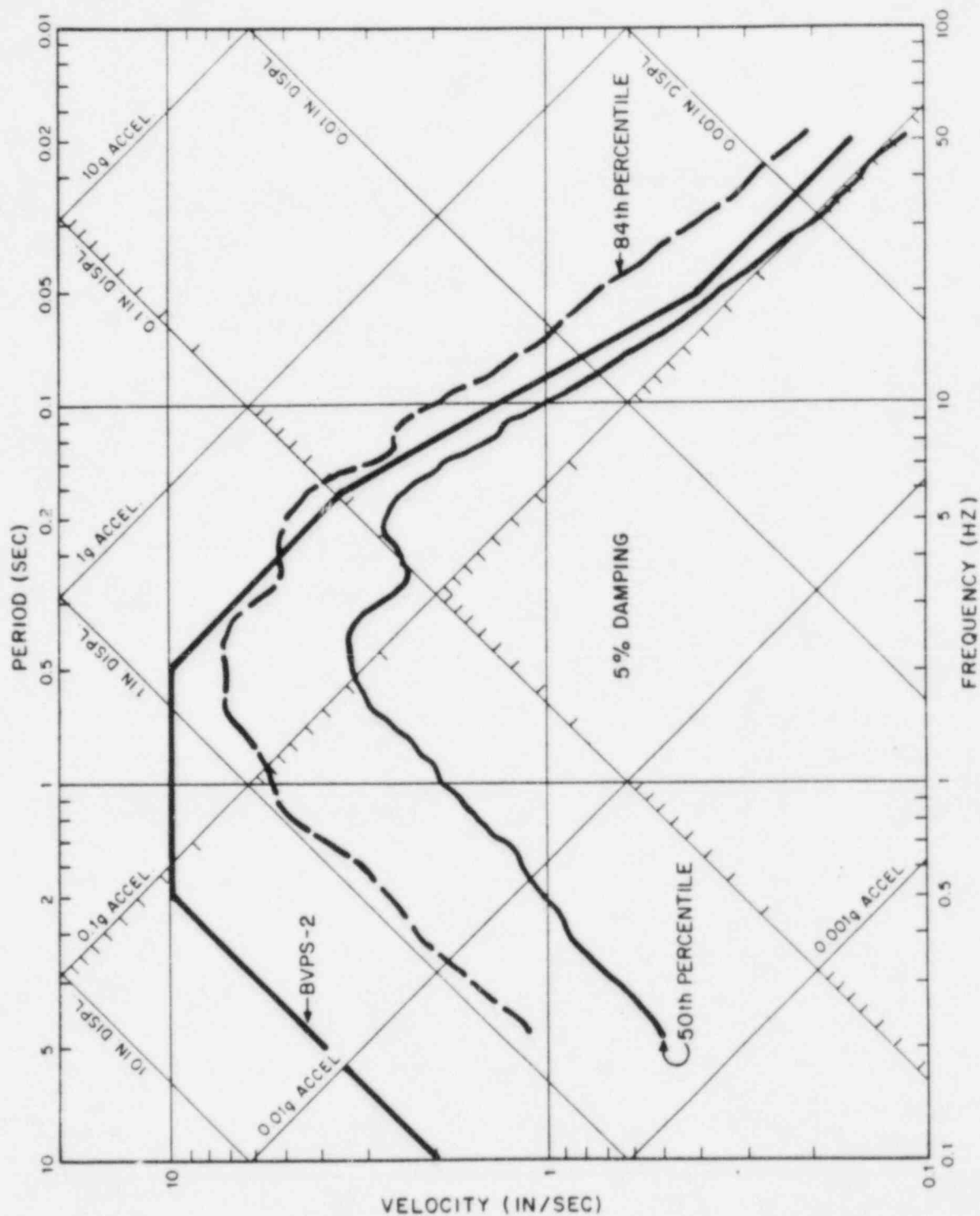


(SF = SCALING FACTOR)



NOTE
RESPONSE SPECTRA
FROM EVENTS SCALED ACCORDING TO
REVISED SCALING LAW - EQ 2-6

FIGURE 3-5
SITE MATCHED RESPONSE
SPECTRA ADJUSTED FOR SHEAR
WAVE VELOCITY CONTRAST
BEAVER VALLEY POWER STATION - UNIT 2
STONE & WEBSTER ENGINEERING CORPORATION



NOTE:

RESPONSE SPECTRA COMPUTED
FROM RECORDS LISTED IN TABLE 4-4

FIGURE 4-3
HORIZONTAL RESPONSE SPECTRA
FROM SOIL RESPONSE
ANALYSIS: SCALED
BEAVER VALLEY POWER STATION-UNIT 2
STONE & WEBSTER ENGINEERING CORPORATION

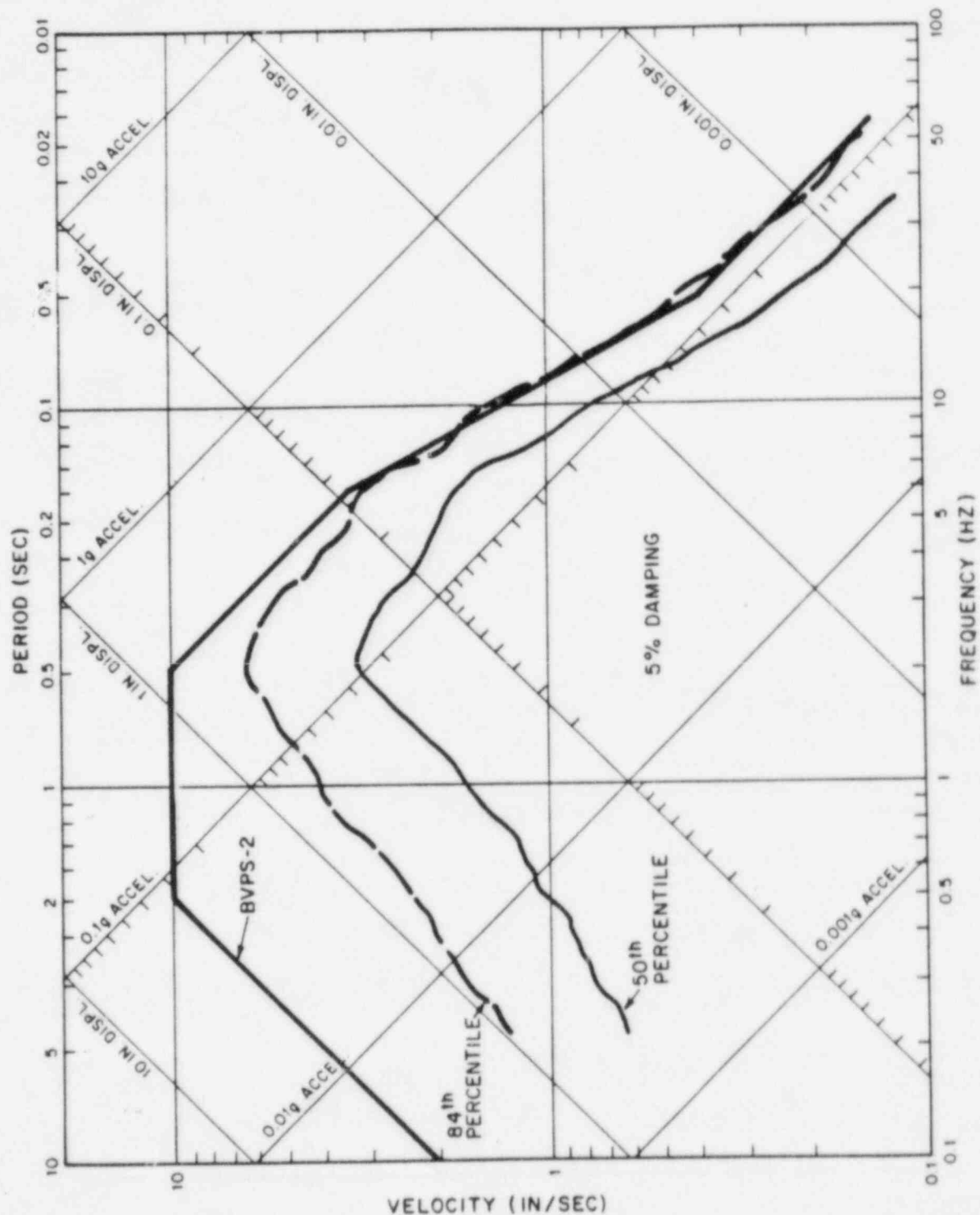
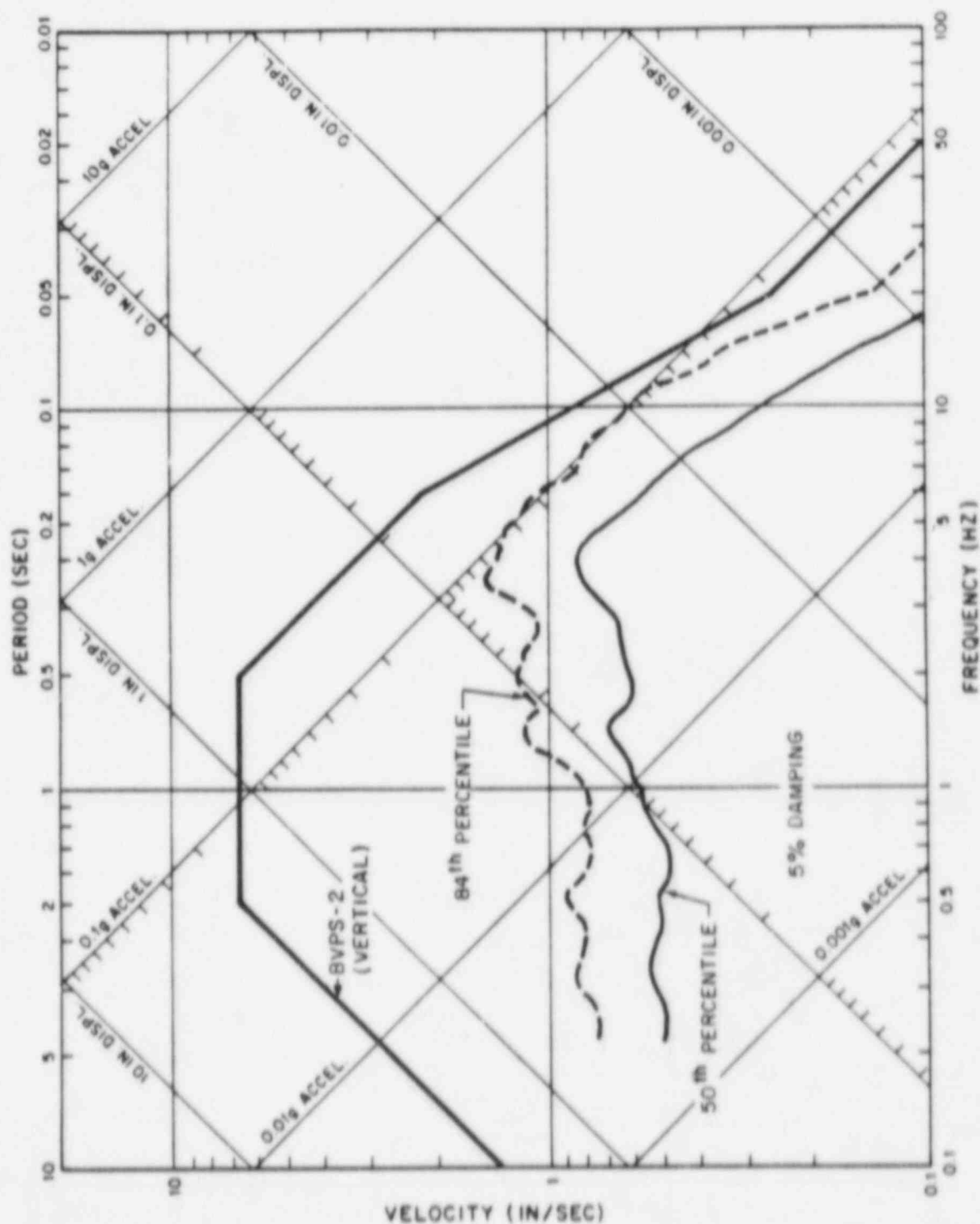


FIGURE 1-1
 SITE DEPENDENT
 RESPONSE SPECTRA
 BEAVER VALLEY POWER STATION-UNIT 2
 STONE & WEBSTER ENGINEERING CORPORATION

VERTICAL RESPONSE SPECTRA



NOTES

1. FROM VERTICAL COMPONENTS OF RECORDS LISTED IN TABLE 3-1
2. SCALED USING EQUATION 2-6a

FIGURE 3-6
SITE MATCHED VERTICAL
RESPONSE SPECTRA
BEAVER VALLEY POWER STATION-UNIT 2
STONE & WEBSTER ENGINEERING CORPORATION

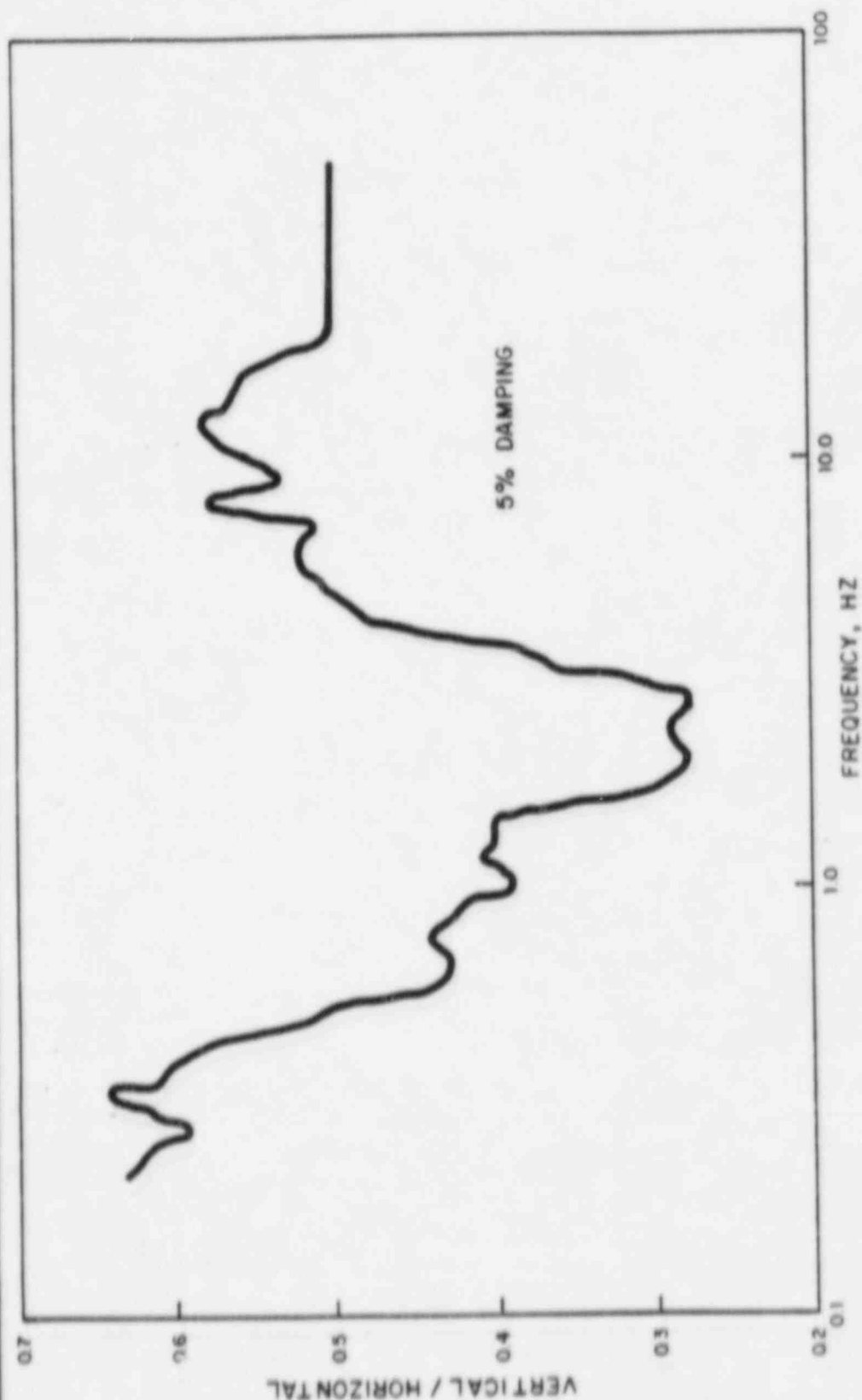


FIGURE 1-2
RATIO OF VERTICAL TO
HORIZONTAL SITE MATCHED
RESPONSE SPECTRA
BEAVER VALLEY POWER STATION-UNIT 2
STONE & WEBSTER ENGINEERING CORPORATION