

Docket No. 50-416

May 21, 1985

LICENSEE: Mississippi Power and Light Company
FACILITY: Grand Gulf Unit 1
SUBJECT: SUMMARY OF APRIL 29, 1985 MEETING REGARDING SOIL
STRUCTURE INTERACTION FOR STANDBY SERVICE WATER BASIN

The purpose of the meeting was to hear and discuss licensee's presentation of its seismic analysis, particularly soil structure interaction, of the standby service water basin (SSWB). Enclosure 1 is a list of attendees. Enclosure 2 is a copy of slides prepared by licensee and used in the meeting.

Licensee presented a description of the seismic analysis of the SSWB. The presentation included clarification of Licensee's January 28, 1985 response to staff questions on the method used to analyze soil structure interactions. Major conclusions are provided on page 16 of Enclosure 2.

Staff indicated that the methods used appear to be acceptable. Staff's evaluation is expected to be completed in May 1985.

/S/
L. L. Kintner, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures 1 and 2

DISTRIBUTION

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ENCLOSURE 1

ATTENDEES

APRIL 29, 1985 MEETING

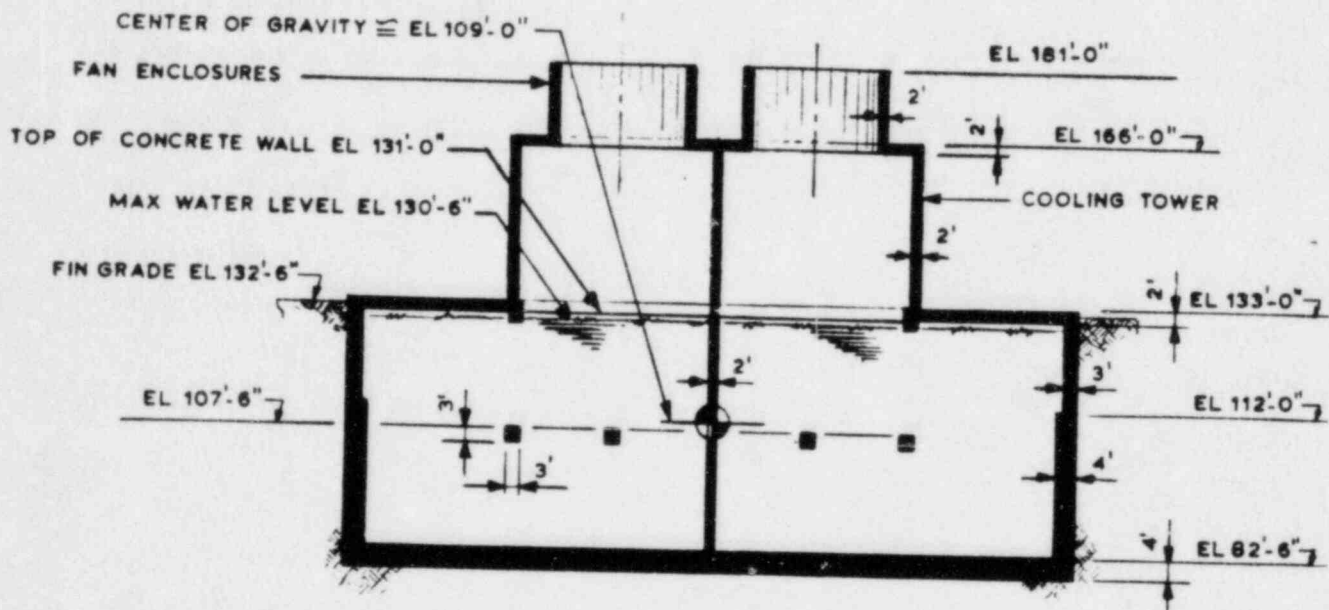
MISSISSIPPI POWER AND LIGHT AND NRC SOIL STRUCTURE INTERACTION

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ENCLOSURE 2

AGENDA

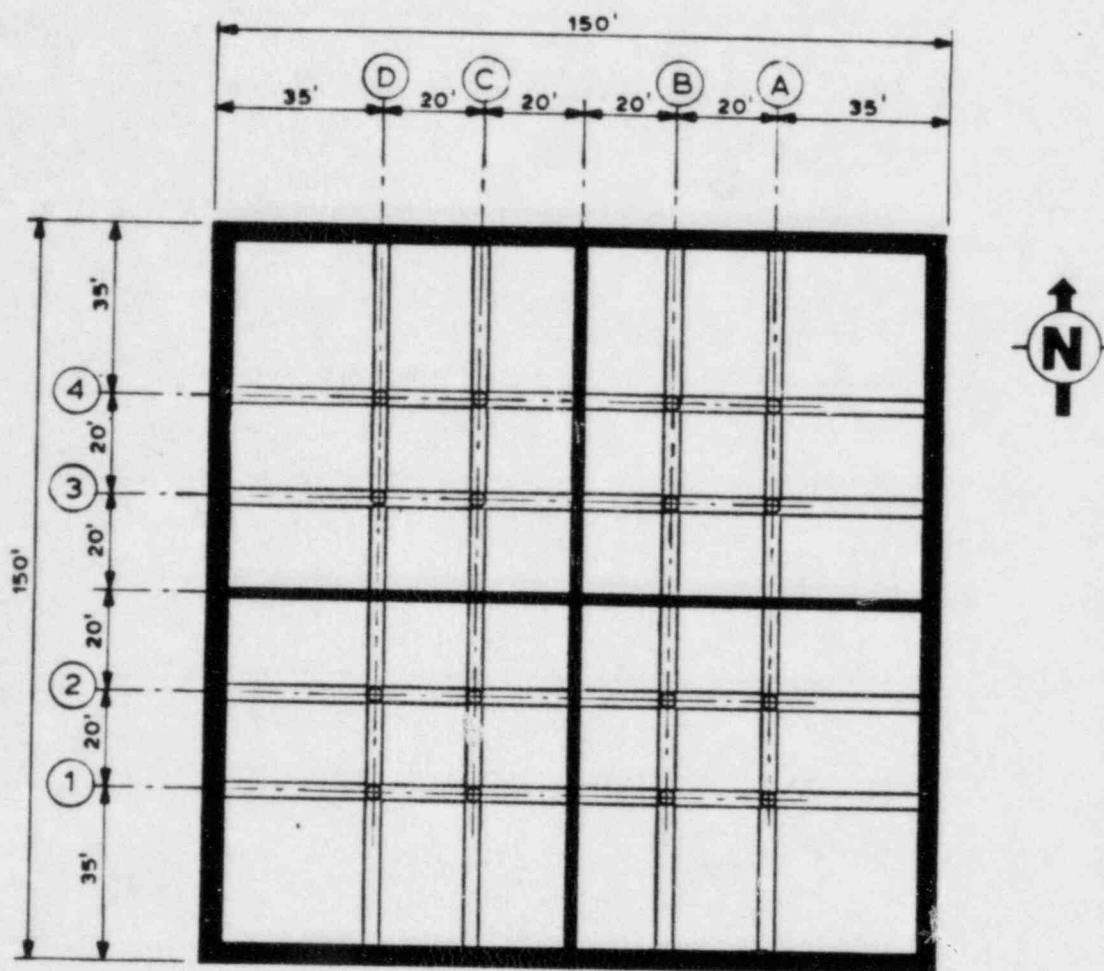
1. BACKGROUND OF SSW BASIN SEISMIC SSI ANALYSIS
2. INPUT MOTION FOR GGNS SEISMIC ANALYSIS
3. SHAKE/LUSH AND FLUSH ANALYSIS
4. EHS ANALYSIS
5. ENVELOPED RESPONSE
6. SPECIFIC RESPONSE TO NRC QUESTIONS
7. CONCLUSIONS



TYPICAL SECTION THRU BASIN

STAND-BY SERVICE WATER BASIN

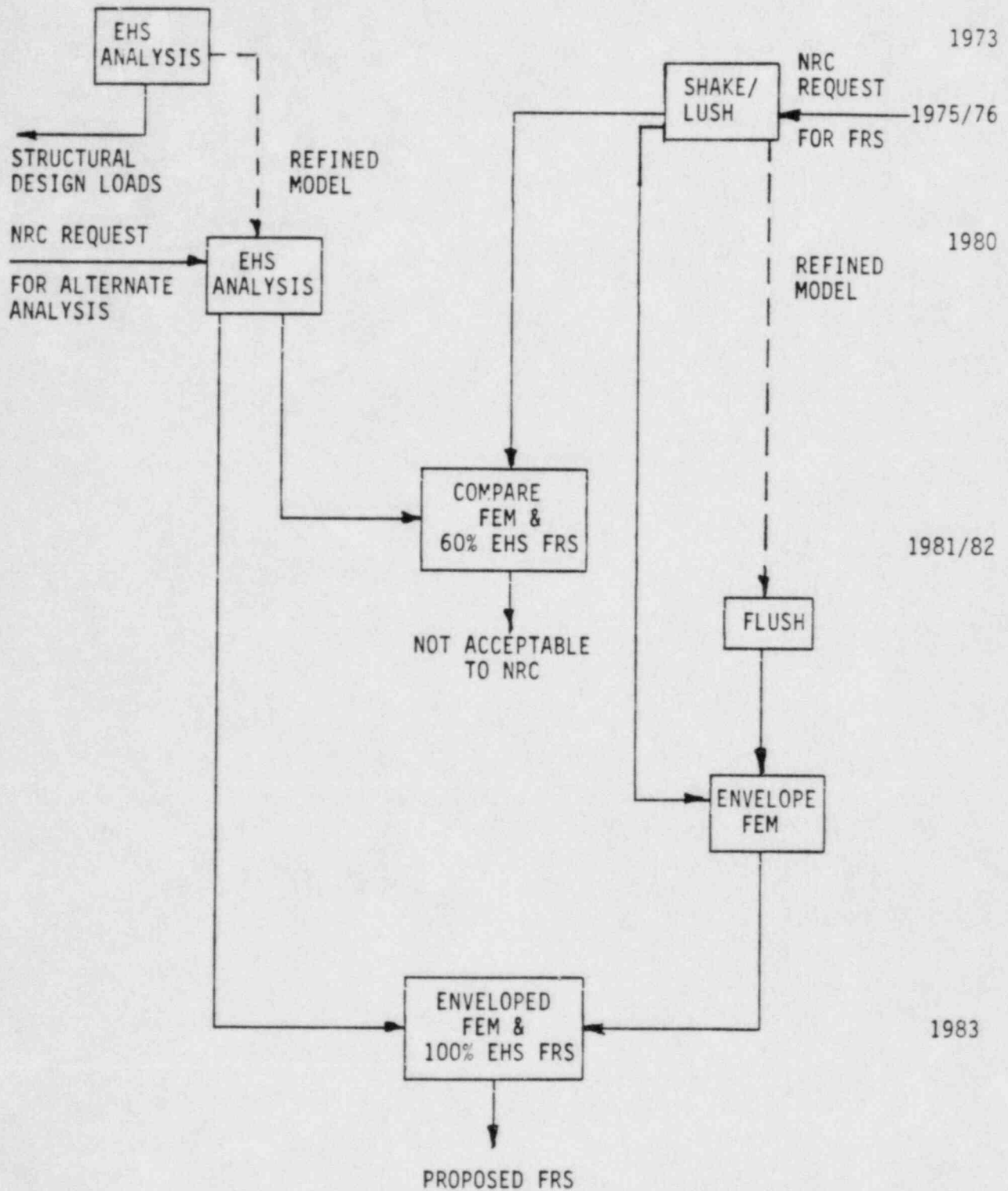
FIGURE 2

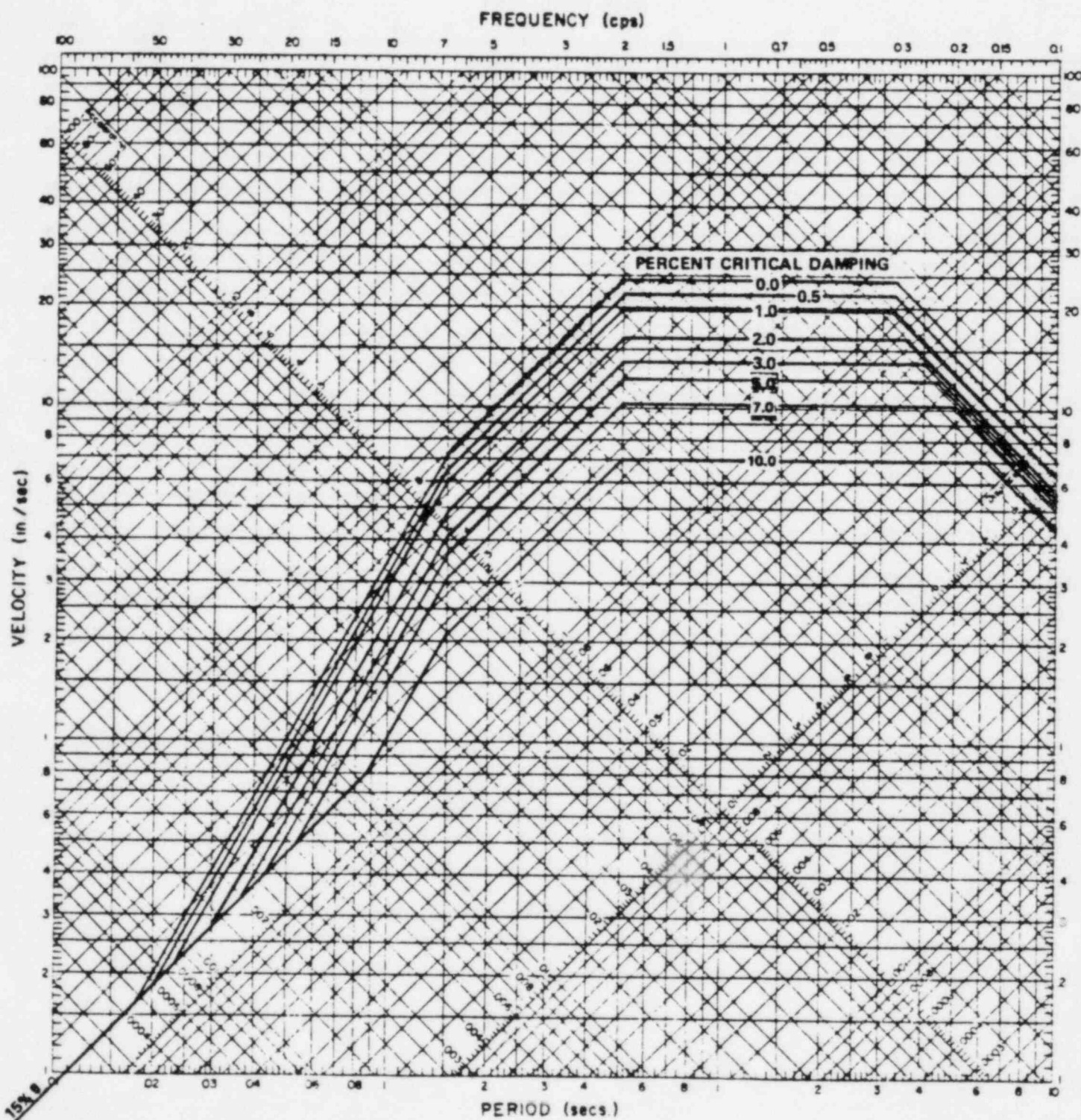


PLAN AT EL 107'-6"
STAND-BY SERVICE WATER BASIN

FIGURE 3

BACKGROUND OF SSW BASIN SEISMIC SSI ANALYSIS





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 UNITS 1 & 2
 FINAL SAFETY ANALYSIS REPORT

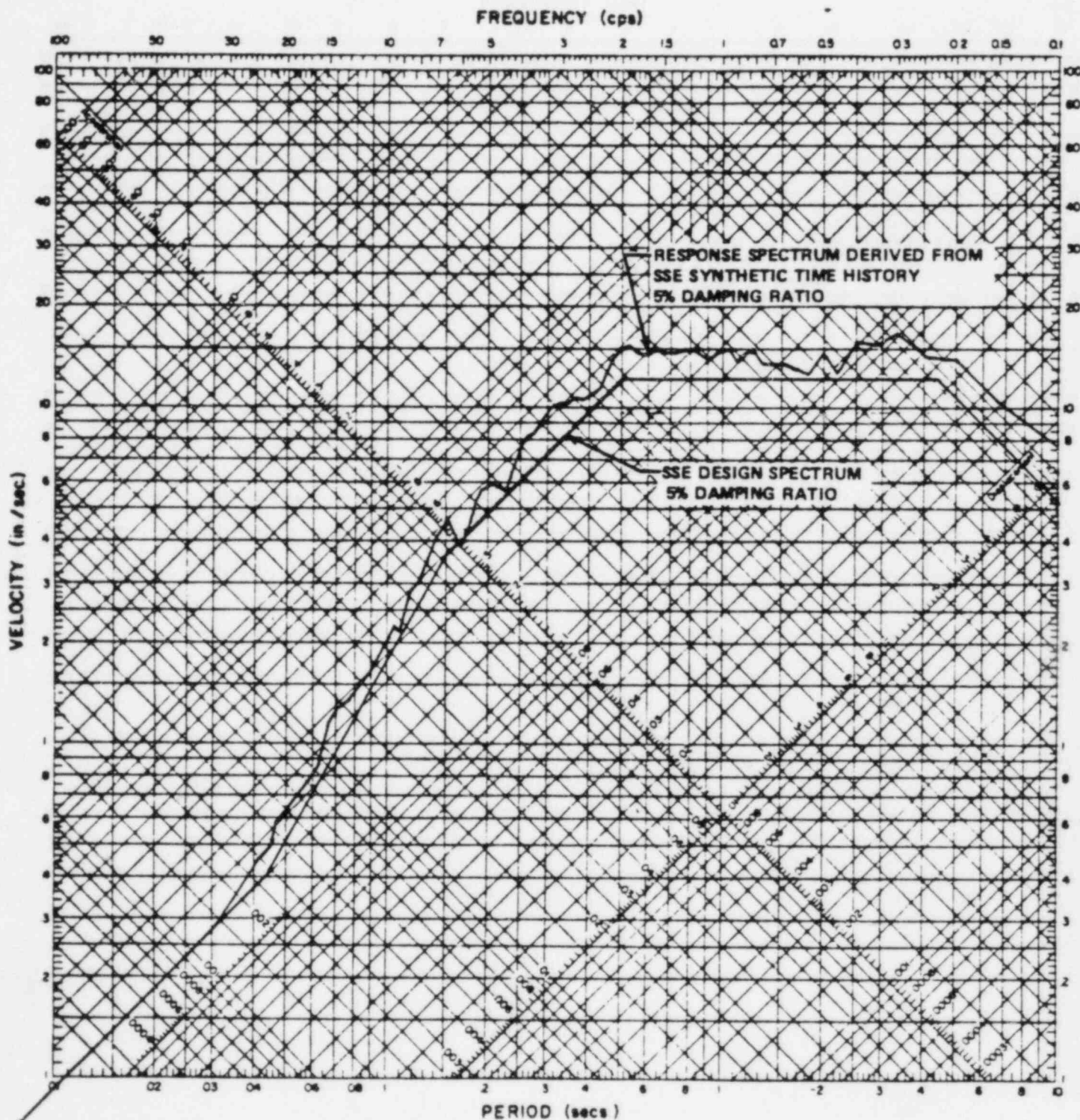
DESIGN SPECTRA FOR SSE

FIGURE 3.7-1

GGNS SER SECTION 2.6.2.4

SAFE SHUTDOWN EARTHQUAKE

IN DETERMINING THE SAFE SHUTDOWN EARTHQUAKE WE HAVE FOLLOWED THE TECTONIC PROVINCE APPROACH DESCRIBED IN APPENDIX A OF 10 CFR PART 100. THE APPLICANTS' PROPOSED SAFE SHUTDOWN EARTHQUAKE ACCELERATION LEVEL OF 0.15g, USED TO ANCHOR A NEWMARK TYPE RESPONSE SPECTRA IS A CONSERVATIVE REPRESENTATIVE OF THE SAFE SHUTDOWN EARTHQUAKE (FOR FREQUENCIES GREATER THAN 1 Hz). COMPARING THE APPLICANTS' RESPONSE SPECTRA IS ALSO COMPARED TO R.G. 1.60 AND DISCUSSED IN SECTION 3.7.1 OF THIS REPORT). THE APPLICANTS' RESPONSE SPECTRA ROUGHLY CORRESPONDS TO A MM INTENSITY VII OCCURRING NEAR THE GRAND GULF SITE. USING THE INTENSITY ACCELERATION RELATIONSHIP OF TRIFUNAC AND BRADY (1975) THE RESPONSE SPECTRA IS ANCHORED AT 0.13g FOR MM INTENSITY VII. A REGULATORY GUIDE 1.60 RESPONSE SPECTRA ANCHORED AT 0.13g IS ENVELOPED BY THE APPLICANTS' PROPOSED RESPONSE SPECTRA AT FREQUENCIES ABOVE 1 Hz. THE DESIGN RESPONSE SPECTRA WOULD THUS ACCOMMODATE THE LARGEST HISTORICAL INTENSITY EARTHQUAKE (OCTOBER 19, 1930 MM INTENSITY VI) IF SUCH AN EVENT WERE TO OCCUR IN THE IMMEDIATE VICINITY OF THE SITE. THE GROUND MOTION FROM THE LARGEST HISTORICAL MAGNITUDE EARTHQUAKE (NOVEMBER 5, 1983, $M_B=4.8$) HAS BEEN ESTIMATED AS PART OF THE WATERFORD SAFETY EVALUATION REPORT (1981).



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FINAL SAFETY ANALYSIS REPORT

SSE DESIGN SPECTRUM AND RESPONSE
SPECTRUM DERIVED FROM SSE
SYNTHETIC TIME HISTORY BASED
ON 5% DAMPING RATIO
FIGURE 3.7-4

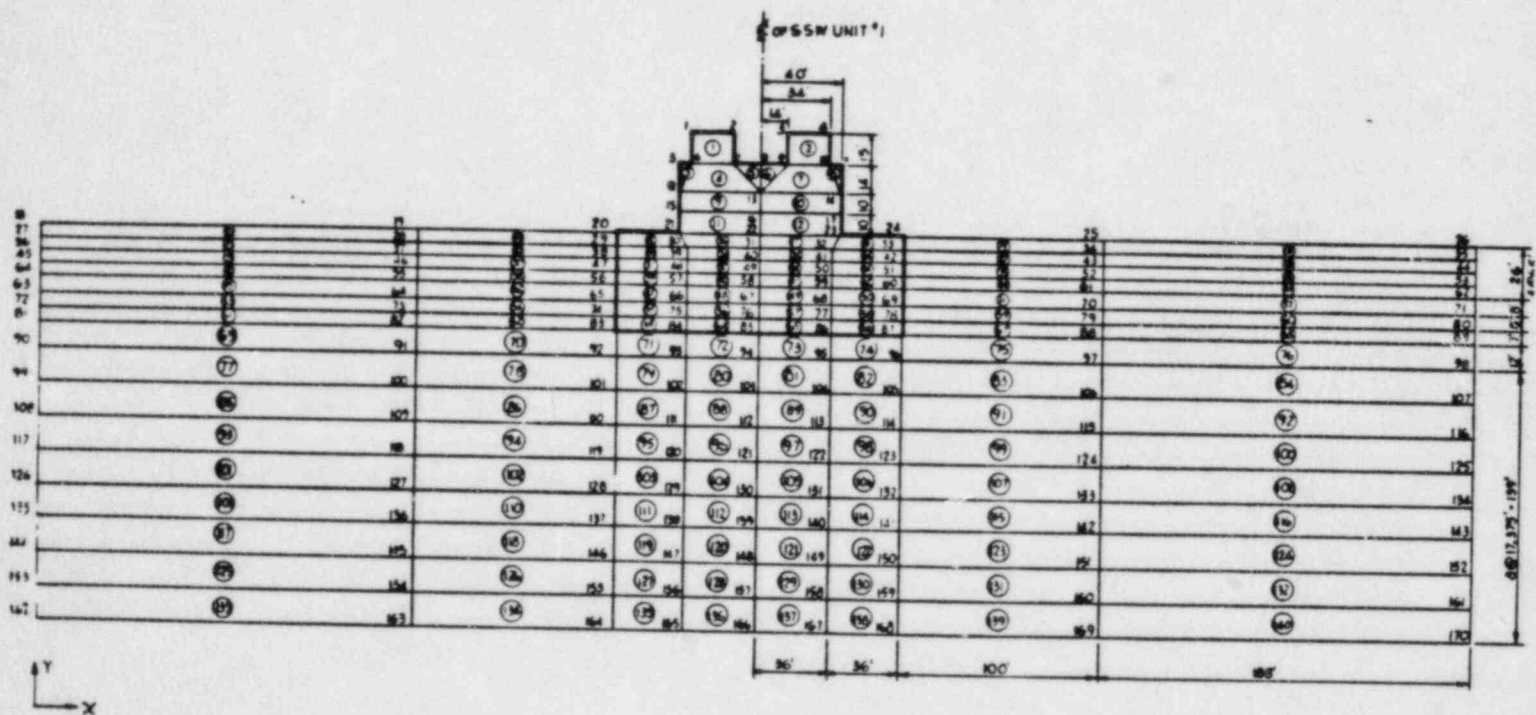


FIGURE 7

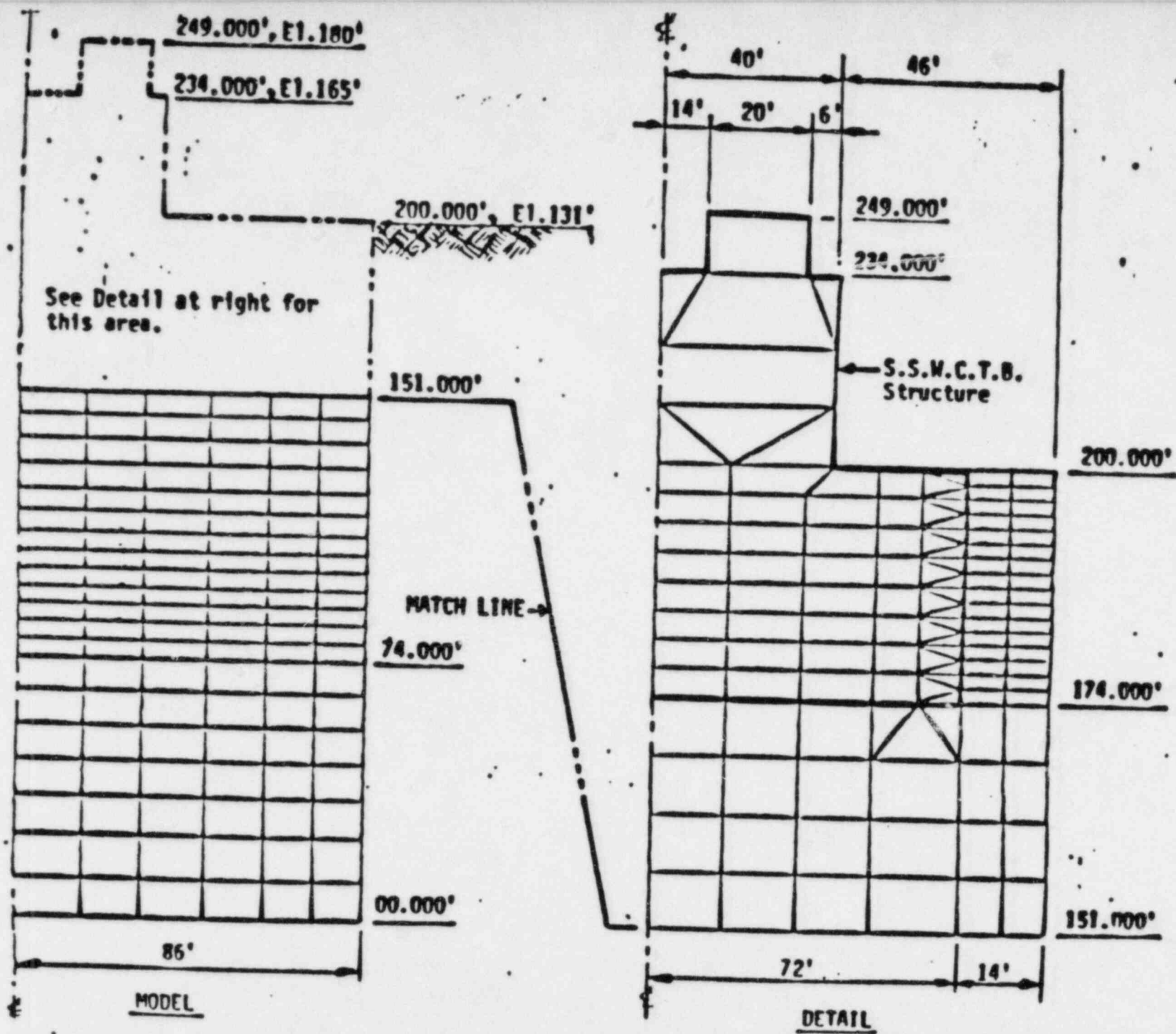
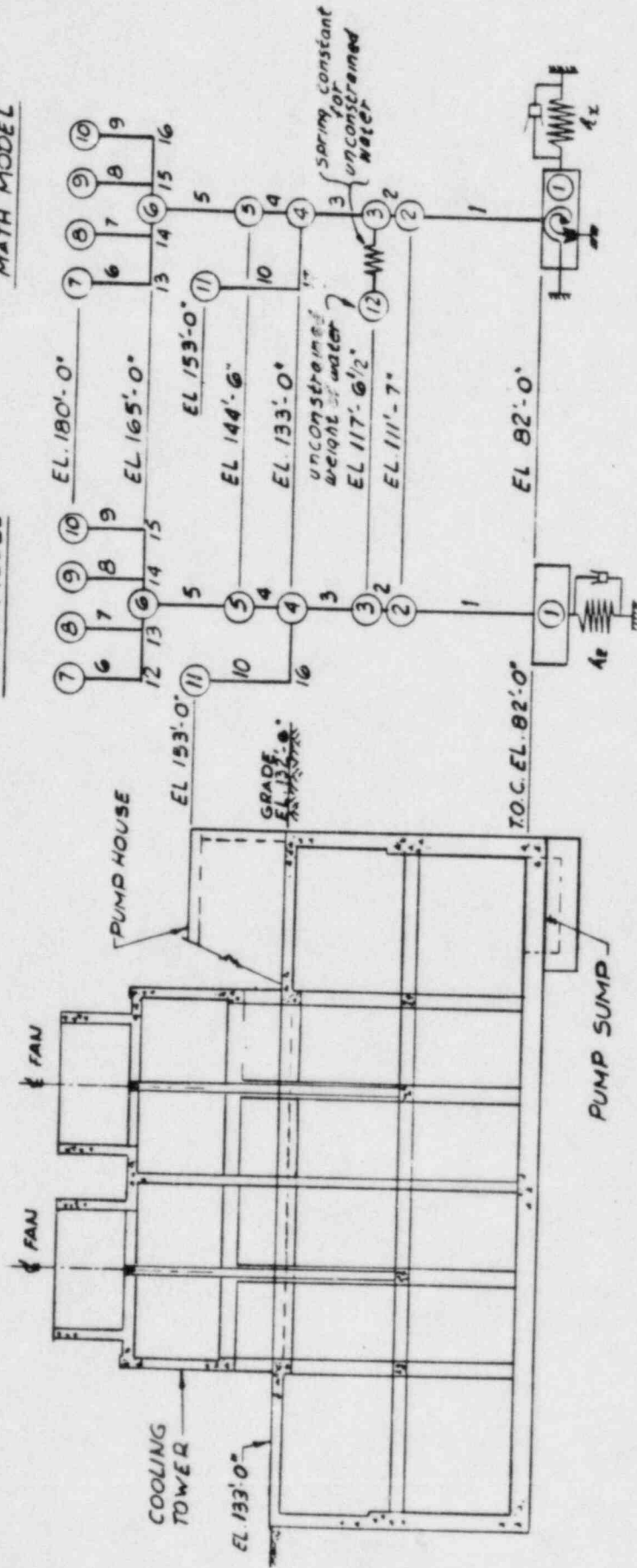


Fig. 3 FLUSH FINITE ELEMENT MODEL OF S.S.W.C.T.B.

SHAKE/LUSH AND FLUSH MODEL

- MOTION INPUT AT SURFACE IN ACCORD WITH SRP SECTION 3.7.1 DATED NOVEMBER 24, 1975 (NUREG 75-087)
- IDEALIZED STRUCTURE AS A PLANE STRAIN FINITE ELEMENT MODEL
- ELEMENT MASS DENSITY REPRESENTED AS AN AVERAGE EXISTING BETWEEN ELEMENT VERTICAL BOUNDARIES
- SHEAR MODULI CHOSEN TO RESULT IN A MATCH OF NATURAL FREQUENCIES WITH LUMPED MASS IDEALIZATION
- DID NOT USE VISCOUS DAMPERS TO SIMULATE ENERGY RADIATING OUT OF PLANE
- ACCOUNTED FOR SOIL BEYOND FINITE ELEMENT BOUNDARY WITH TRANSMITTING BOUNDARY CONDITION AND VISCO-ELASTIC FORCE DISPLACEMENT RELATIONSHIPS
- FRS FOR BOTH SHAKE/LUSH AND FLUSH ENVELOPED

EHS ANALYSIS



SSW COOLING TOWER SECTION

EHS ANALYSIS

- ° CONTROL MOTION INPUT AT FOUNDATION OF STRUCTURE
- ° STRUCTURAL MODEL DEVELOPED IN ACCORD WITH BC-TOP4
- ° SOIL STRUCTURE INTERACTION (IMPEDANCE) DETERMINED IN ACCORD WITH RICHART & HALL PROCEDURE (BC-TOP4). THE FOUNDATION IMPEDANCE WAS ADJUSTED TO IDENTIFY A FREQUENCY SHIFT THAT ACCOMPANIES THE EFFECT OF EMBEDMENT BY A PROCEDURE BASED ON ASPEL
- ° SOIL (MATERIAL) DAMPING WAS CONSERVATIVELY NOT INCLUDED
- ° COMPOSITE DAMPING WAS OBTAINED BY THE TSAI METHOD

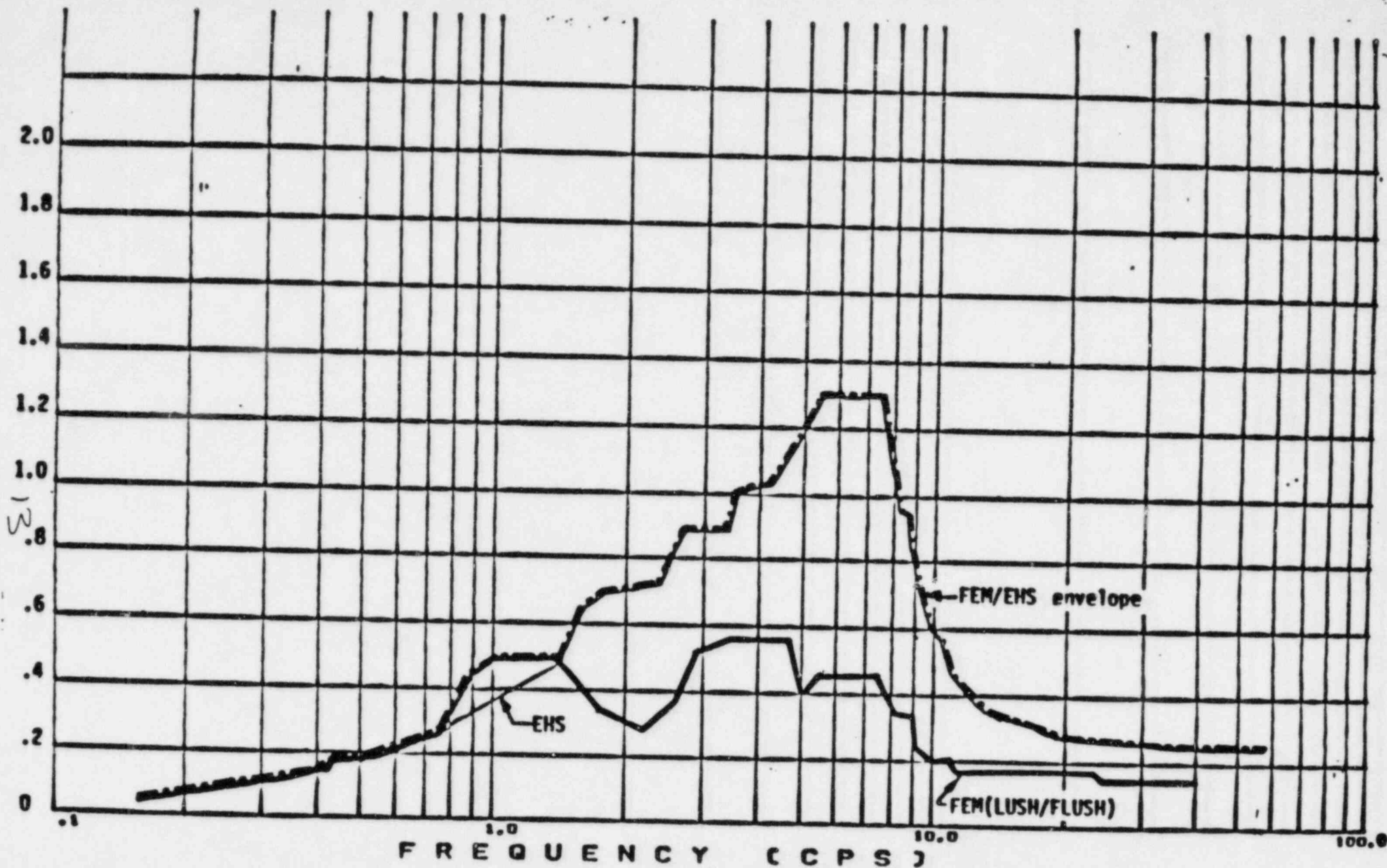


Fig.8 FLOOR RESPONSE SPECTRA EL. 133.00 LATERL
SEISMIC - SSE

RESPONSE TO NRC QUESTIONS

QUESTION 1

- ° DESCRIPTION OF METHOD USED IN ANALYSIS PREVIOUSLY PROVIDED
- ° VARIATION OF KEY ANALYSIS PARAMETERS ACCOUNTED FOR BY $\pm 15\%$ PEAK BROADENING PER SRP SECTION 3.7.2 (SUBSECTION 9)
- ° BASIS FOR CALCULATING SOIL SPRING CONSTANTS USED TO SIMULATE EMBEDMENT EFFECTS DISCUSSED PREVIOUSLY
- ° SEISMIC INPUT DISCUSSED PREVIOUSLY

RESPONSE TO NRC QUESTIONS

QUESTION 2

- ° NATURE OF QUESTION IS DIRECTED TOWARD SOIL STRUCTURE INTERACTION (CURRENT SRP SECTION 3.7.2.II.4)
- ° BOTH EHS & FEM ANALYSIS COMPLY WITH THE INTENT OF THE ABOVE SRP SECTION WITH THE FOLLOWING EXCEPTION:

THE CONTROL MOTION FOR THE FEM ANALYSIS (ONLY) WAS PLACED AT GRADE LEVEL

MAJOR CONCLUSIONS

- ° BASIC METHODOLOGY USE FOR BOTH EHS & FEM ANALYSIS HAVE BEEN USED PREVIOUSLY IN THE LICENSING OF NUCLEAR POWER PLANTS

THE CONTROL MOTION FOR THE FEM WAS APPLIED AT THE GROUND SURFACE PER NUREG 75-087

- ° THE NRC HAS COMPARED THE GGNS DESIGN SPECTRA WITH THAT OF R.G. 1.60 AND FOUND IT ACCEPTABLE
- ° THE FRS FROM BOTH THE EHS AND FEM ANALYSIS HAS BEEN ENVELOPED FOR EVALUATION

May 21, 1985

MEETING SUMMARY DISTRIBUTION

Docket No(s): 50-416

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