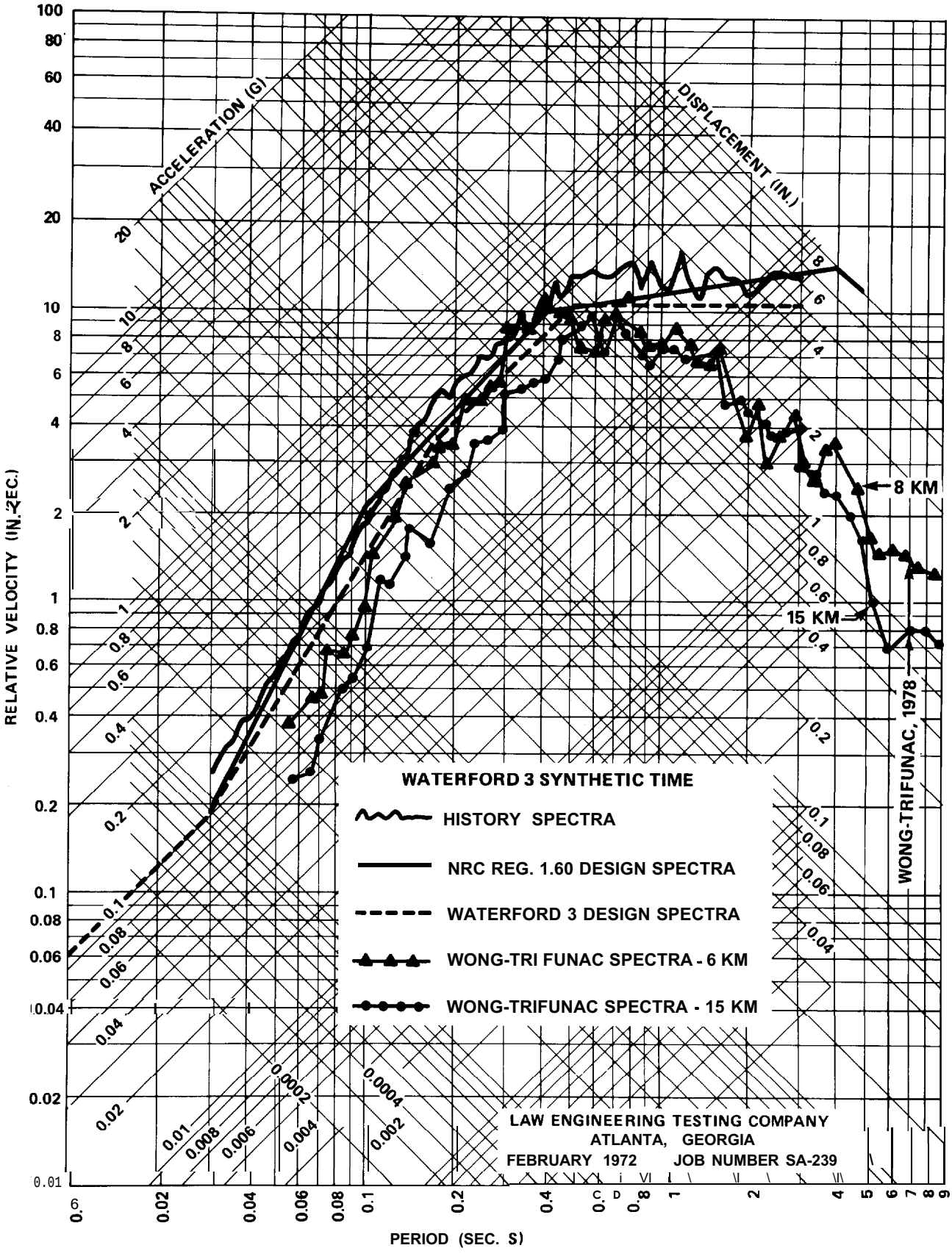
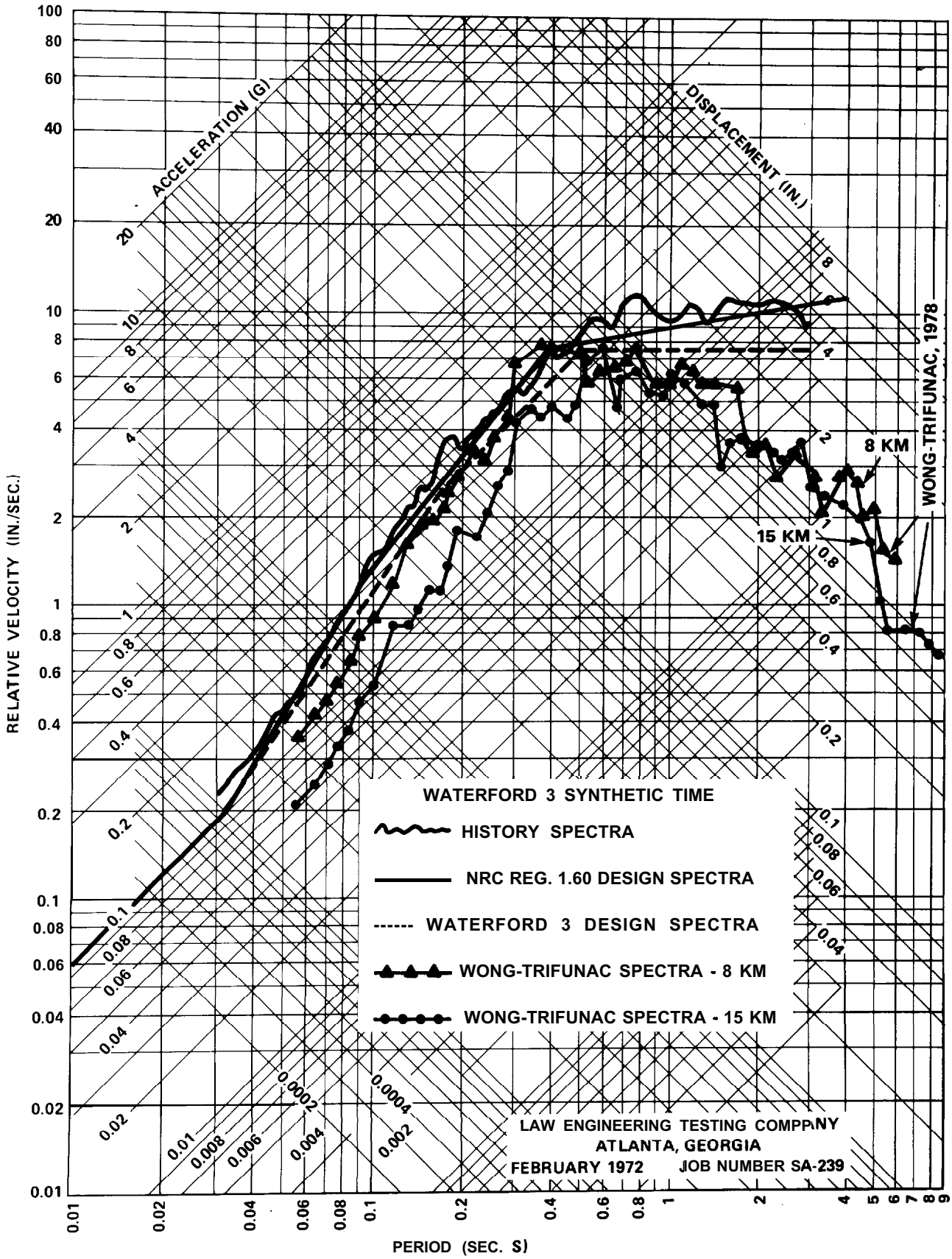
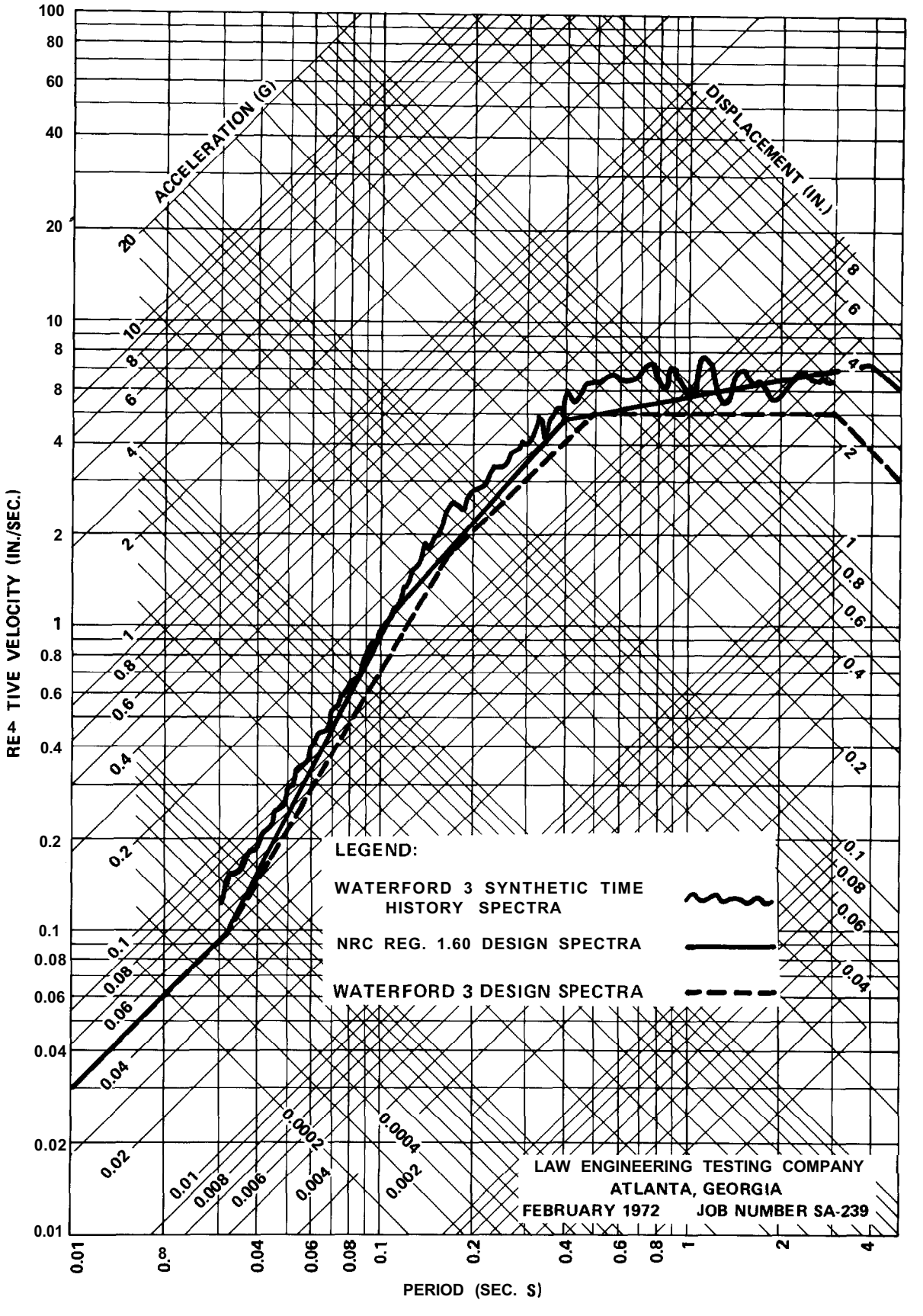


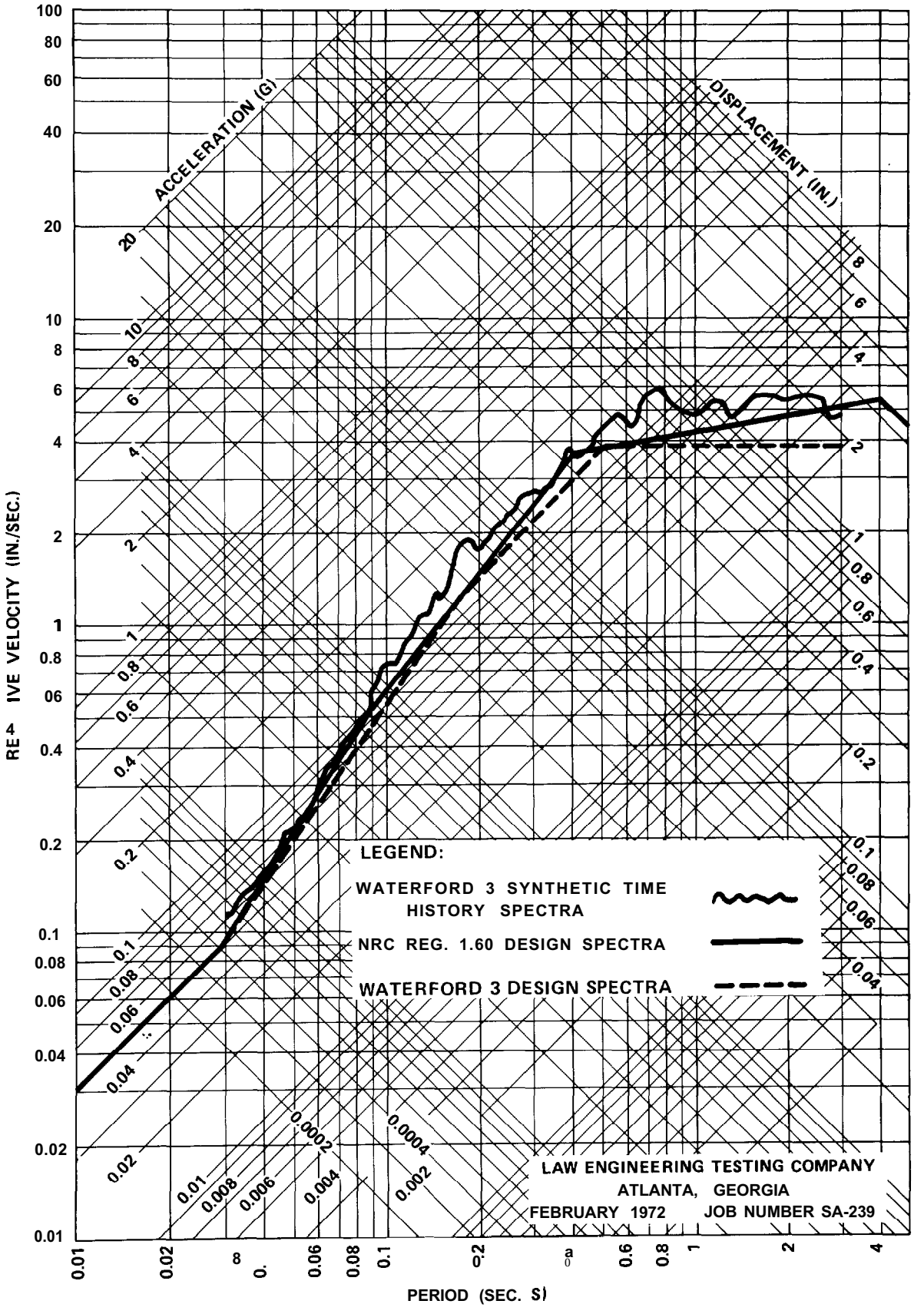
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	HORIZONTAL RESPONSE SPECTRUM DESIGN BASIS EARTHQUAKE 2% DAMPING-TOP OF PLEISTOCENE	Figure 3.7-1



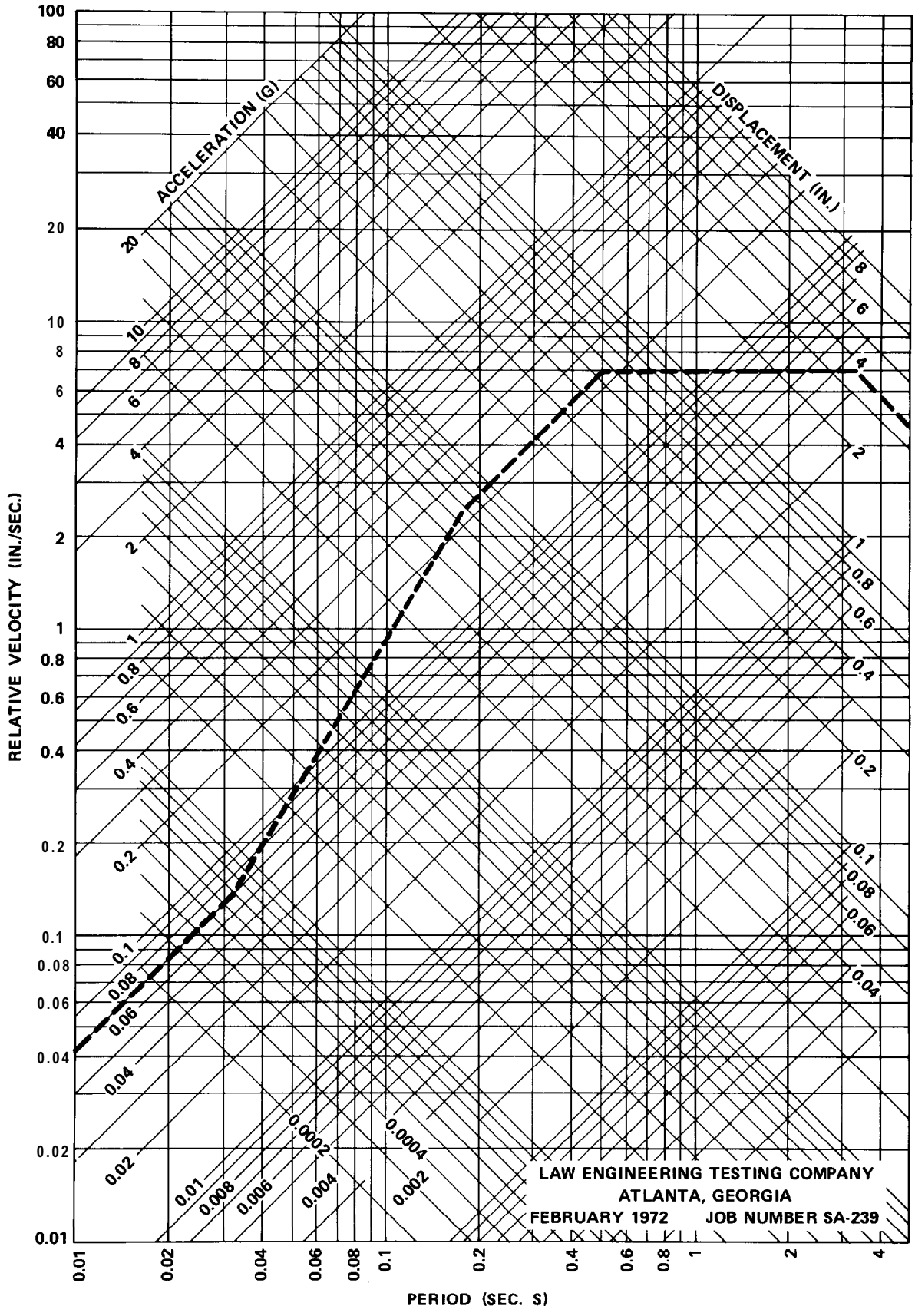
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	HORIZONTAL RESPONSE SPECTRUM DESIGN BASIS EARTHQUAKE 5% DAMPING-TOP OF PLEISTOCENE	Figure 3.7-2



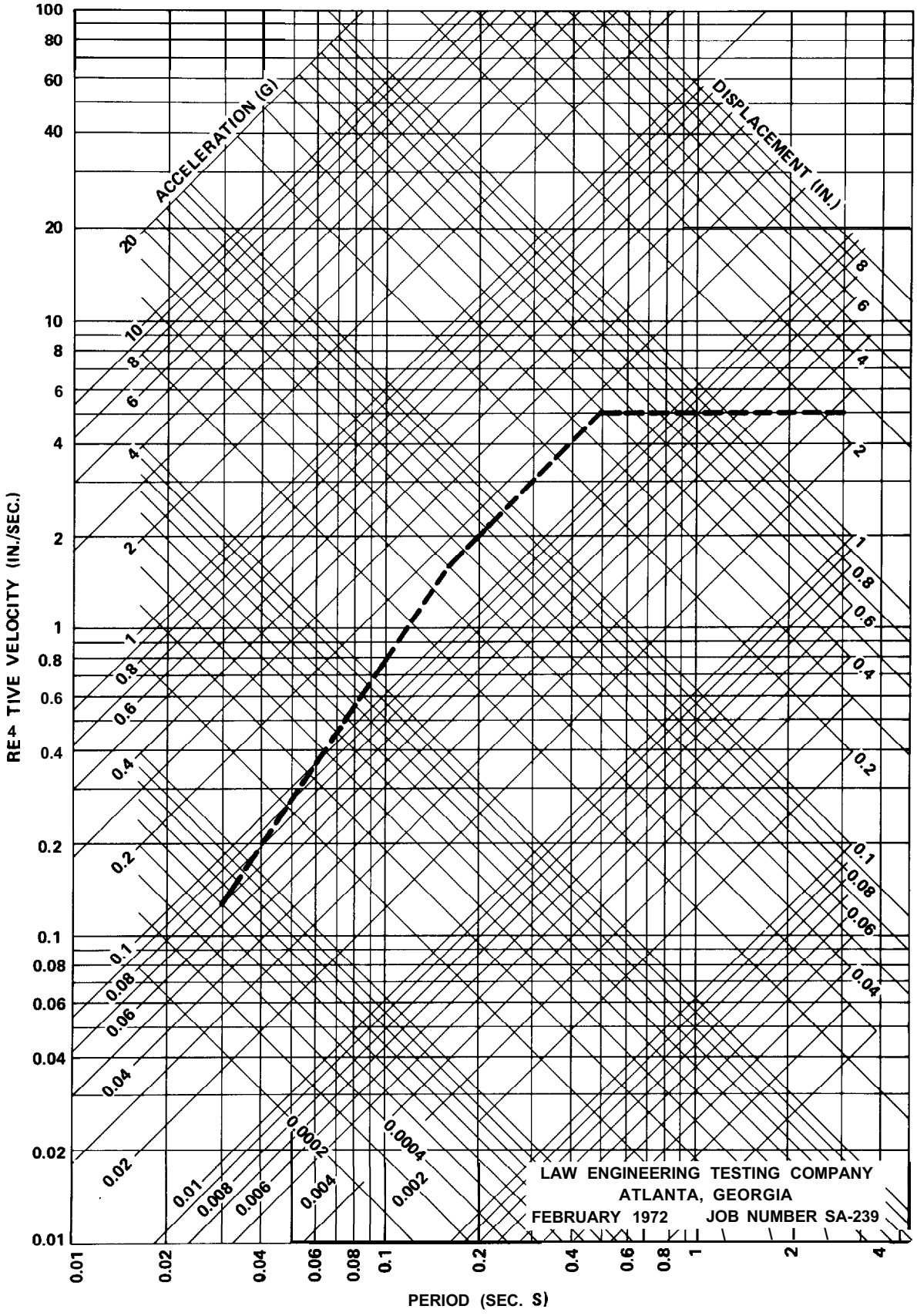
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**HORIZONTAL RESPONSE SPECTRUM OPERATING BASIS EARTHQUAKE 2% DAMPING-TOP OF PLEISTOCENE**	Figure 3.7-3



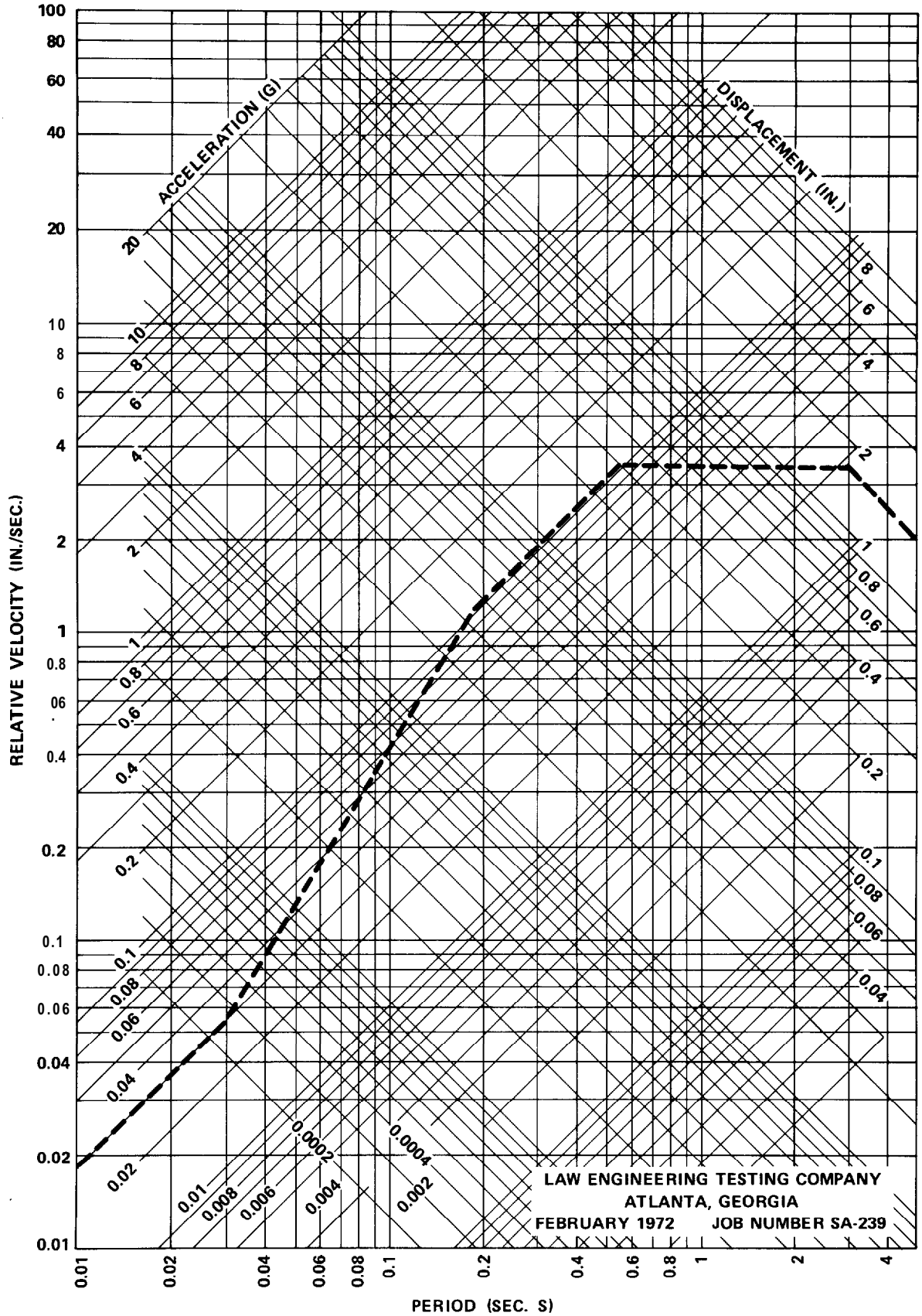
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**HORIZONTAL RESPONSE SPECTRUM OPERATING BASIS EARTHQUAKE 5% DAMPING-TOP OF PLEISTOCENE**	Figure 3.7-4



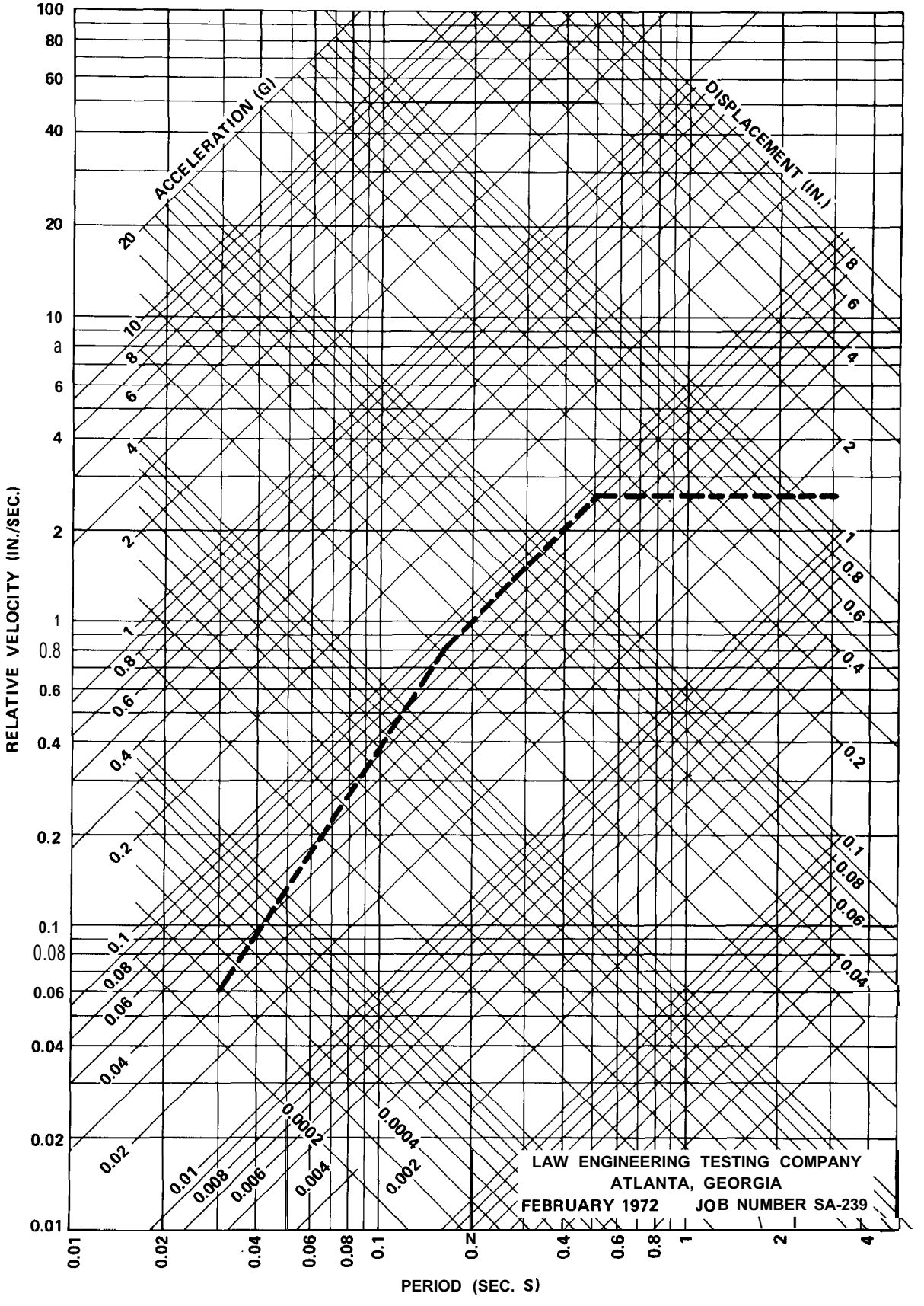
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	VERTICAL RESPONSE SPECTRUM DESIGN BASIS EARTHQUAKE 2% DAMPING-TOP OF PLEISTOCENE	Figure 3.7-5



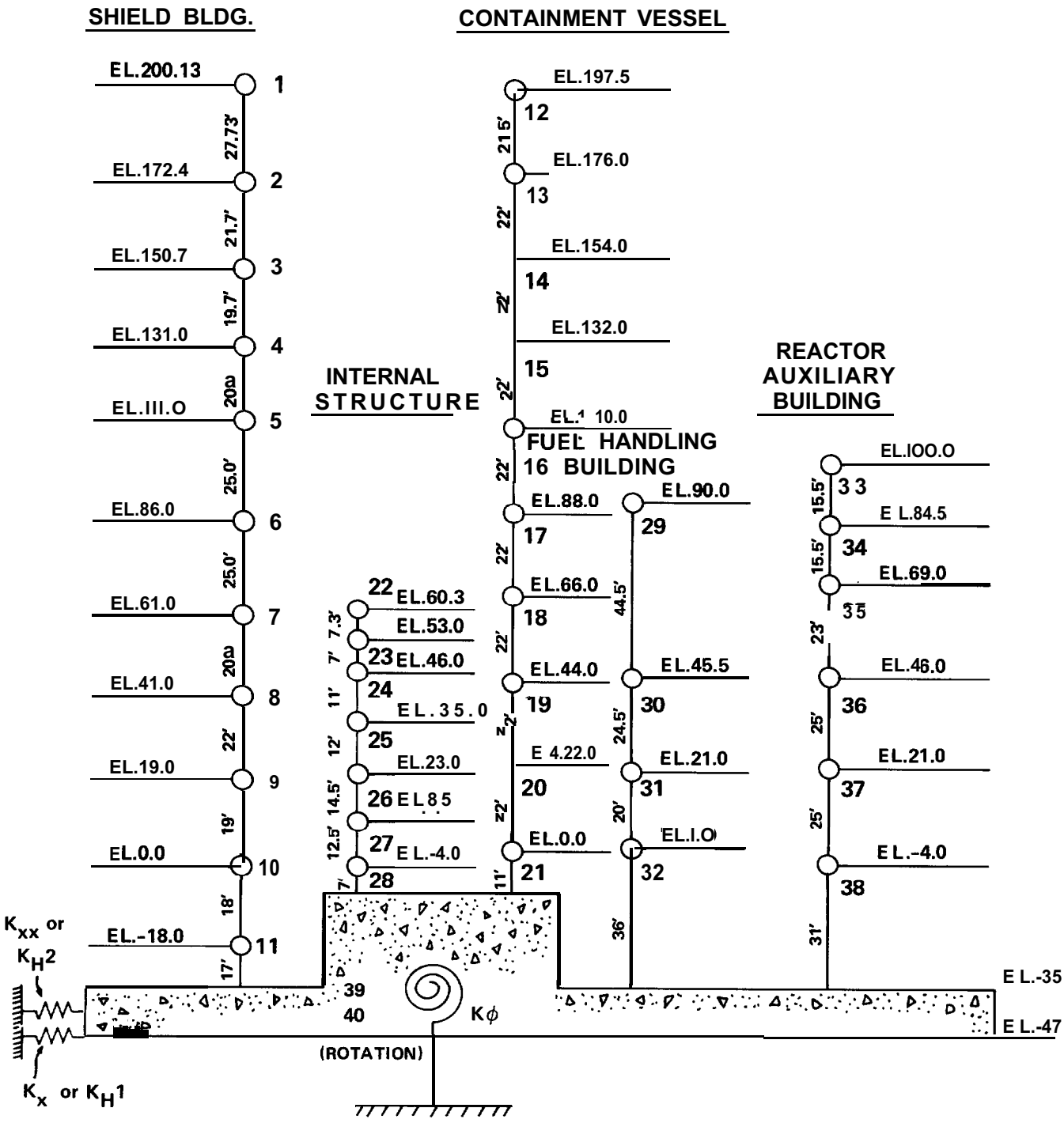
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	VERTICAL RESPONSE SPECTRUM DESIGN BASIS EARTHQUAKE 5% DAMPING-TOP OF PLEISTOCENE	Figure 3.7-6



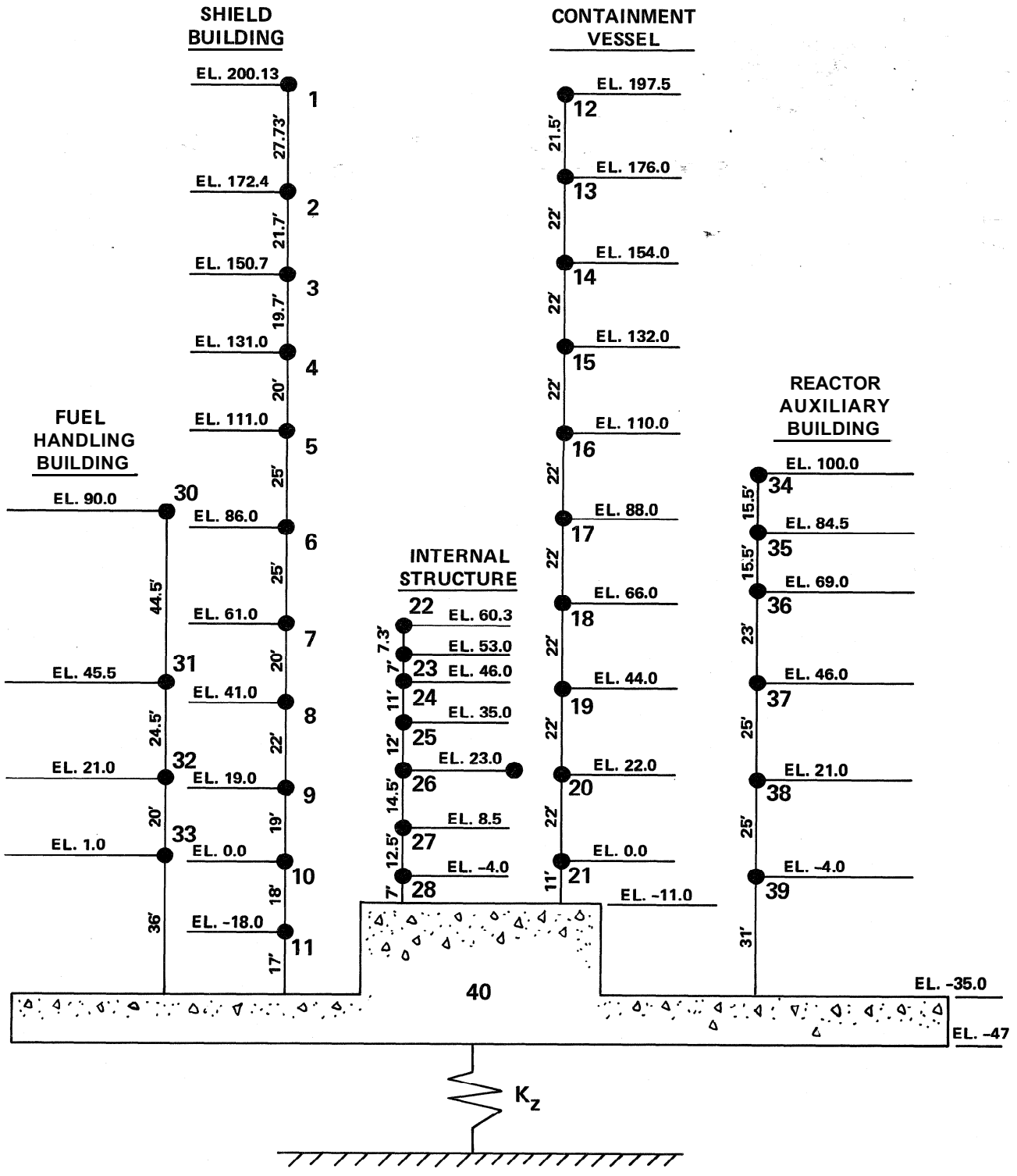
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	VERTICAL RESPONSE SPECTRUM OPERATING BASIS EARTHQUAKE 2% DAMPING-TOP OF PLEISTOCENE	Figure 3.7-7



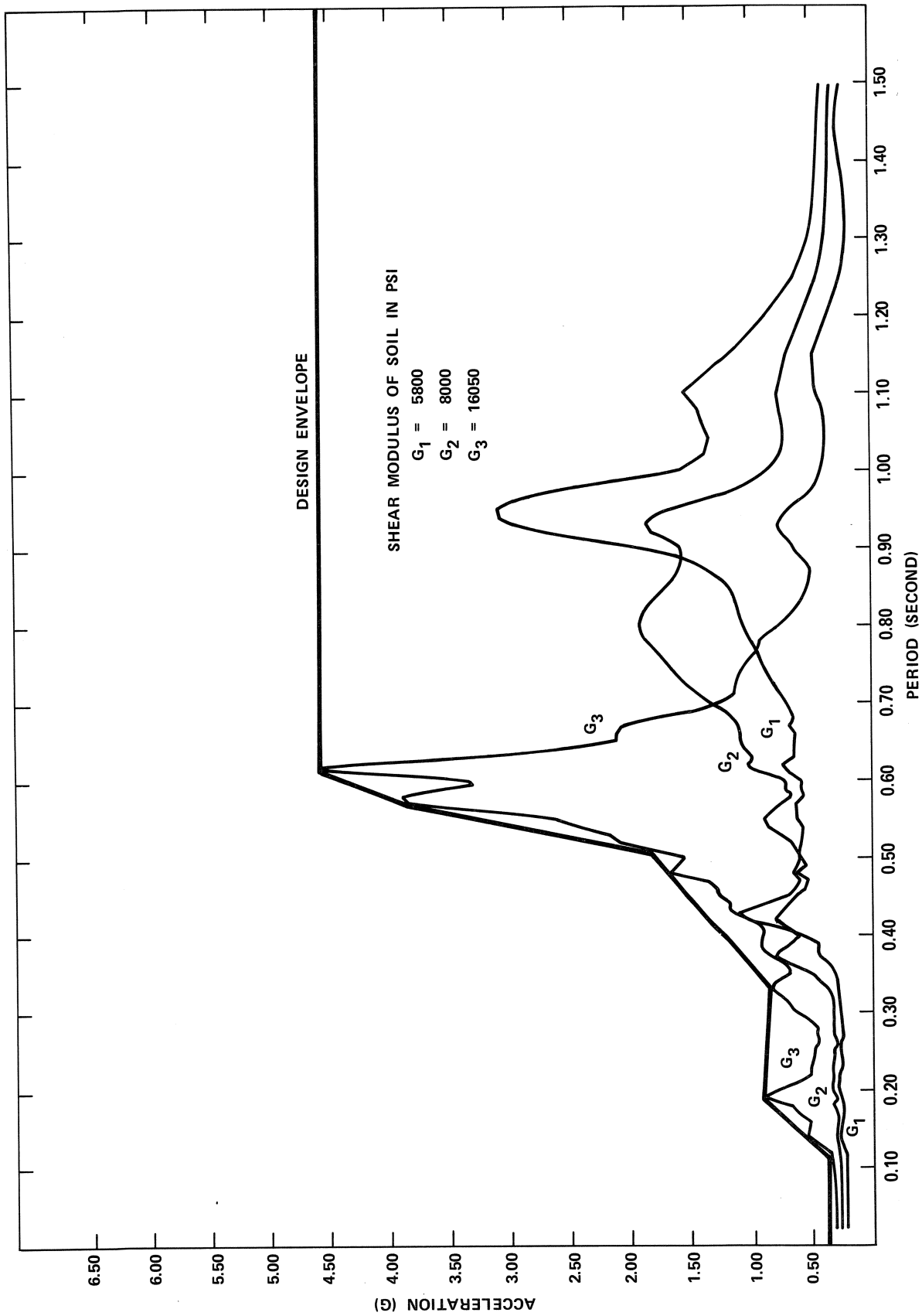
LOUISIANA **POWER & LIGHT CO.** Waterford Steam Electric Station	**VERTICAL RESPONSE SPECTRUM OPERATING BASIS EARTHQUAKE 5% DAMPING-TOP OF PLEISTOCENE**	Figure 3.7-8



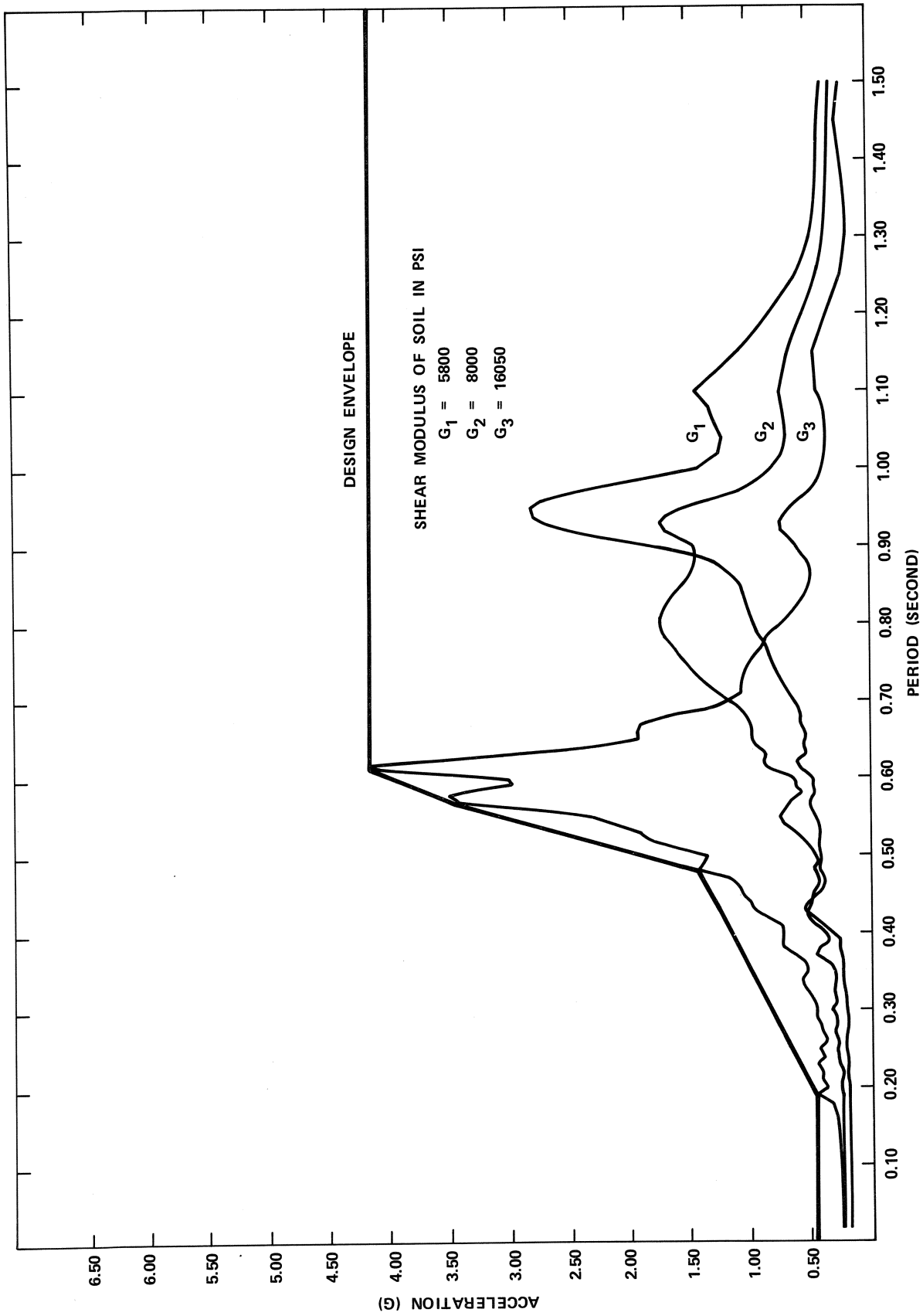
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	MATHEMATICAL MODEL FOR SEISMIC ANALYSIS (HORIZONTAL EXCITATIONS)	Figure 3.7-9



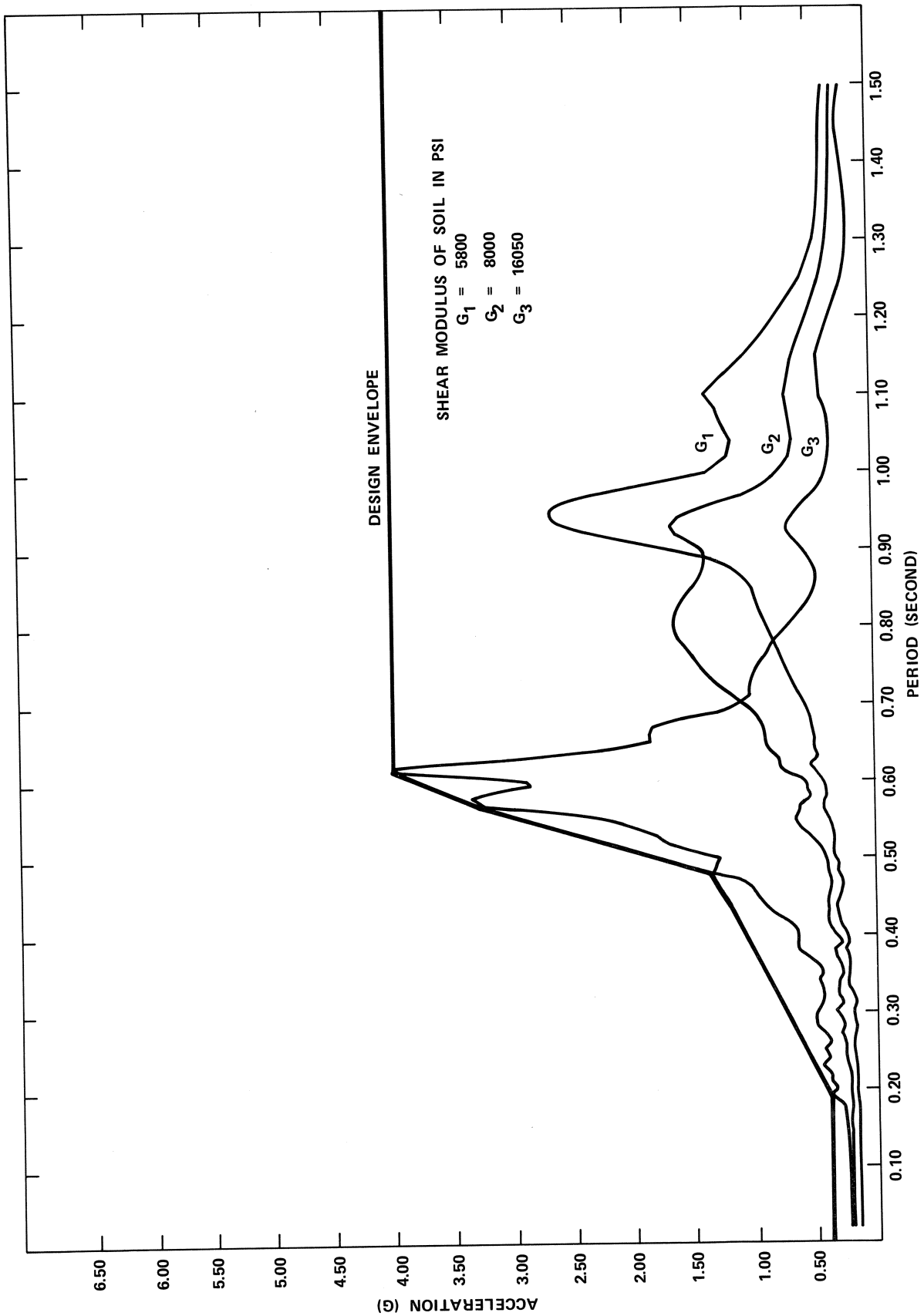
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	MATHEMATICAL MODEL FOR SEISMIC ANALYSIS (VERTICAL EXCITATION)	Figure 3.7–10



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FLOOR SPECTRA E-W SSE 1% CONTAINMENT VESSEL ELEV. + 88 FT. MSL	Figure 3.7–11



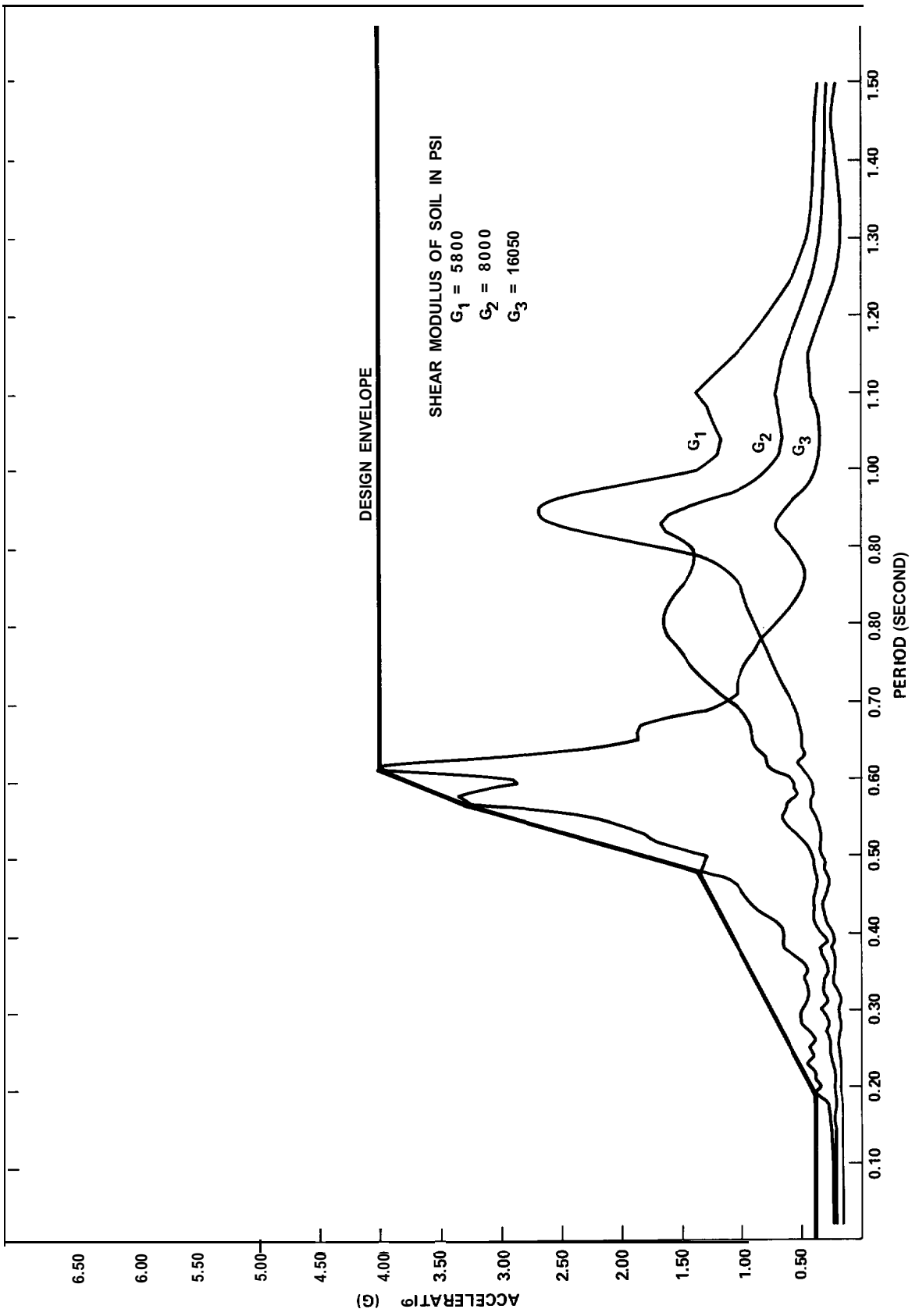
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FLOOR SPECTRA E-W SSE 1% INTERNAL STRUCTURE ELEV. + 46 FT. MSL	Figure 3.7–12



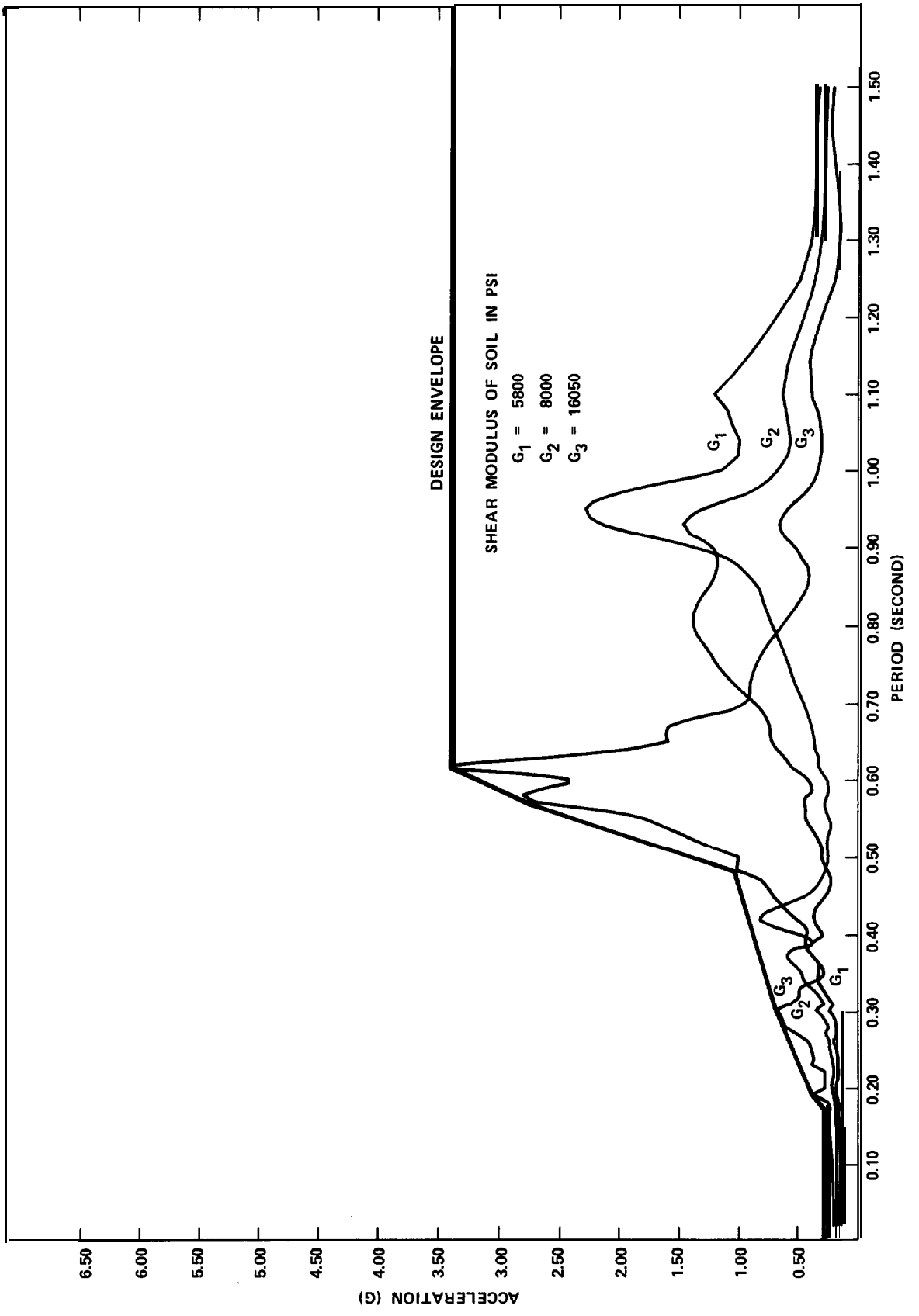
LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station

FLOOR SPECTRA E-W SSE 1%
FUEL HANDLING BLDG. ELEV. + 21 FT. MSL

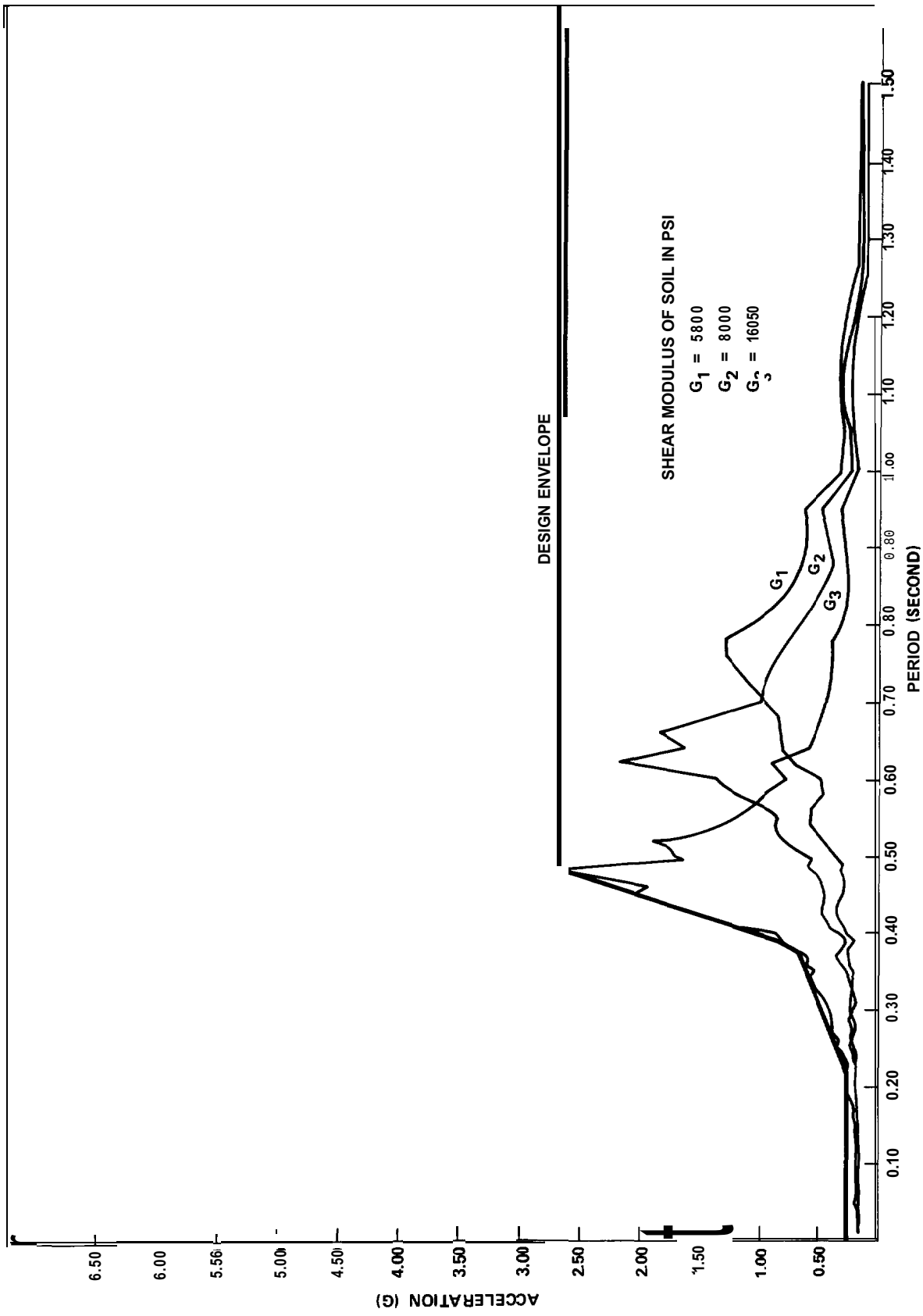
Figure
3.7–13



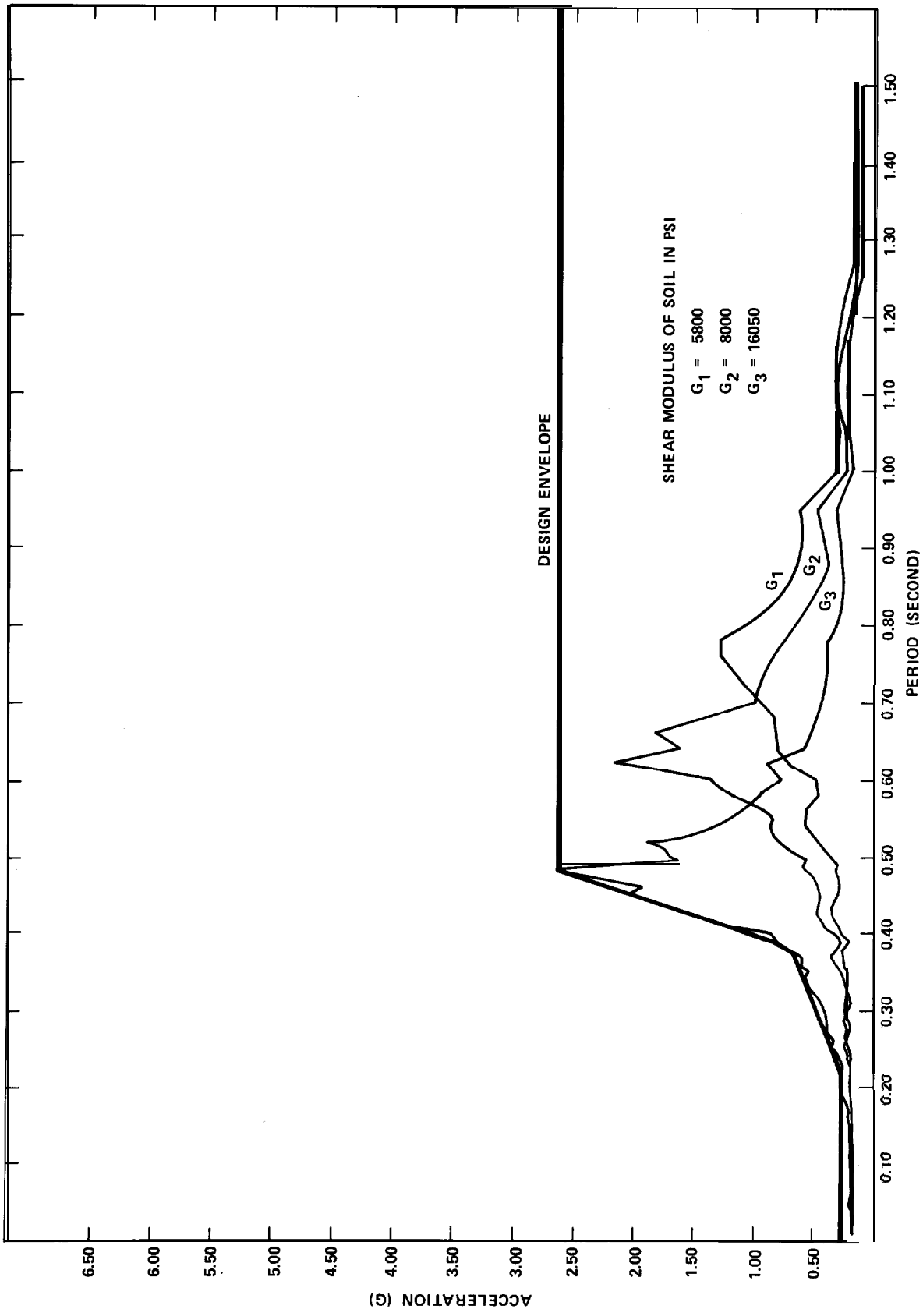
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FLOOR SPECTRA E-W SSE 1% REACTOR AUX. BLDG. ELEV. + 21 FT. MSL	Figure 3.7–14



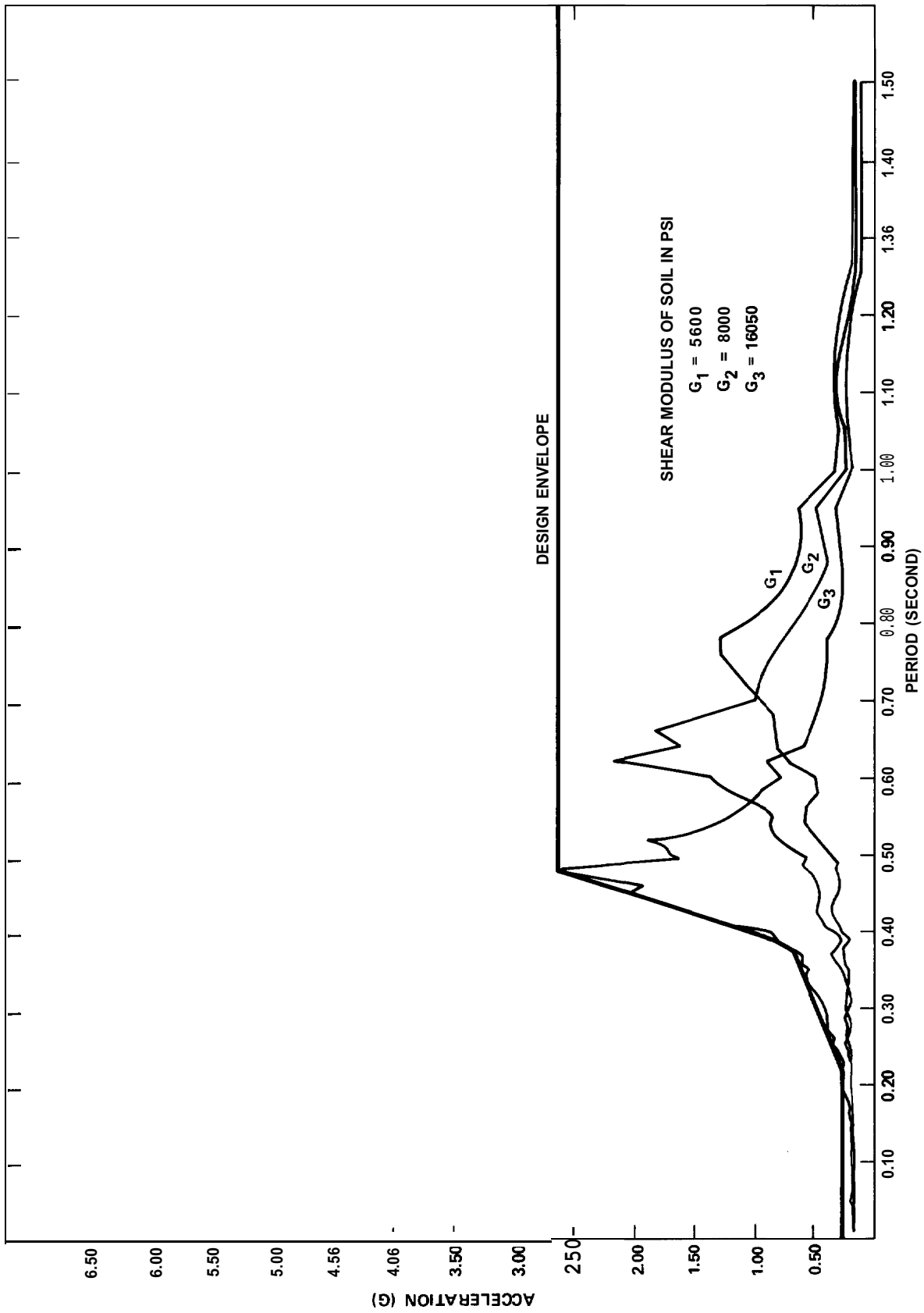
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**FLOOR SPECTRA E-W SSE 1% FOUNDATION MAT ELEV. -35 FT. MSL**	Figure 3.7-I 5



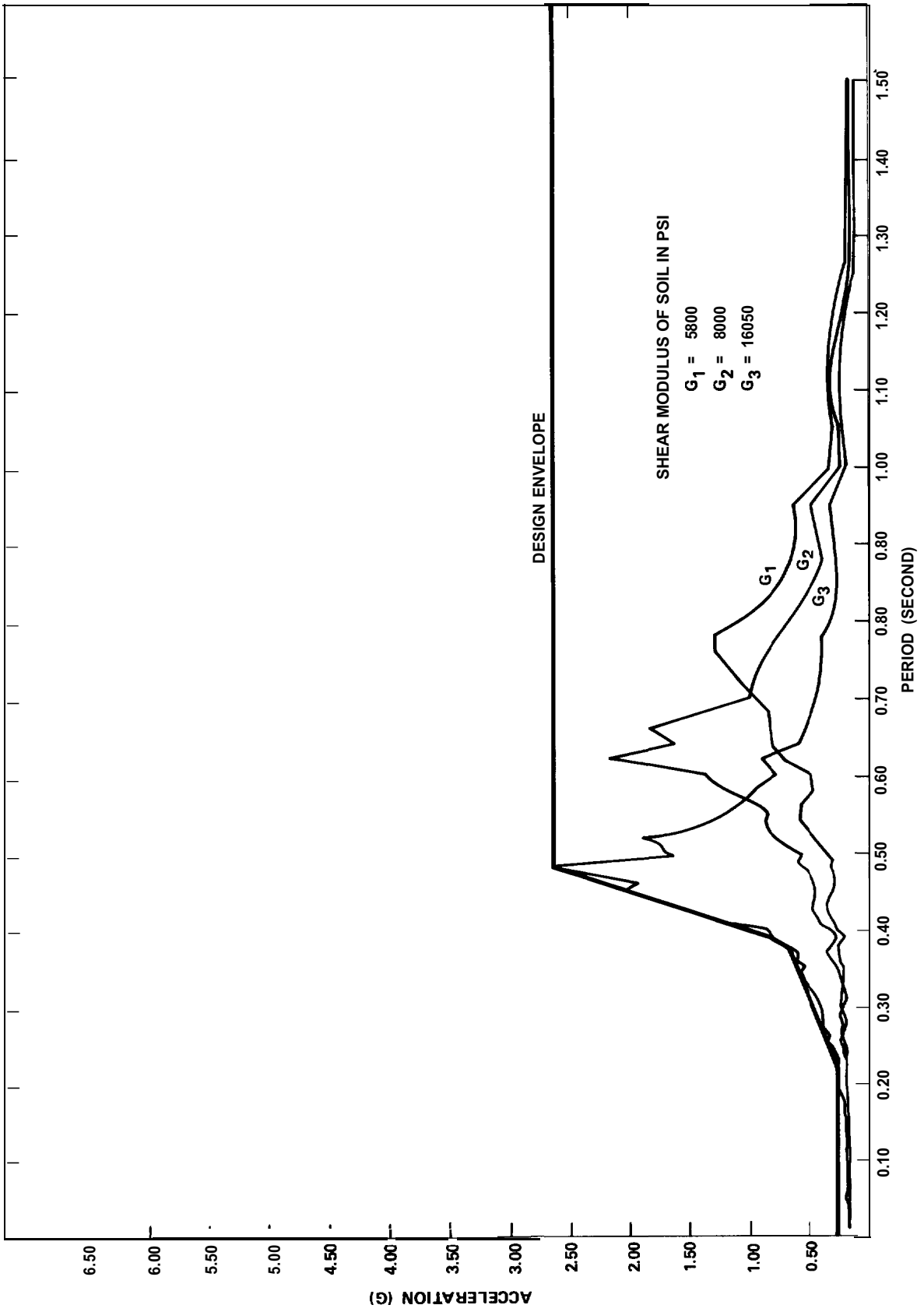
LOUISIANA POWER & LIGHT CO Waterford Steam Electric Station	FLOOR SPECTRA VERTICAL SSE 1% CONTAINMENT VESSEL ELEV. + 88 FT. MSL	Figure 3.7–16



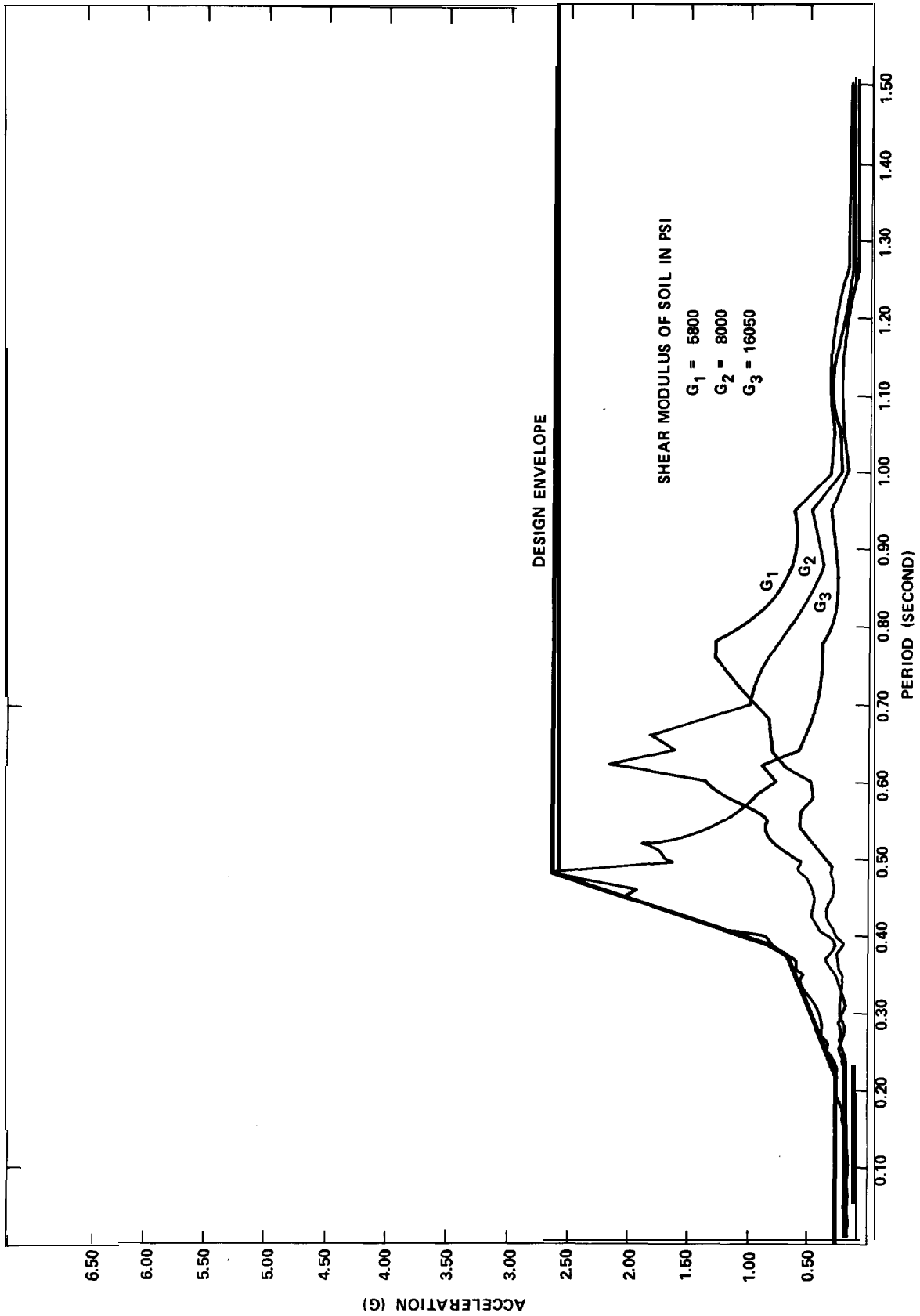
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**FLOOR SPECTRA VERTICAL SSE 1% INTERNAL STRUCTURE ELEV. + 46 FT. MSL**	Figure 3.7-I 7



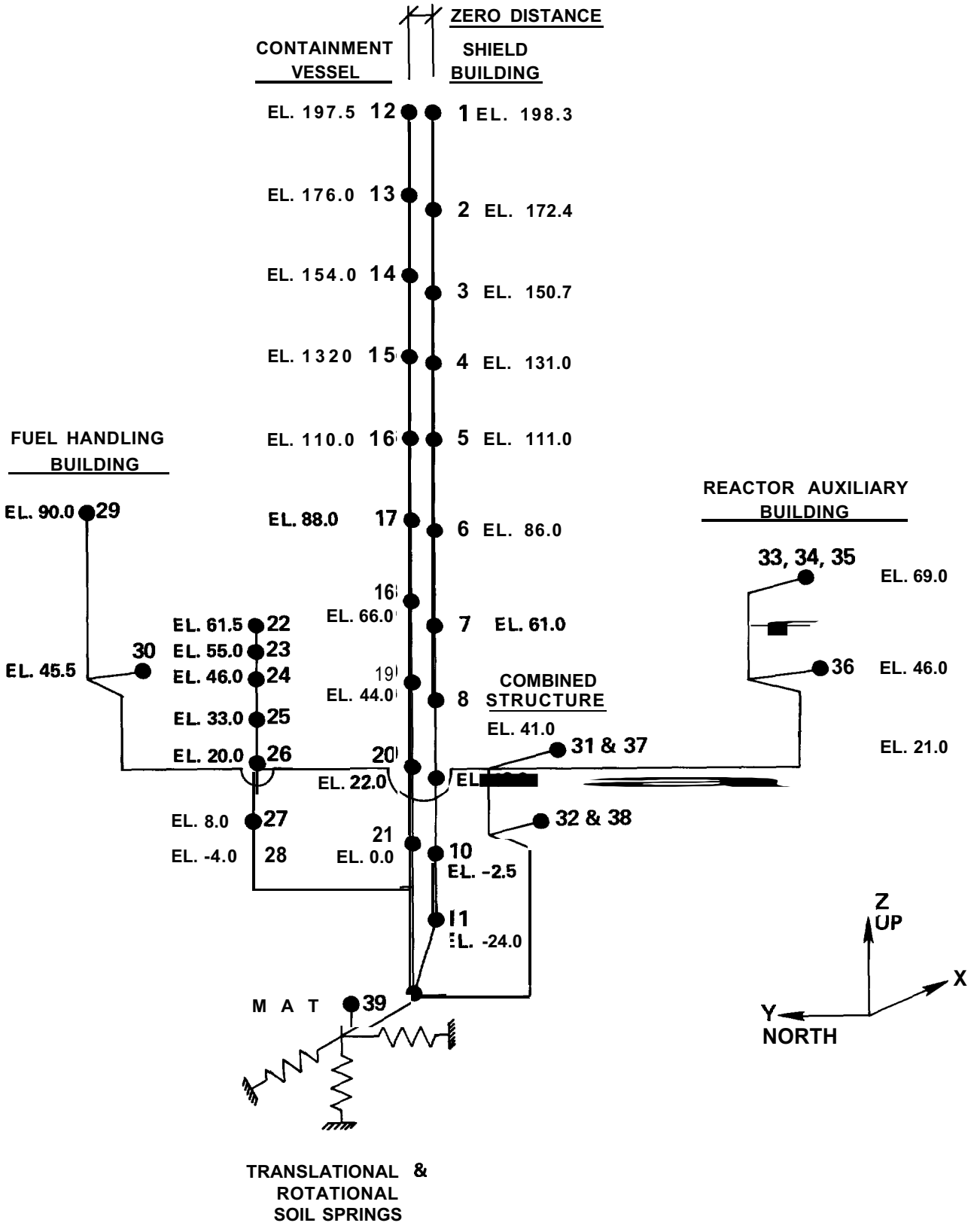
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FLOOR SPECTRA VERTICAL SSE 1% REACTOR AUX. BLDG. ELEV. + 21 FT. MSL	Figure 3.7–18



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FLOOR SPECTRA VERTICAL SSE 1% FUEL HANDLING BLDG. ELEV. + 21 FT. MSL	Figure 3.7–19



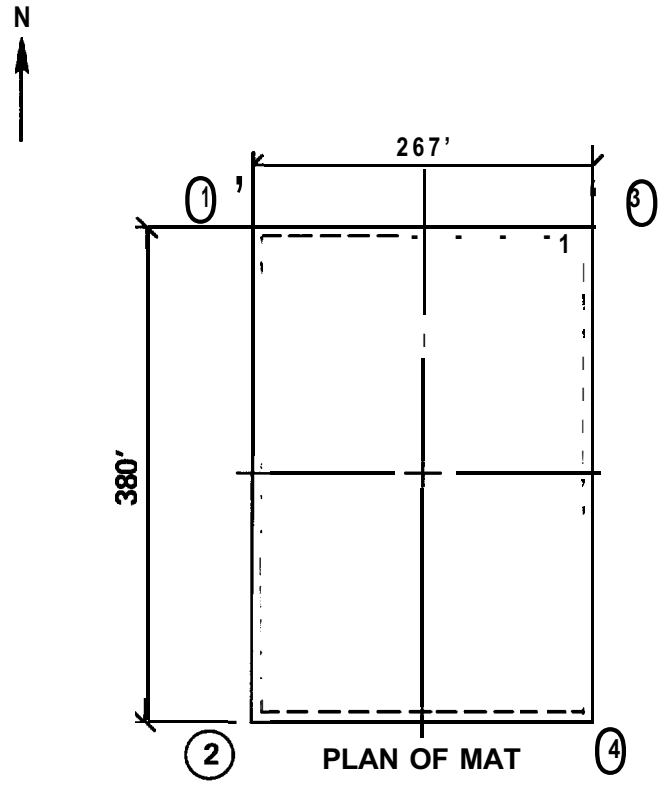
LOUISIANA **POWER & LIGHT CO.** Waterford Steam Electric Station	**FLOOR SPECTRA VERTICAL SSE 1%** **FOUNDATION MAT ELEV. -35 FT. MSL**	Figure **3.7-20**



LOUISIANA **POWER & LIGHT CO.** Waterford Steam Electric Station	REACTOR BUILDING MATHEMATICAL TORSION MODEL	Figure 3.7-21

1. MAXIMUM SOIL BEARING PRESSURE INCLUDING BUOYANCY EFFECT
P_1 = 7.22, P_2 = 7.04, P_3 = 7.02 AND P_4 = 6.64 KSF

2. FACTOR OF SAFETY AGAINST A BEARING CAPACITY FAILURE =
1517.22 = 2.06



DATA:

A. MOMENTS DUE TO SSE IN E-W AND N-s DIRECTIONS ARE APPLIED SIMULTANEOUSLY.
M_{E-W} = 8,893,000 1K
M_{N-S} = 8,791,000 1K

B. BUOYANCY EFFECTS ARE CALCULATED BASED ON MINIMUM GROUND WATER LEVEL AT EL + 5.0 FT. MSL

C. TOTAL LOADS =
1.10 (D + L') + 1.0 (E' + B'')
WHERE:
D = DEAD LOAD
L' = EQUIPMENT LOAD
E' = SAFE SHUTDOWN EARTHQUAKE
B'' = BUOYANCY

D. ULTIMATE BEARING CAPACITY
= 15.0 KSF

3. FACTOR OF SAFETY AGAINST OVERTURNING

OVERTURNING MOMENT = $\sqrt{(M_{E-W})^2 + (M_{N-S})^2} = M_o$ = 12,505,000 1K

RESISTING MOMENT = MR = 34,700,000 1K (BASED ON MAXIMUM GROUND WATER LEVEL AT EL + 13.0 FT MSL)

F.S. = $\frac{M_R}{M_o}$ = 2.77

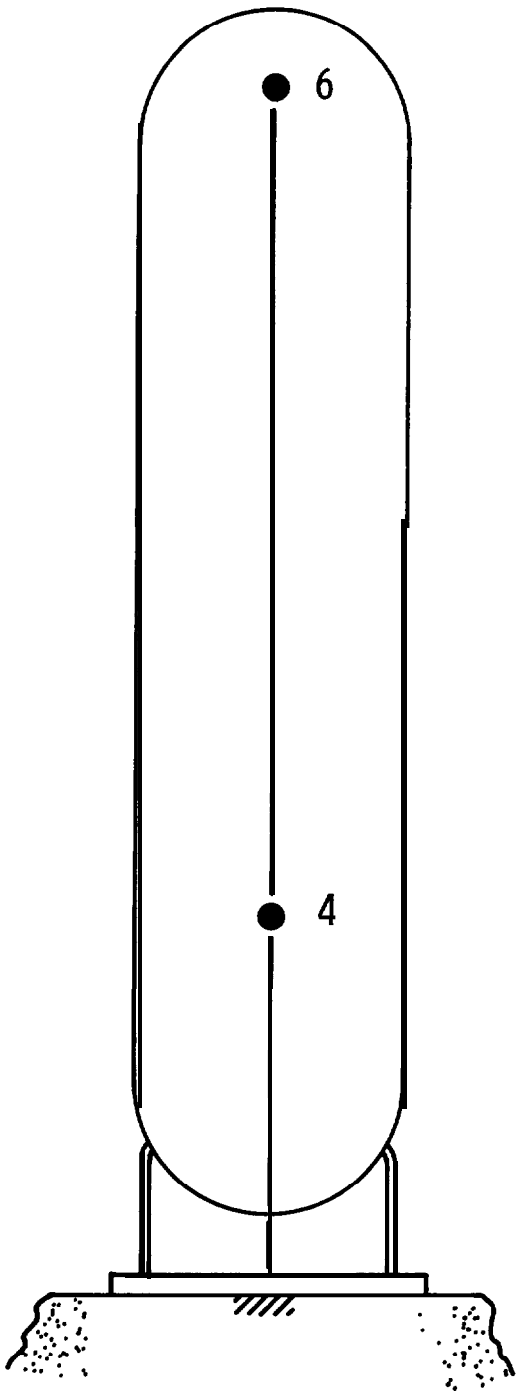
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	STABILITY AGAINST OVERTURNING FOR SEISMIC CATEGORY I STRUCTURES	Figure 3.7-22

→(EC-8458, R307)

FIGURE 3.7-23

HAS BEEN DELETED

←(EC-8458, R307)



● MASS POINT

SUPPORT POINT

Y

X

MASSPOINT	DEGREE OF FREEDOM
4	X
6	X, Y

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**PRESSURIZER SEISMIC ANALYSIS MODEL**	Figure 3.7-24

→(EC-8458, R307)

FIGURE 3.7-25

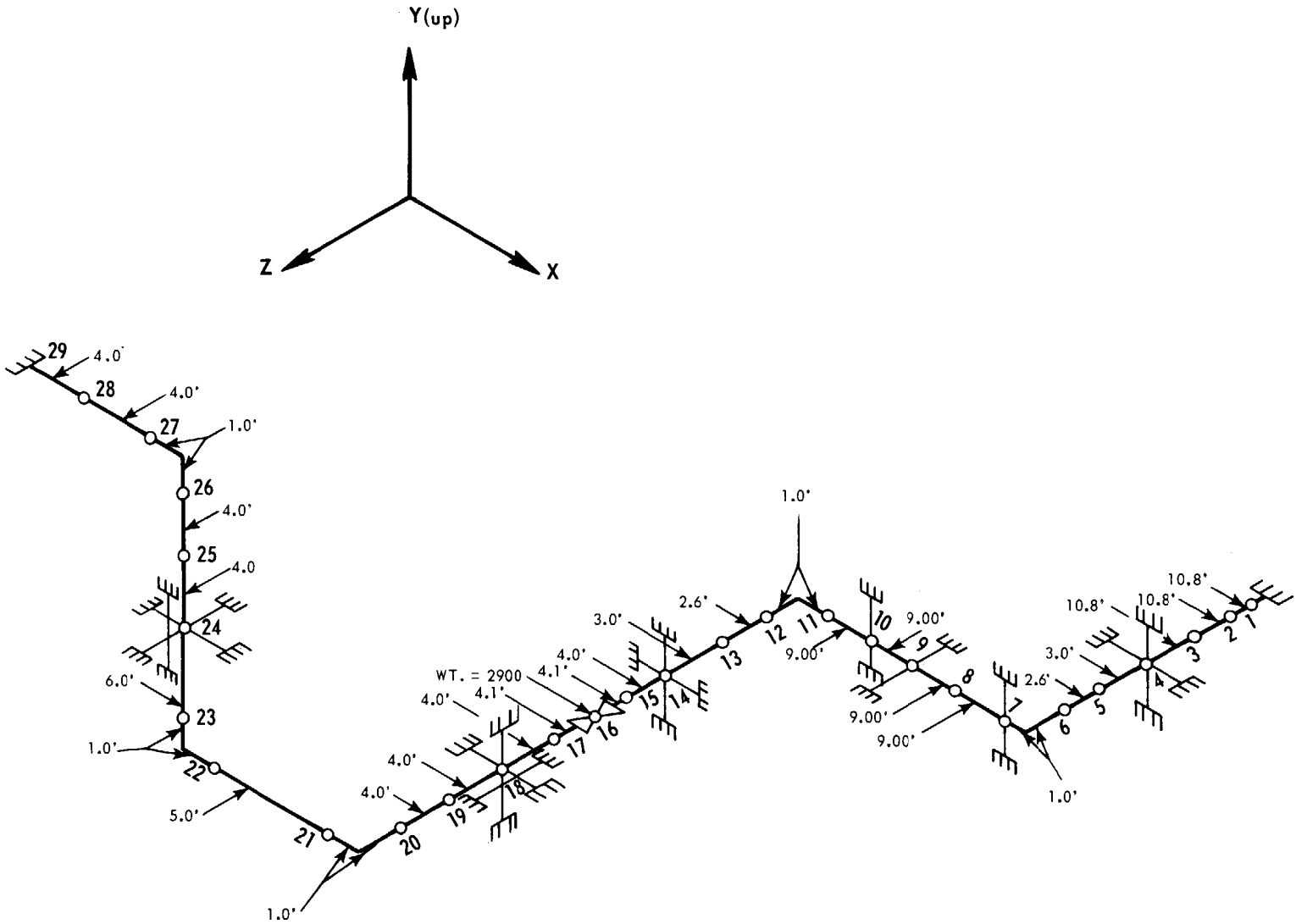
HAS BEEN DELETED

←(EC-8458, R307)

LOUISIANA POWER & LIGHT CO.
Waterford Steam Electric Station

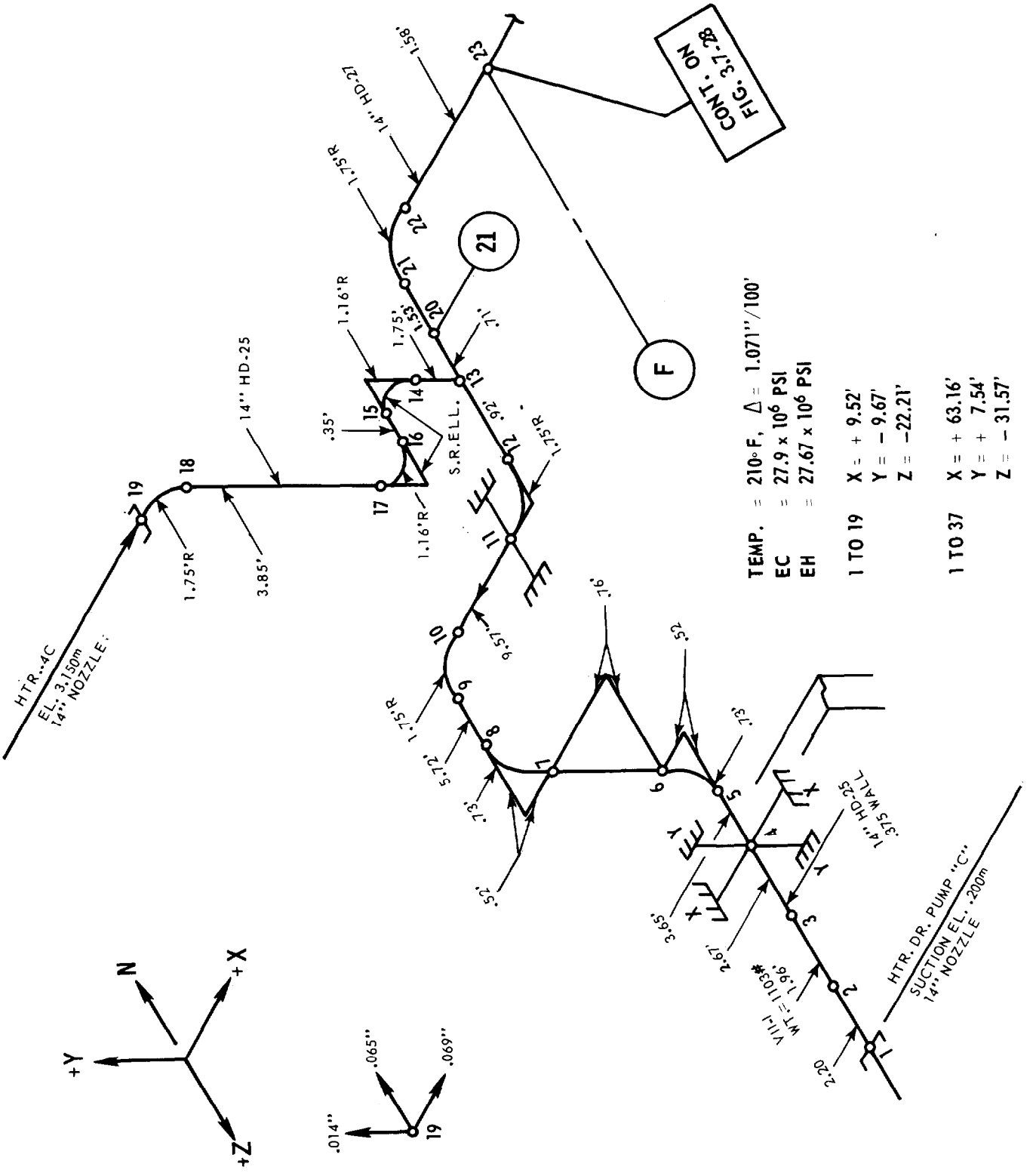
SEISMIC PROTECTION ANALYSIS SAMPLE PROBLEM NO. 1

Figure 3.7-25

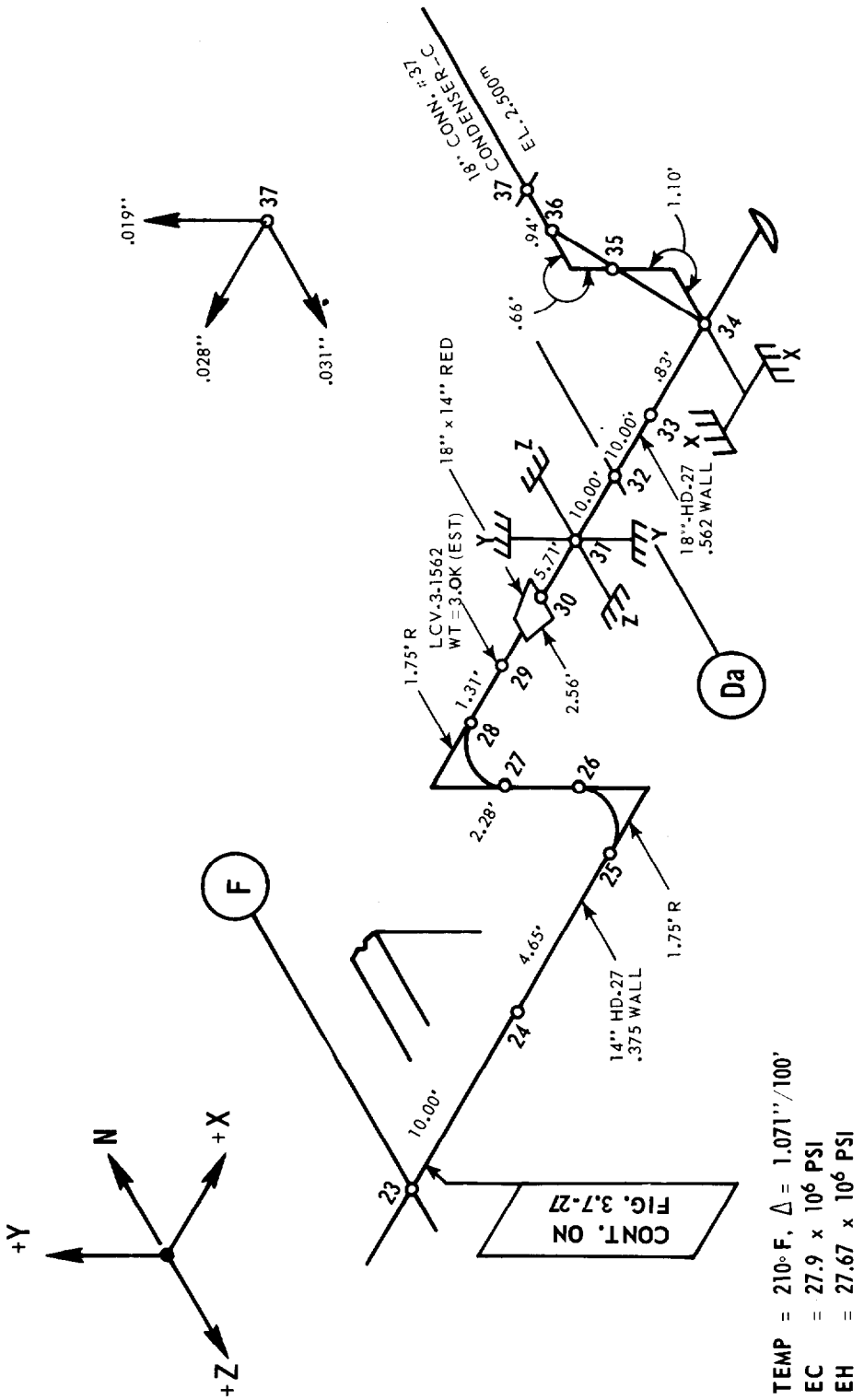


TO 29 X → 54.0'
Y → 16.0'
Z → 70.8'

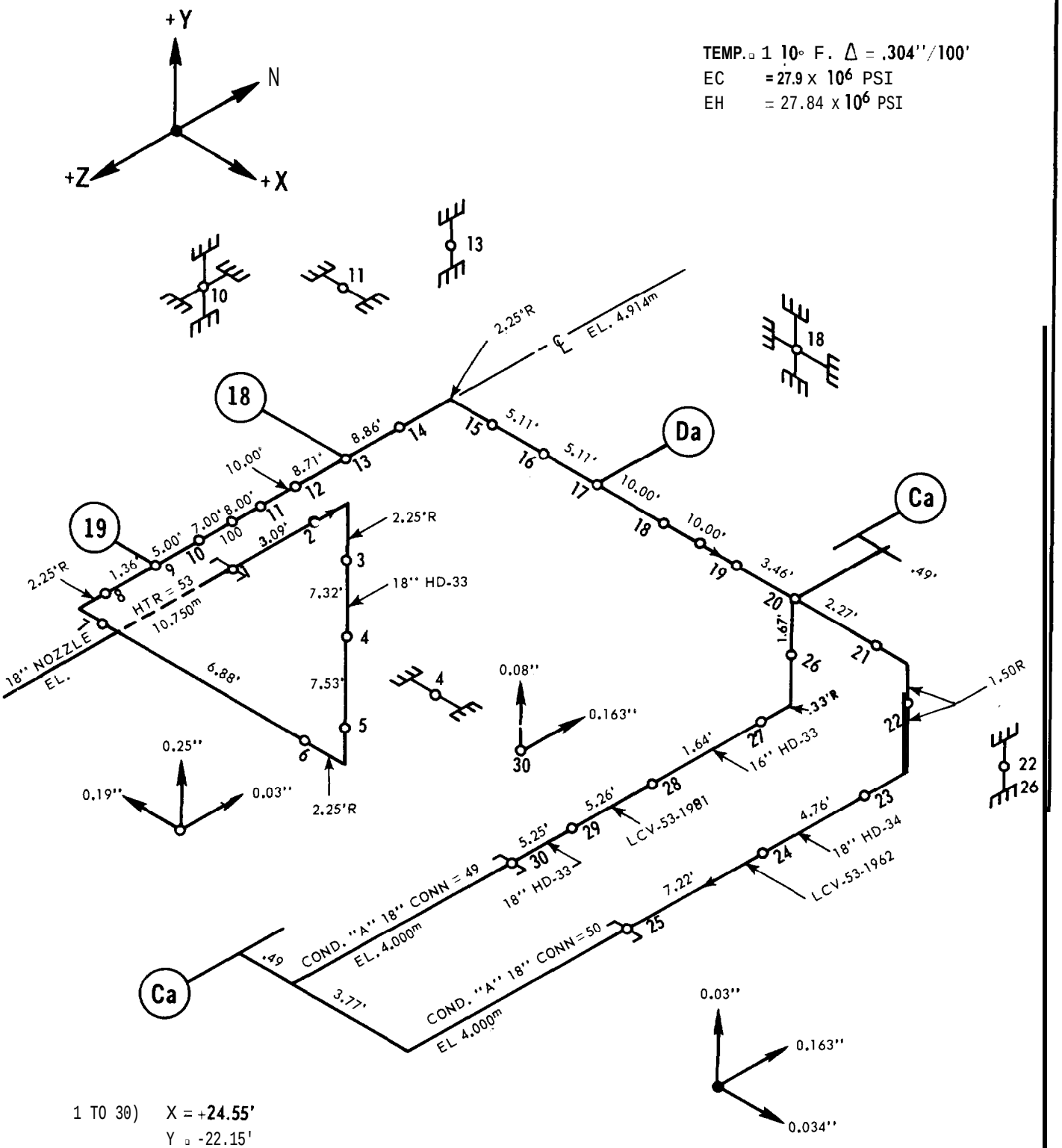
8'' SCH. 40 C.S. WATER FILLING PIPING



LOUISIANA **POWER & LIGHT CO.** Waterford Steam Electric Station	**SEISMIC PROTECTION ANALYSIS SAMPLE PROBLEM NO.. 2 SHEET 1**	Figure 3.7-27



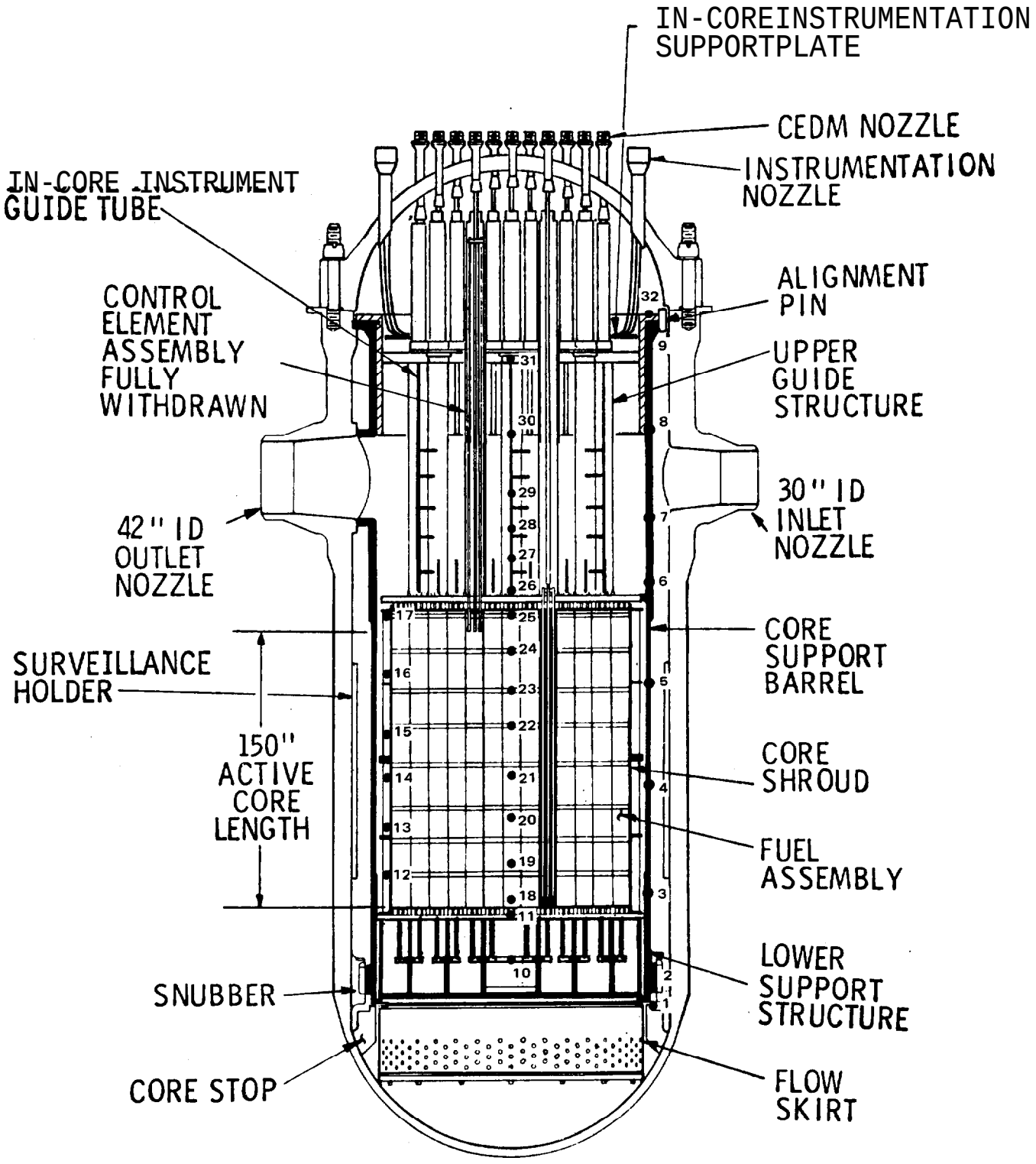
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	SEISMIC PROTECTION ANALYSIS SAMPLE PROBLEM NO. 2 SHEET 2	Figure 3.7-28



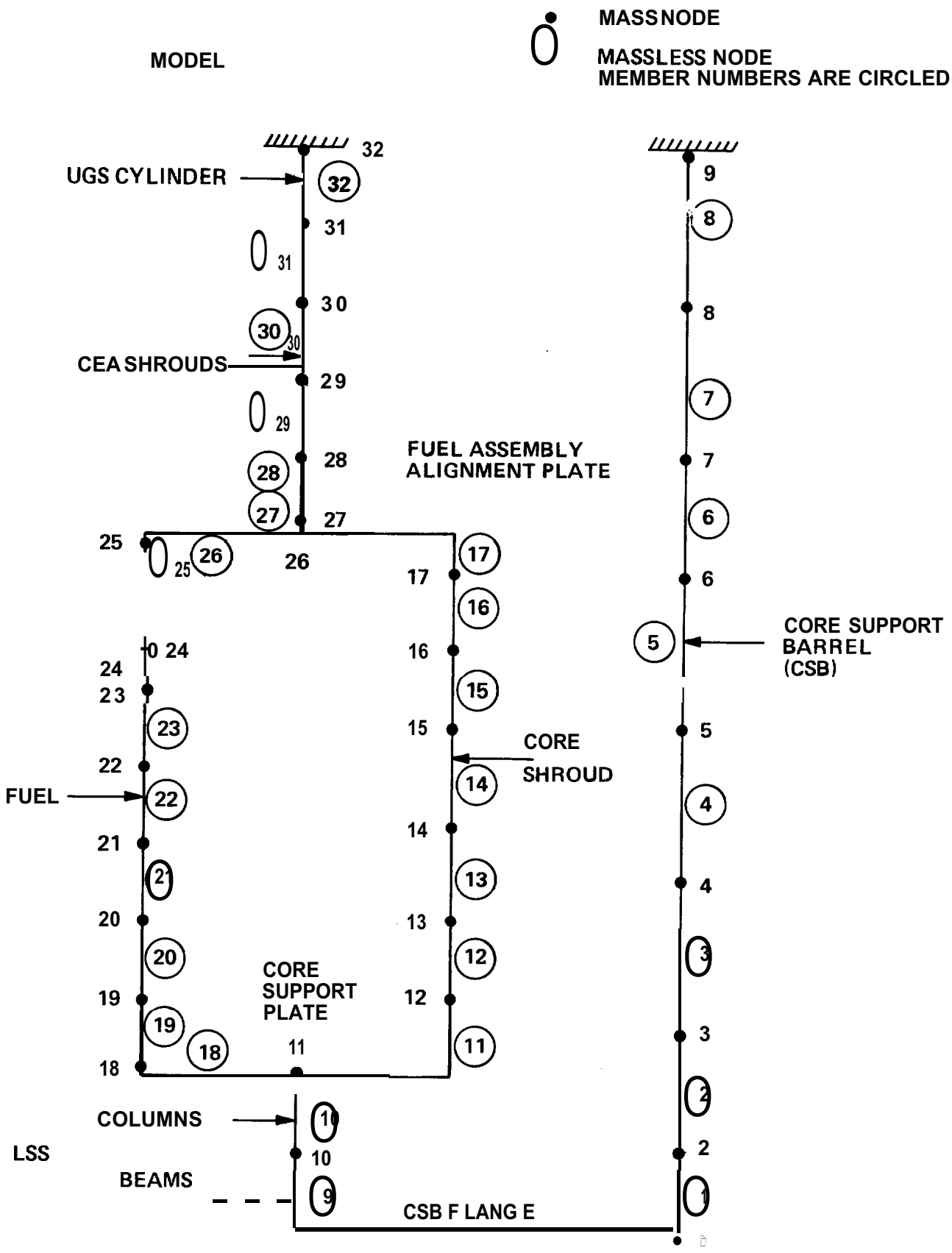
1 TO 30) X = +24.55'
Y = -22.15'

1 TO 25) X = +28.32'
Y = -22.15'
Z = -50.29'

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	SEISMIC PROTECTION ANALYSIS SAMPLE PROBLEM NO.. 3	Figure 3.7-29



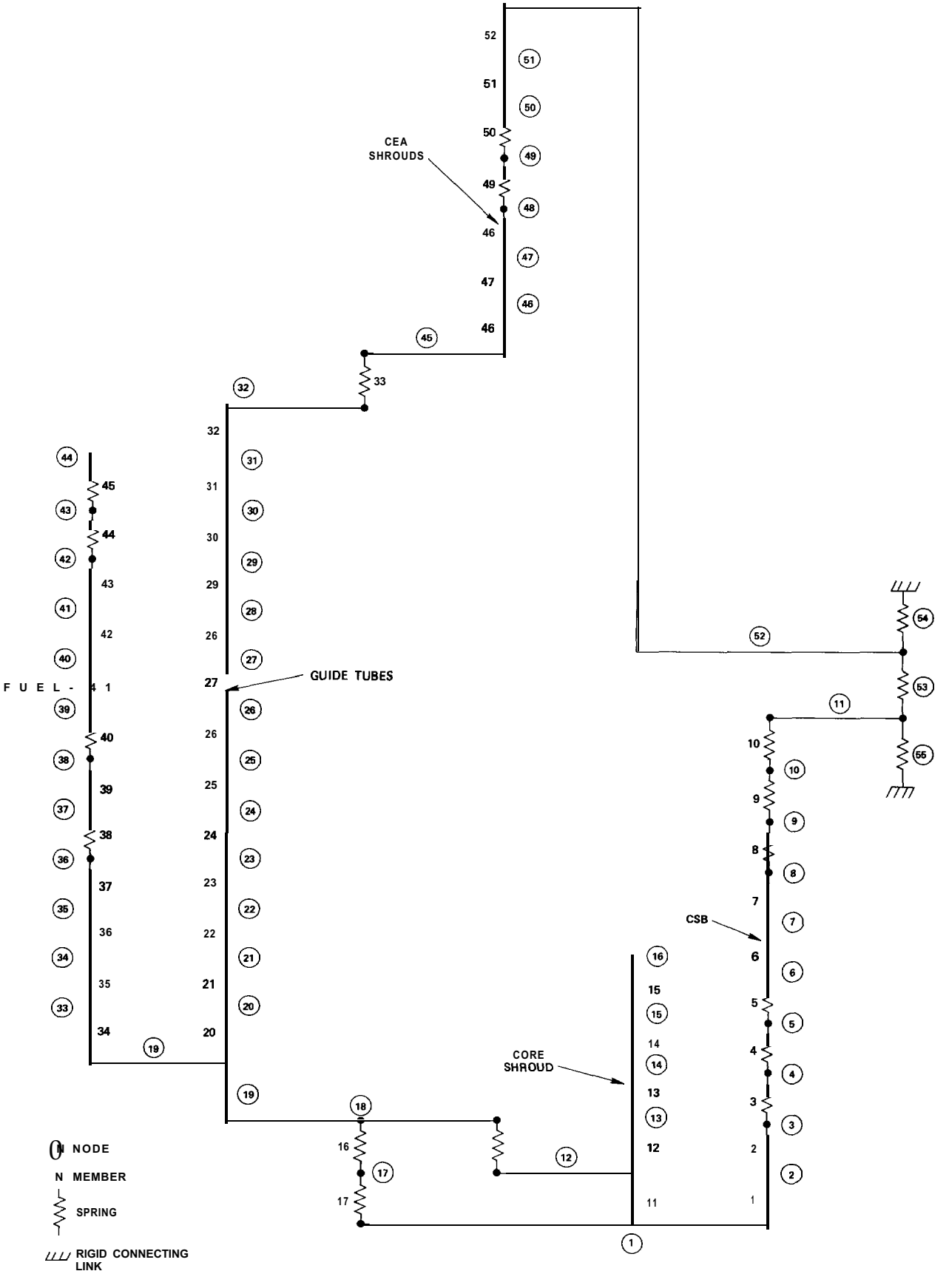
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	REPRESENTATIVE NODE LOCATIONS SEISMIC MATHEMATICAL MODEL	Figure 3.7-30



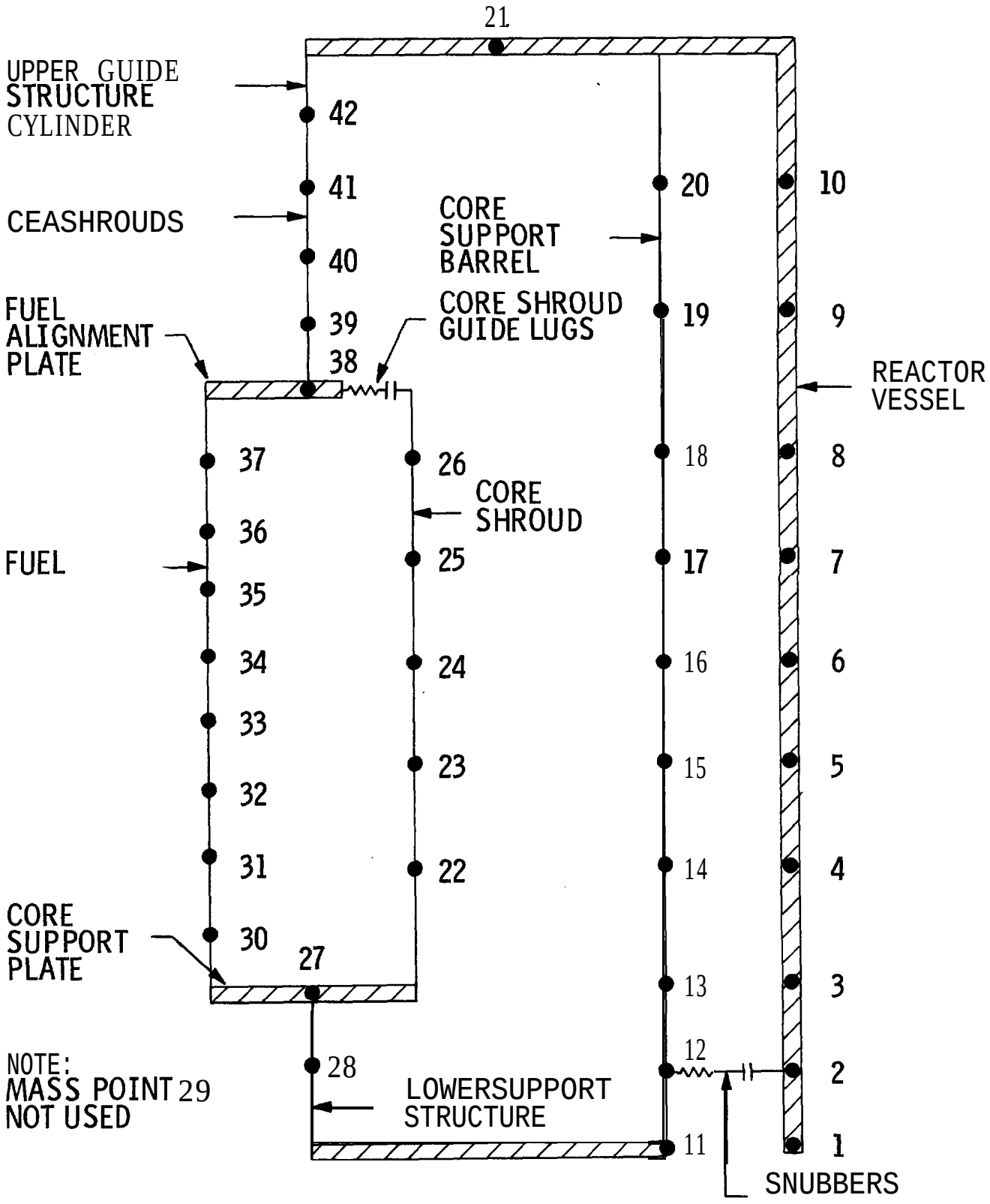
LOUISIANA POWER & LIGHT CO.
Waterford Steam Electric Station

REACTOR INTERNALS LINEAR LATERAL SEISMIC MODEL

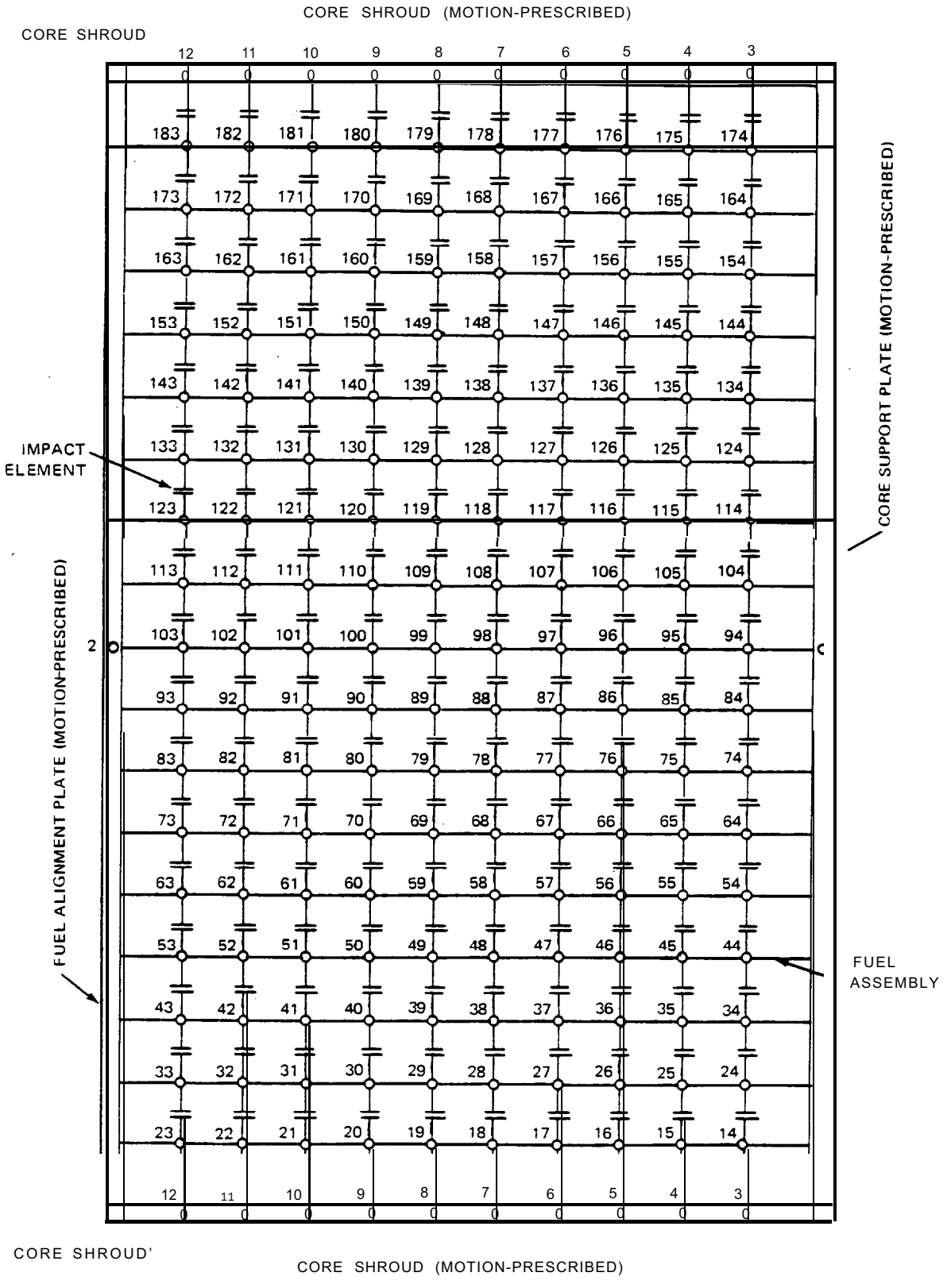
Figure 3.7-31



LOUISIANA POWER & LIGHT CO. **Waterford** Steam **Electric Station**	**REACTOR INTERNALS LINEAR VERTICAL SEISMIC MODEL**	**Figure 3.7-32**



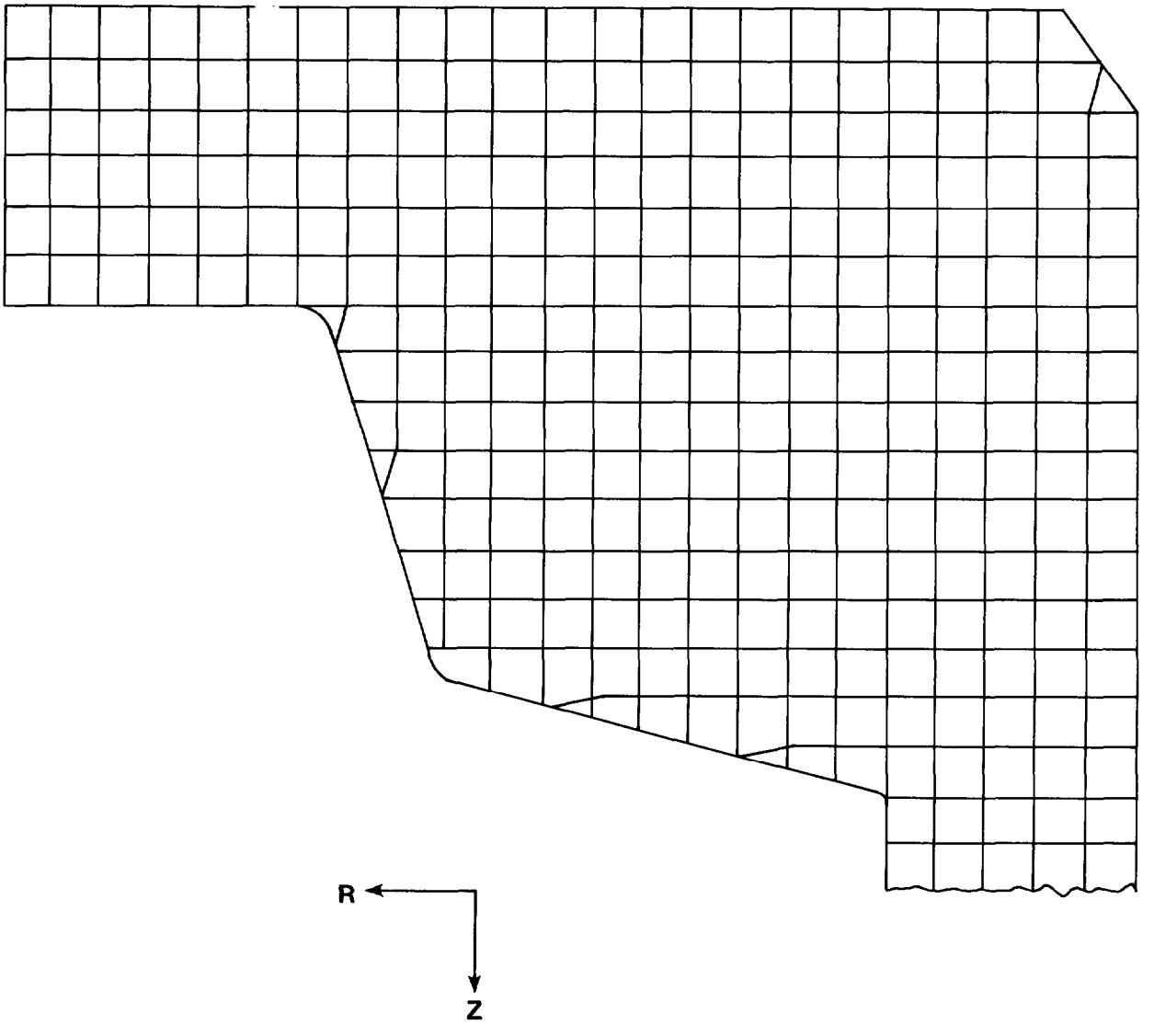
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	REACTOR INTERNALS NONLINEAR LATERAL SEISMIC MODEL	Figure 3.7-33



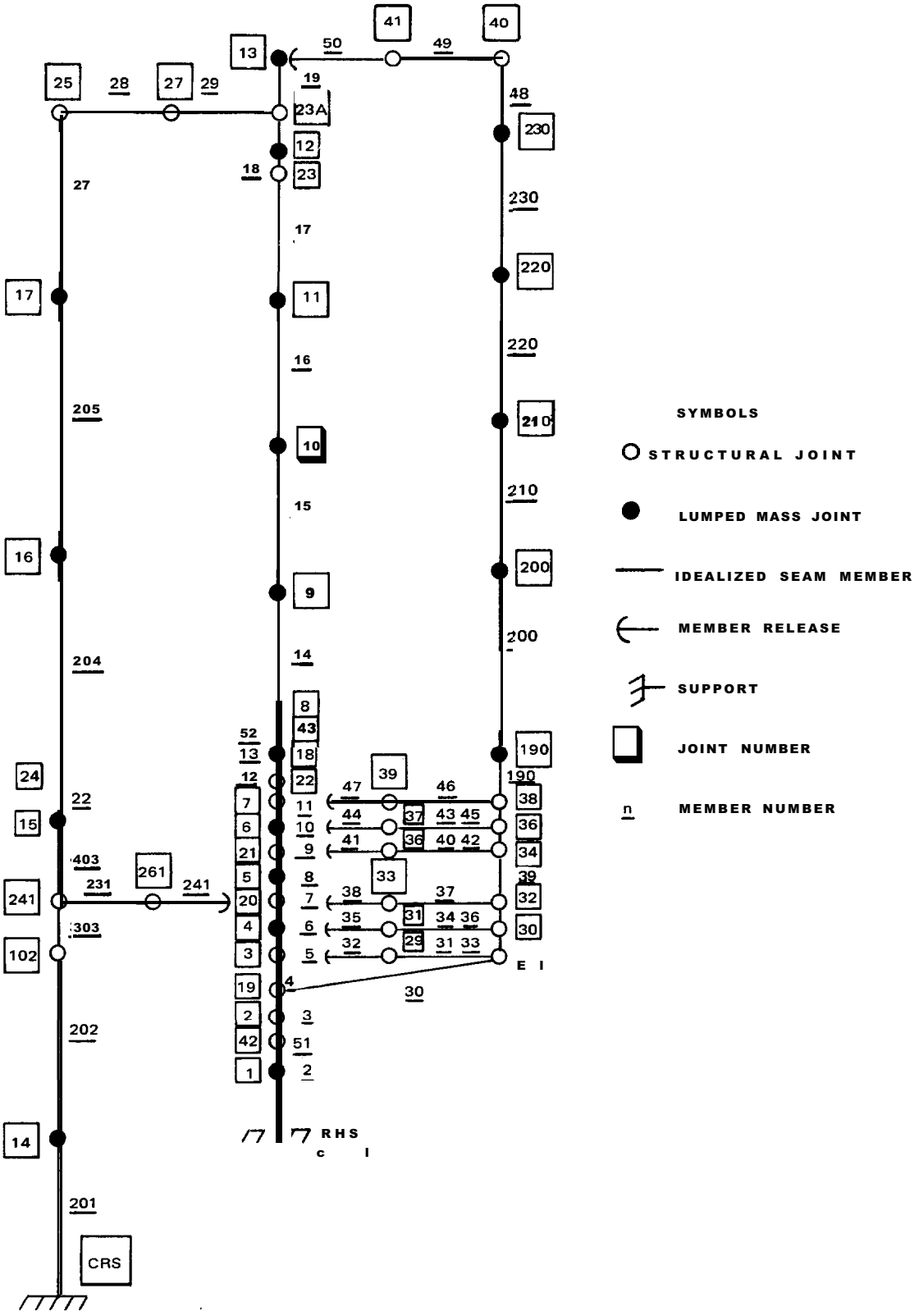
NOTE:

DETAILED CORE SEISMIC MODEL
(ONE ROW OF 17 FUEL ASSEMBLIES)

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**REACTOR CORE HORIZONTAL NONLINEAR SEISMIC MODEL**	**Figure** 3.7-34



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	CORE-SUPPORT BARREL UPPER FLANGE FINITE-ELEMENT MODEL	Figure 3.7-35



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	SCHEMATIC REPRESENTATION OF THE THEORETICALLY MODELED 150 INCH CEDM	Figure 3.7-36