
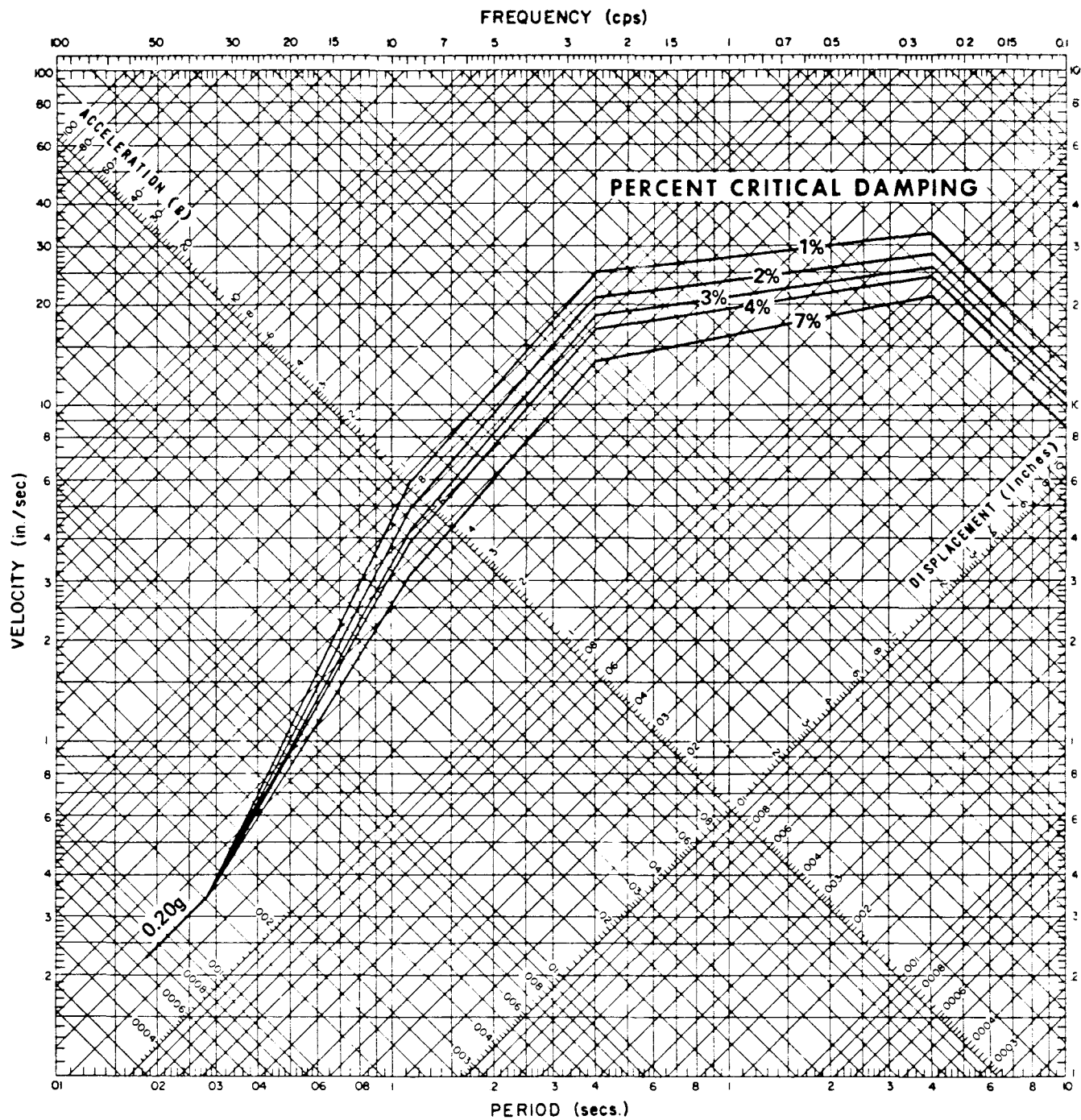


-  STRUCTURES HOUSING SYSTEMS & COMPONENTS THAT ARE ESSENTIAL IN ATTAINING & MAINTAINING A SAFE SHUTDOWN OF THE PLANT.
- * FOR CRITICAL NON POWER BLOCK STRUCTURES

Rev. OL-0
6/86

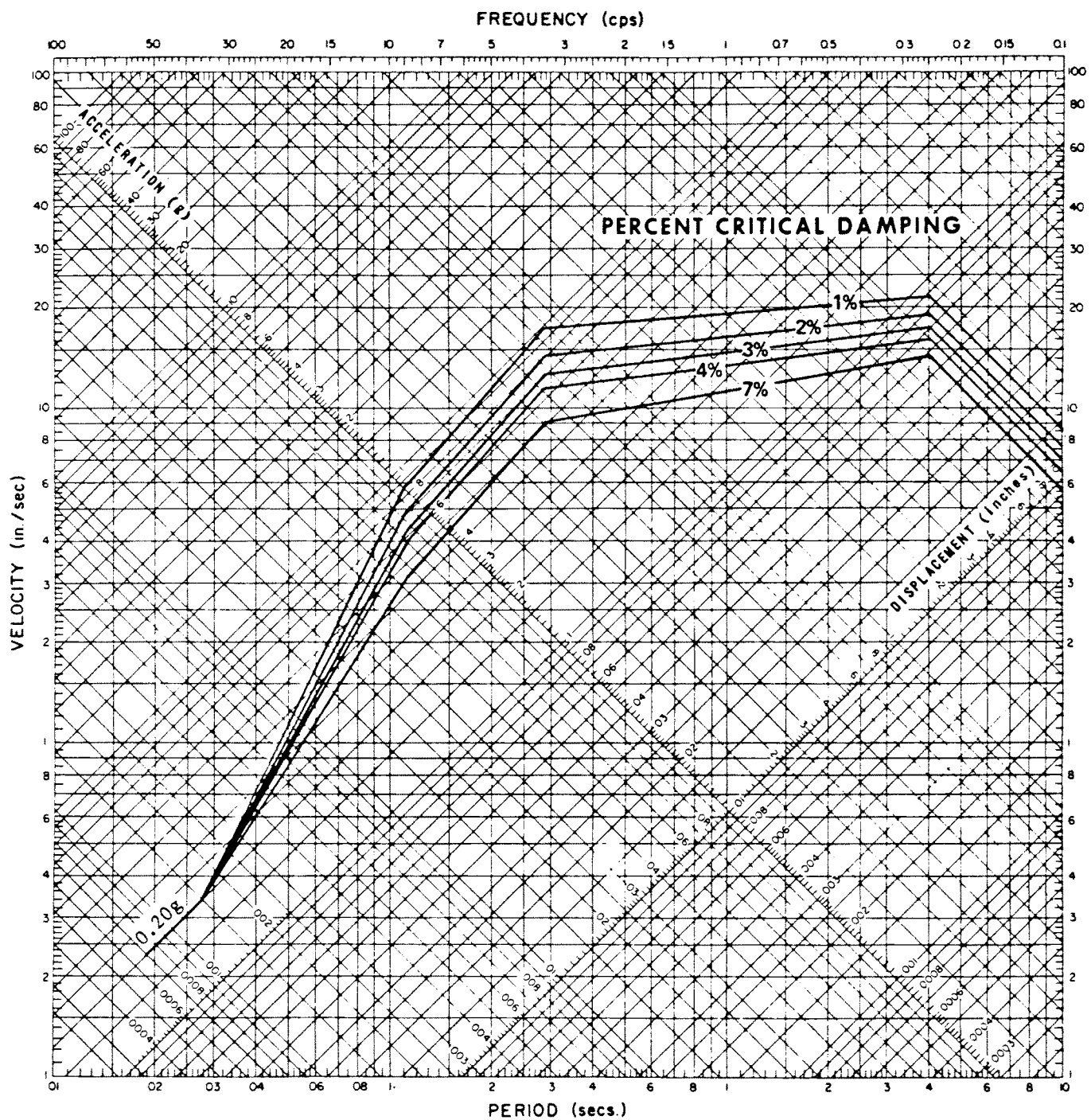
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FIGURE 3.5-1 TURBINE MISSILE TRAJECTORY



Rev. OL-0
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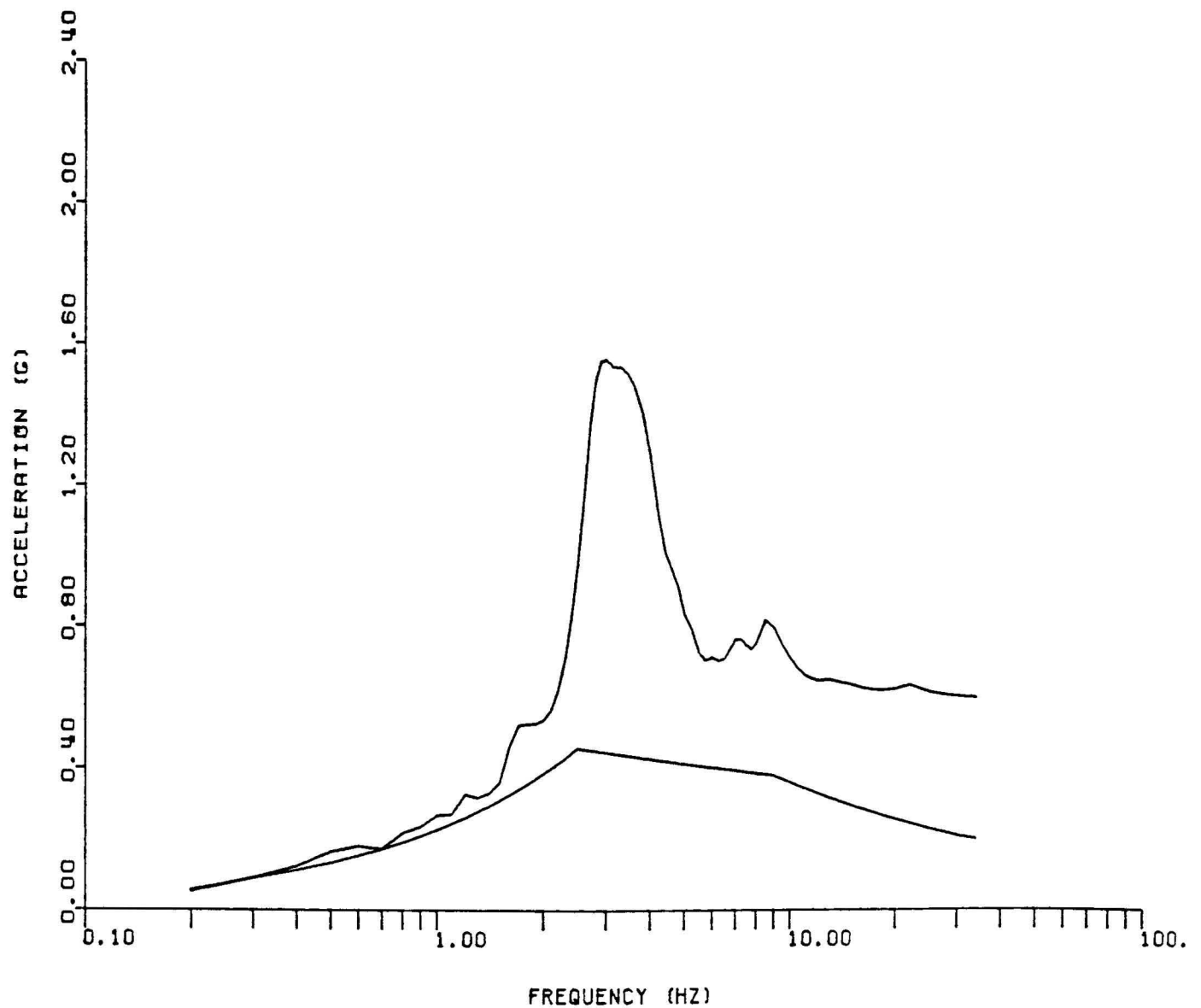
FIGURE 3.7-1
SSE HORIZONTAL GROUND SPECTRA
0.20 G



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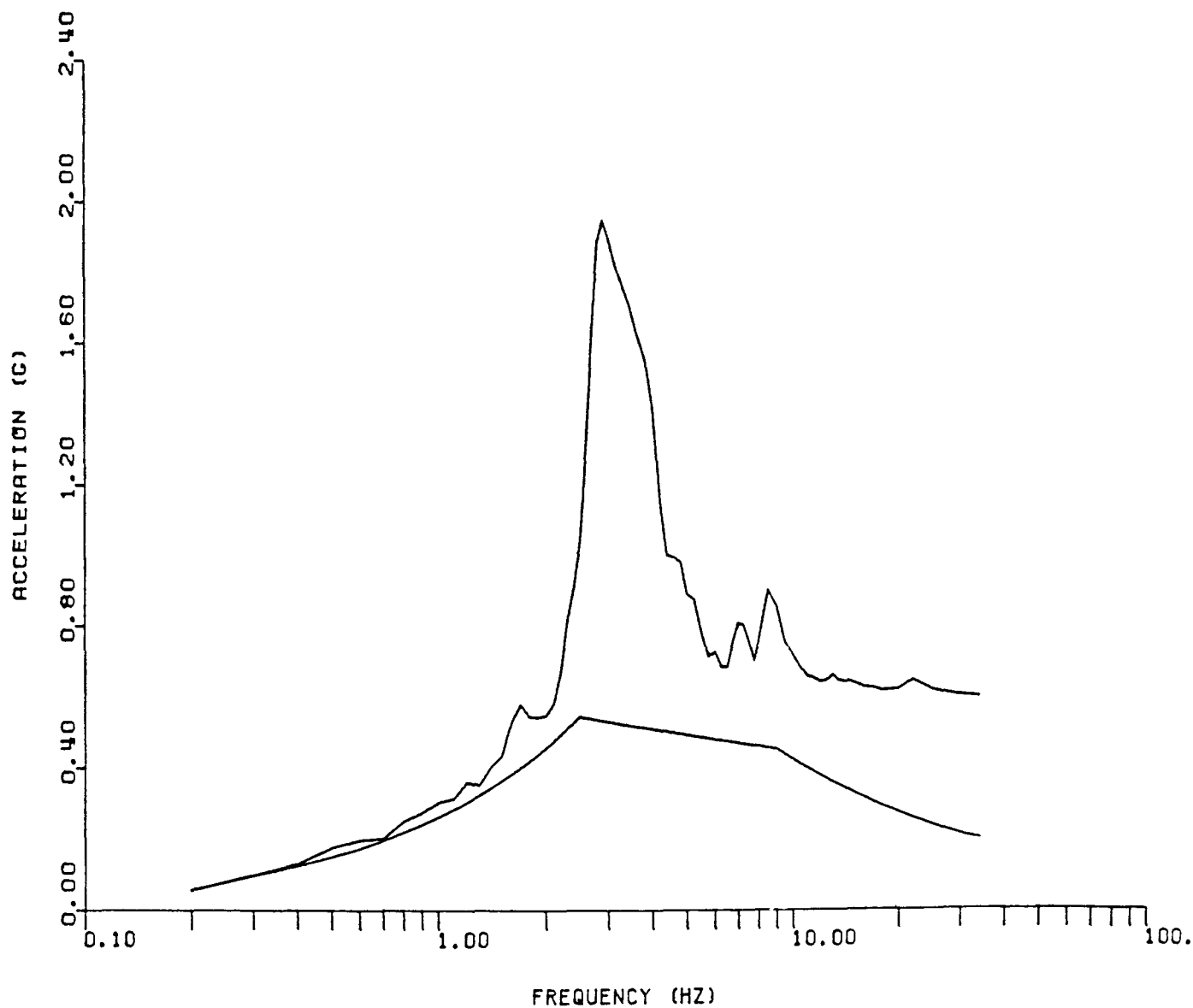
FIGURE 3.7-2
SSE VERTICAL GROUND SPECTRA
0.20 G



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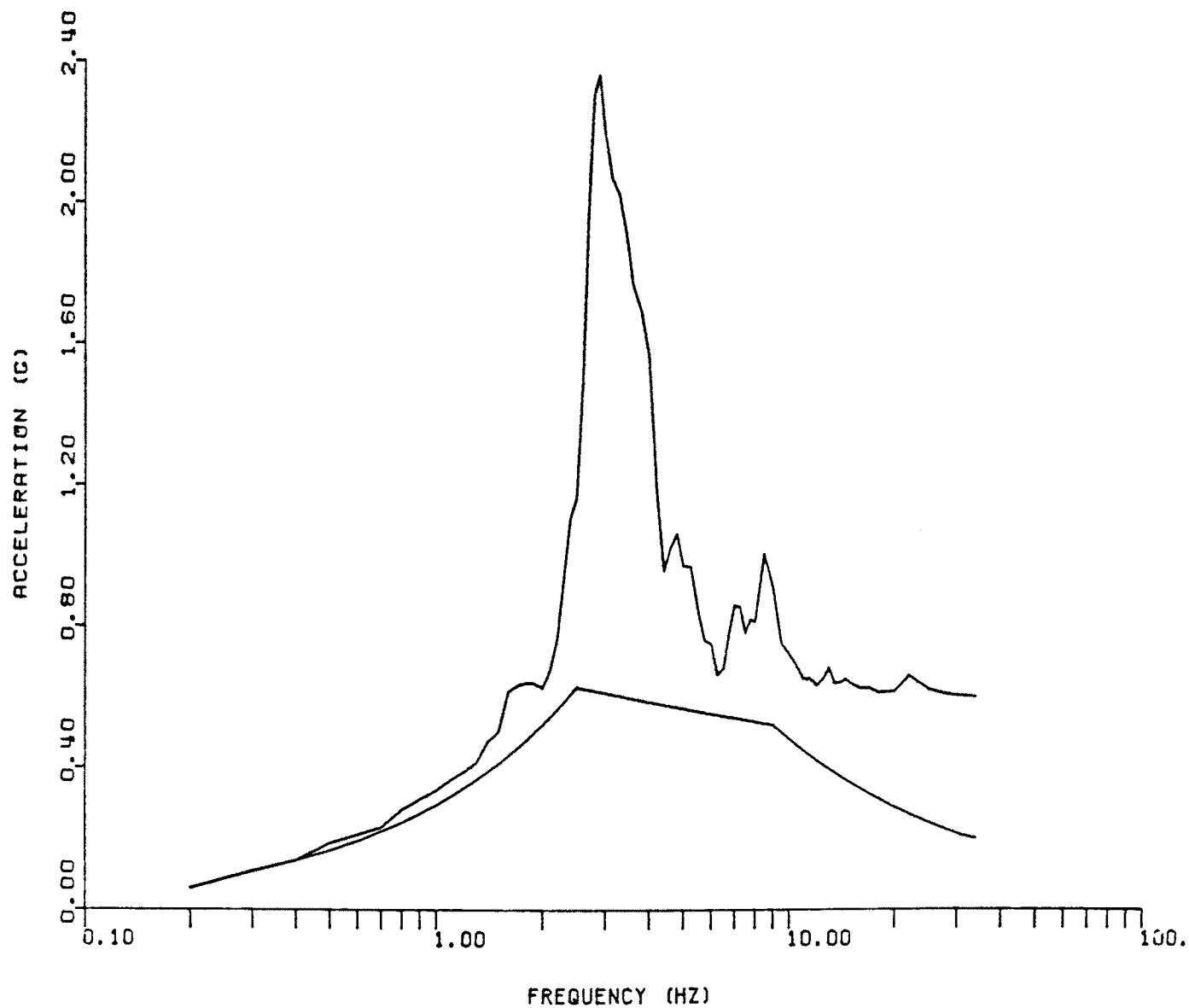
**FIGURE 3.7-3
HORIZONTAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
10% DAMPING**



Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

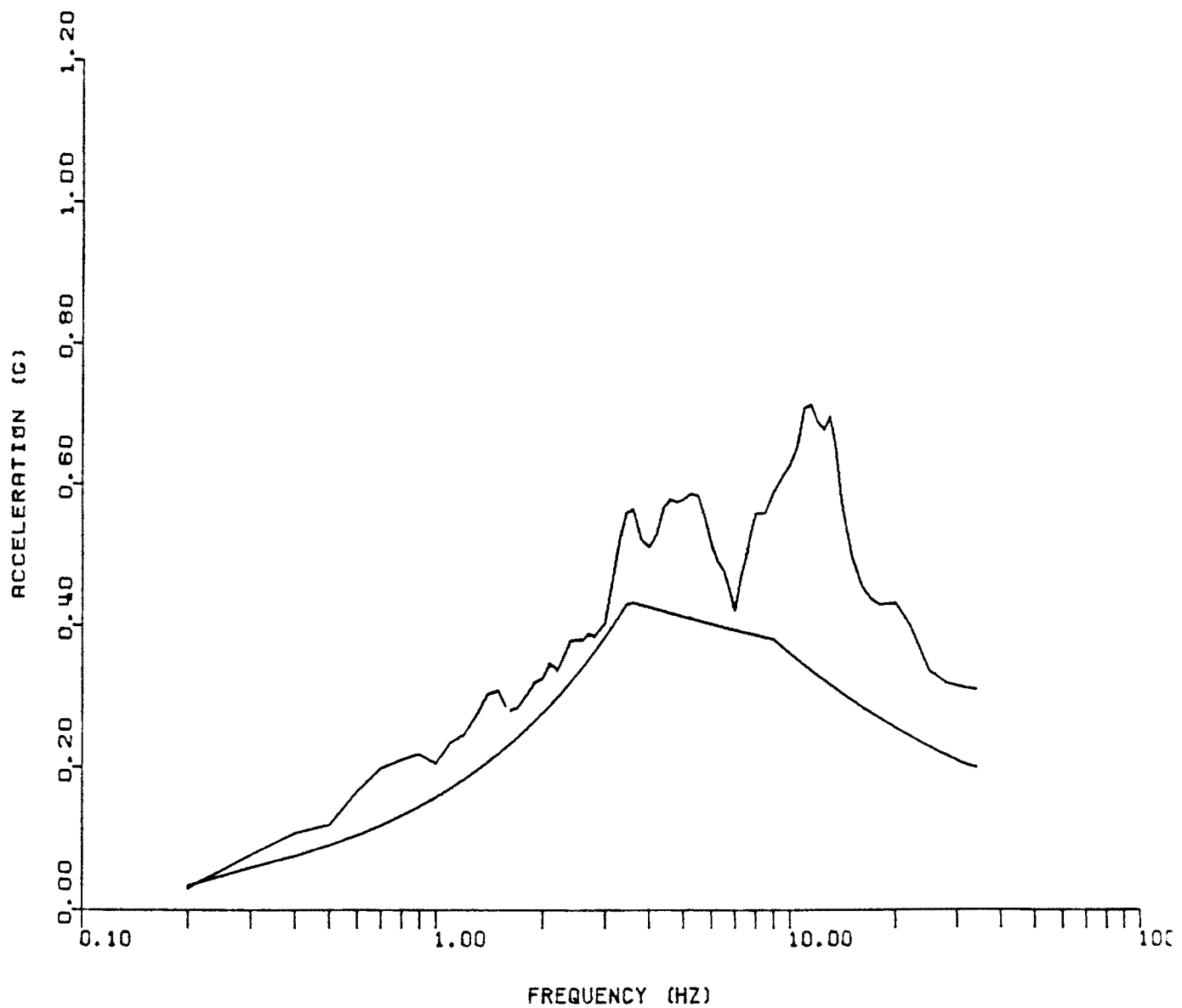
FIGURE 3.7-4
HORIZONTAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
7% DAMPING



Rev. OL-0
6/86

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CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT**

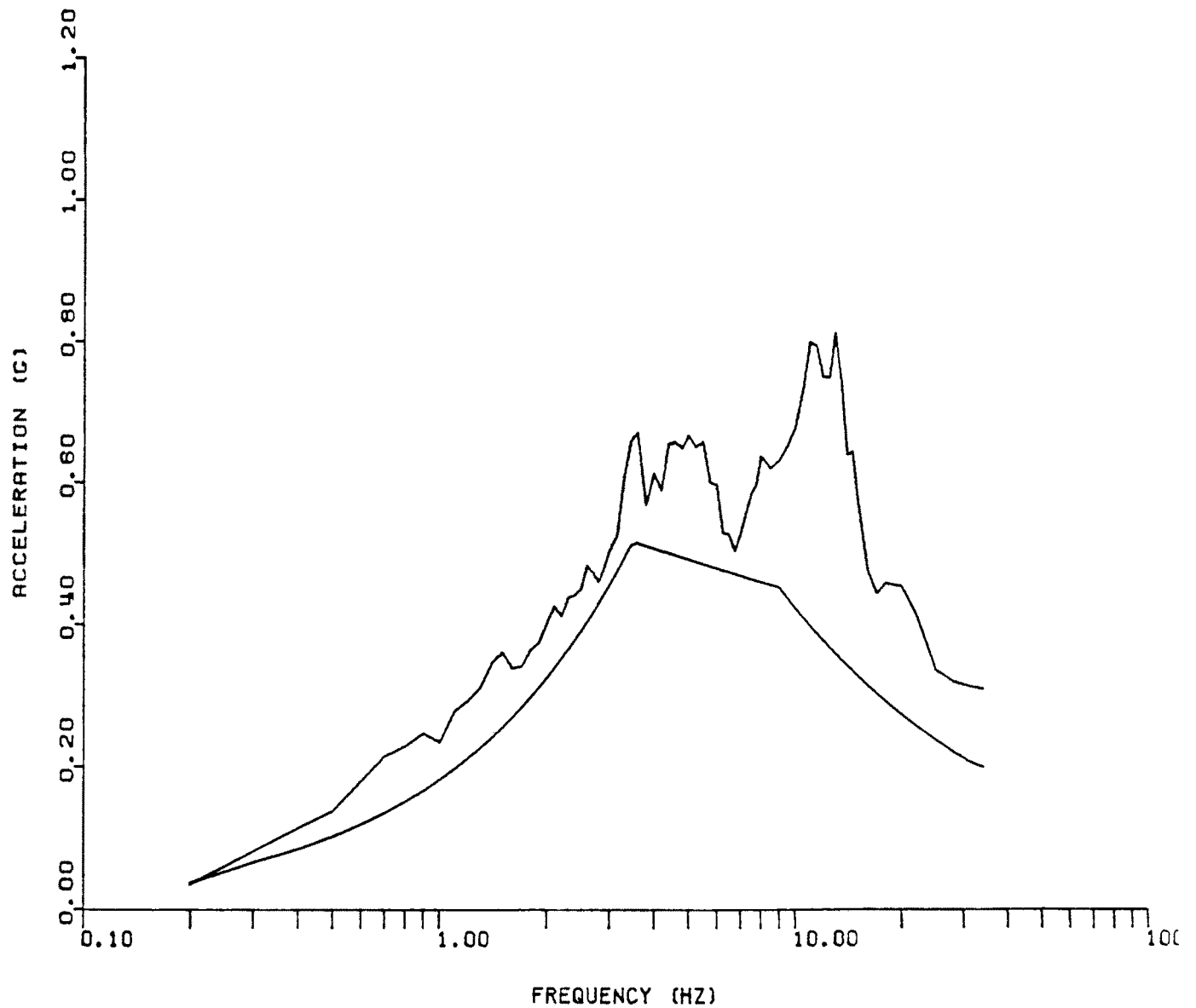
**FIGURE 3.7-5
HORIZONTAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
5% DAMPING**



Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT**
FINAL SAFETY ANALYSIS REPORT

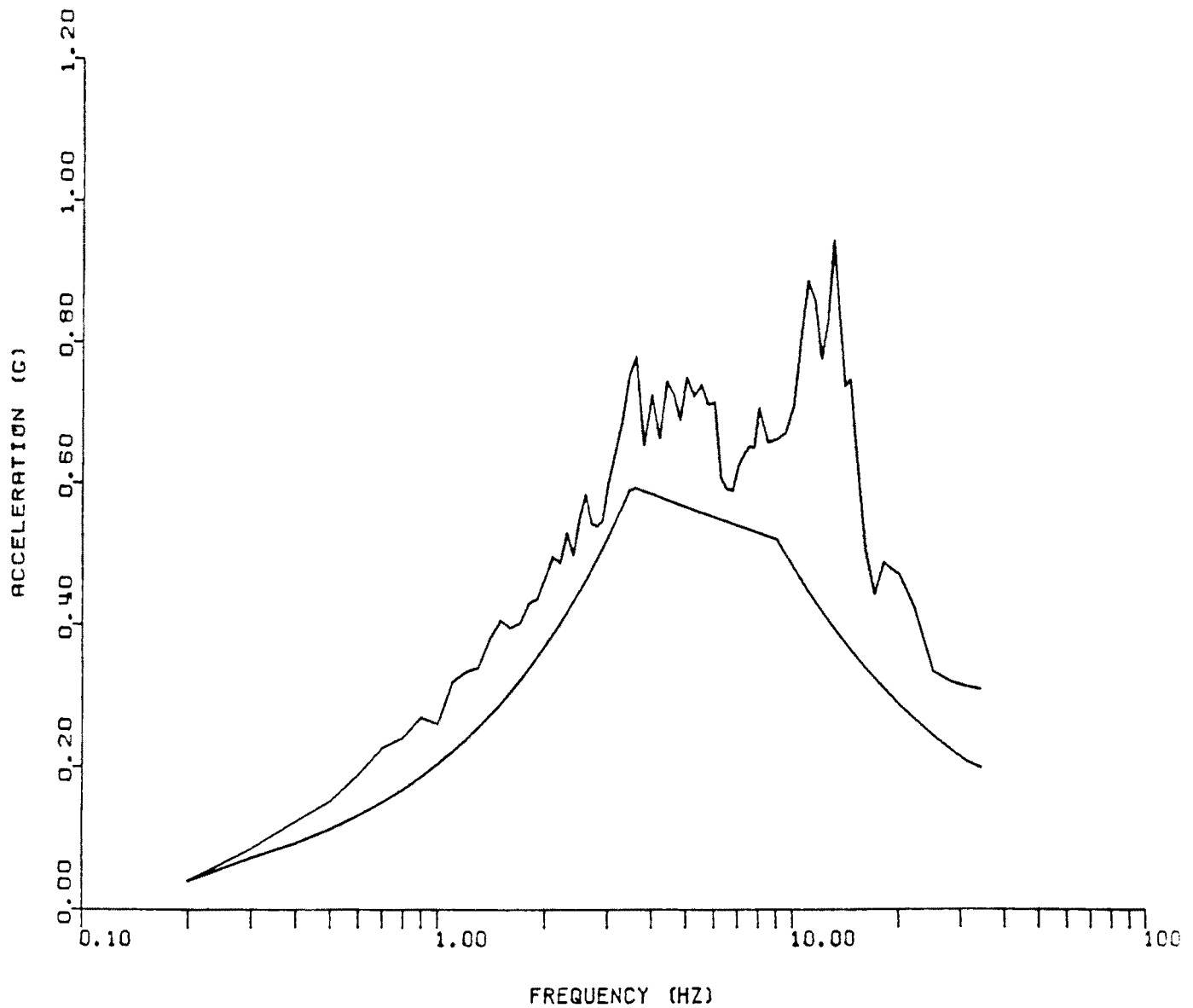
**FIGURE 3.7-6
VERTICAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
10% DAMPING**



Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
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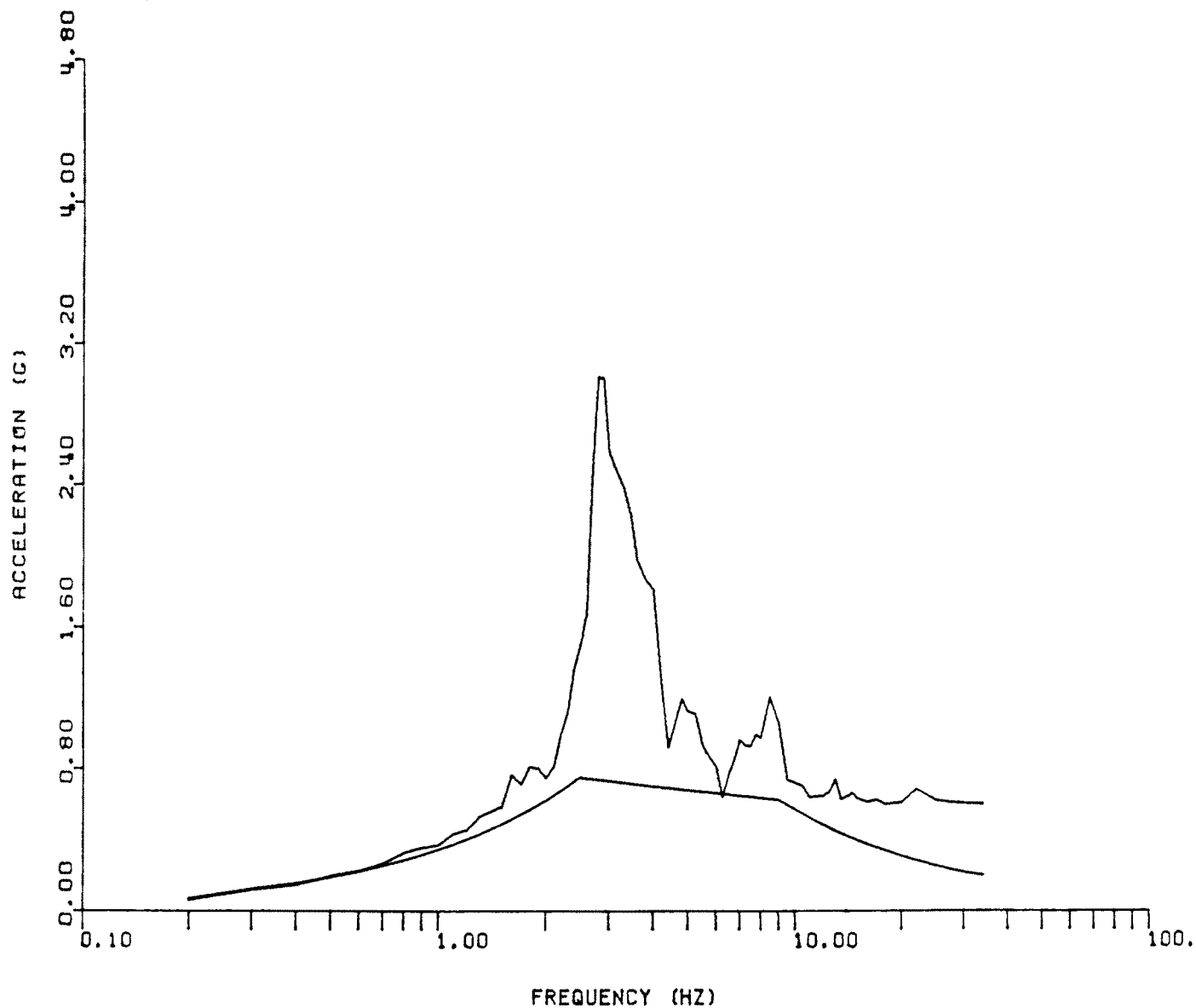
**FIGURE 3.7-7
VERTICAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
7% DAMPING**



Rev. OL-0
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**UNION ELECTRIC COMPANY
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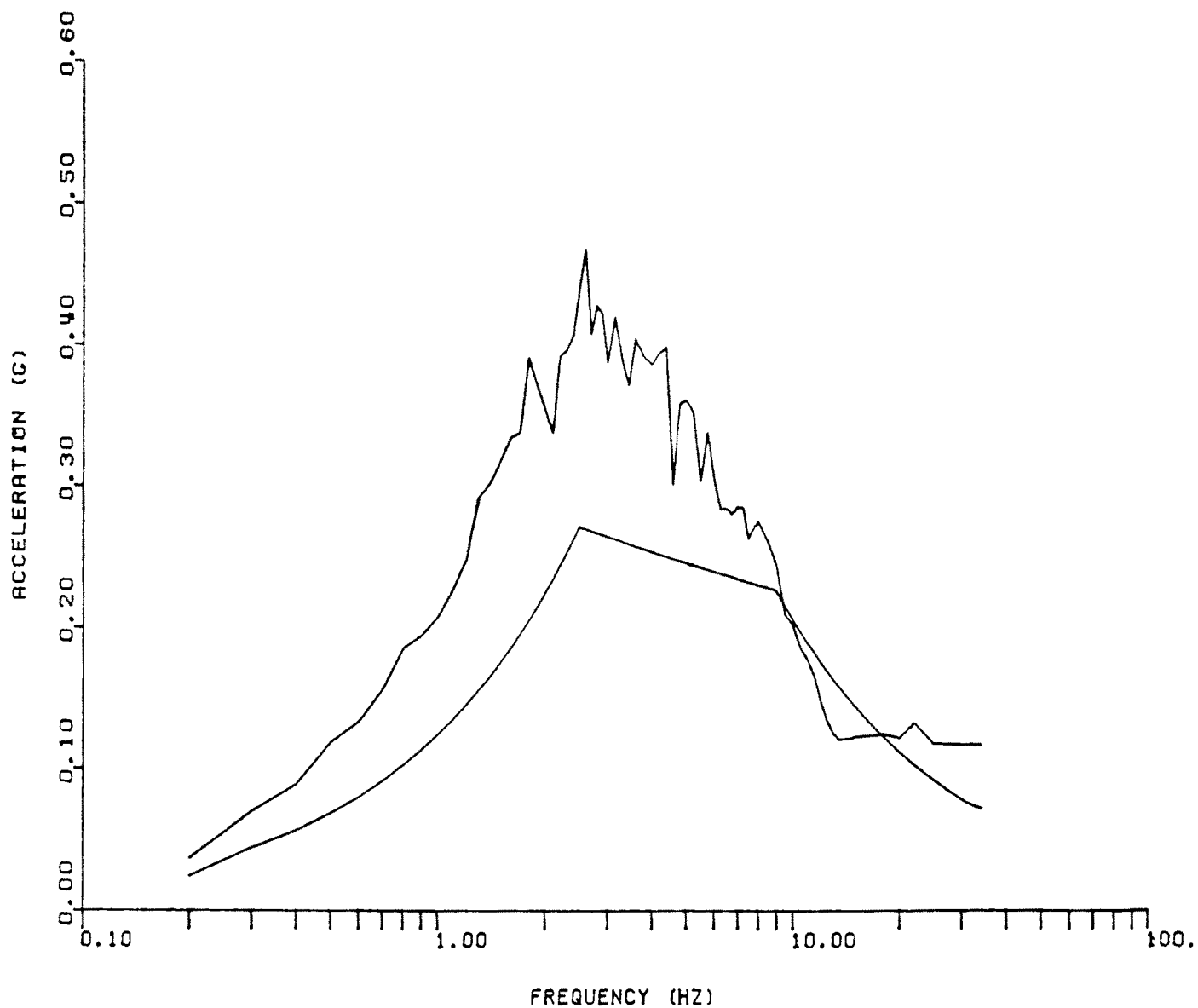
**FIGURE 3.7-8
VERTICAL DESIGN RESPONSE SPECTRA
0.20 G GROUND ACCELERATION
5% DAMPING**



Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT**

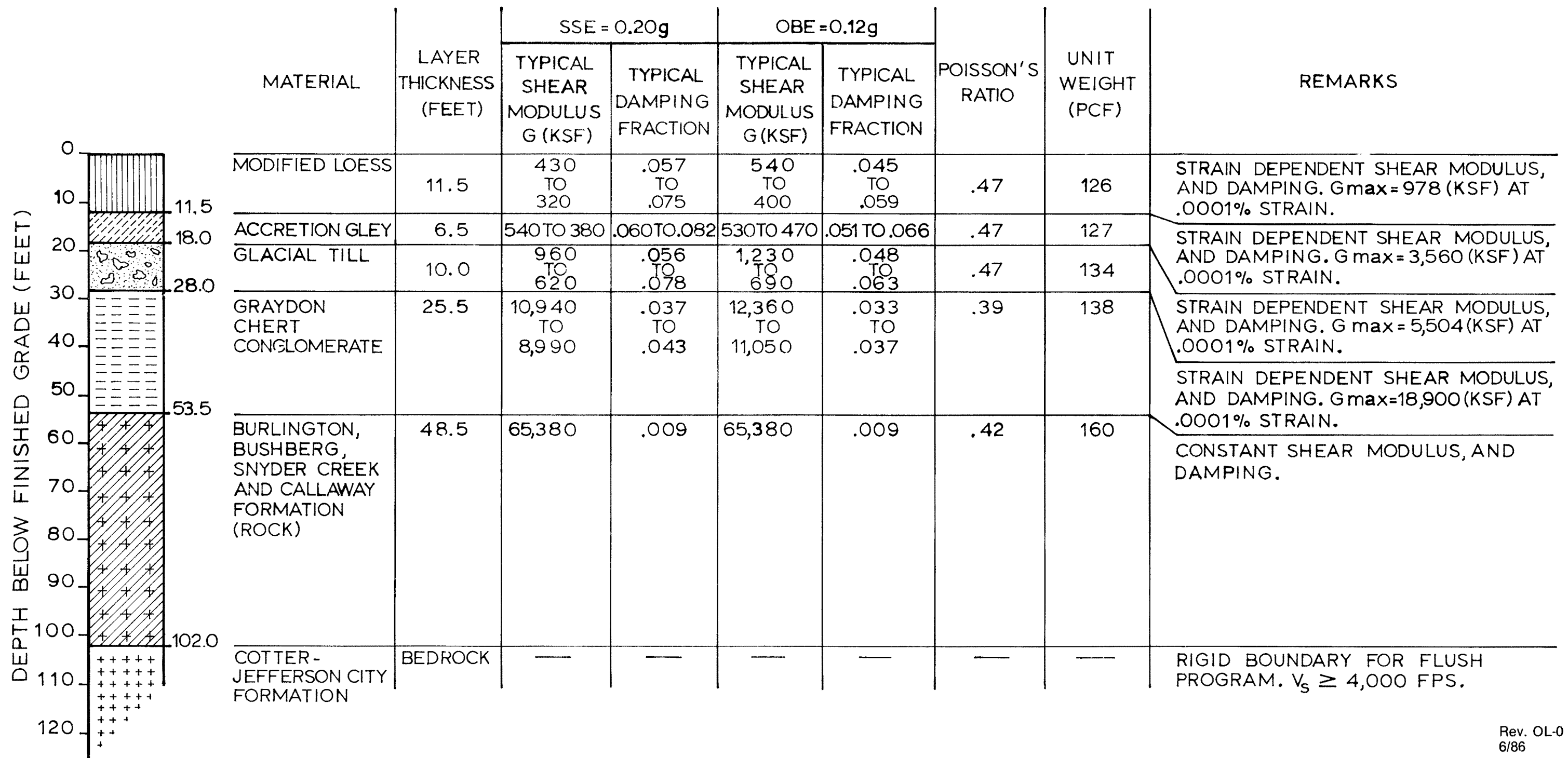
**FIGURE 3.7-9
TYPICAL, FREE FIELD BASE
ELEVATION SPECTRA
ESWS PUMPHOUSE**



Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT**
FINAL SAFETY ANALYSIS REPORT

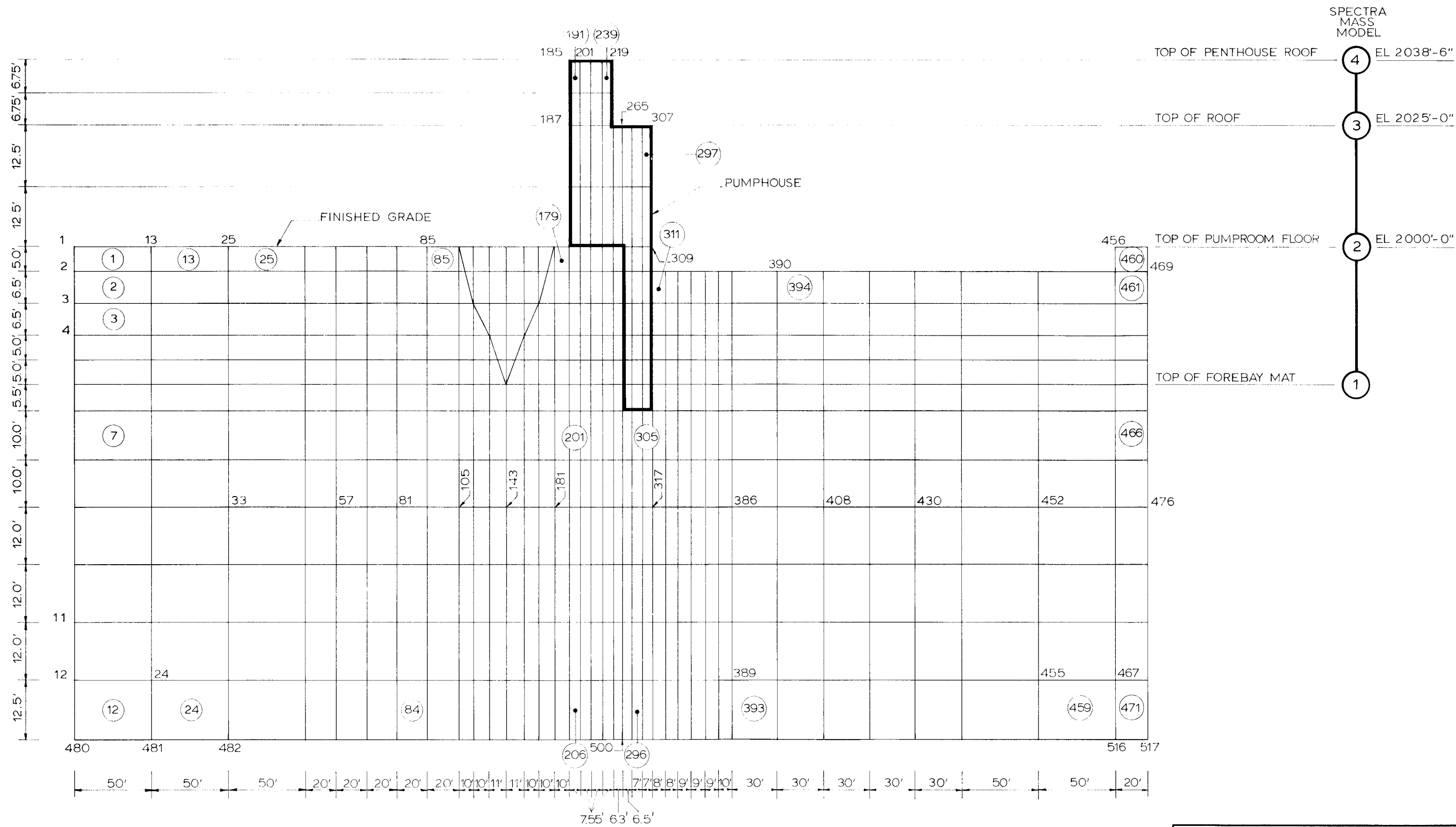
FIGURE 3.7-10
TYPICAL, FREE FIELD BASE
ELEVATION SPECTRA
UHS COOLING TOWER

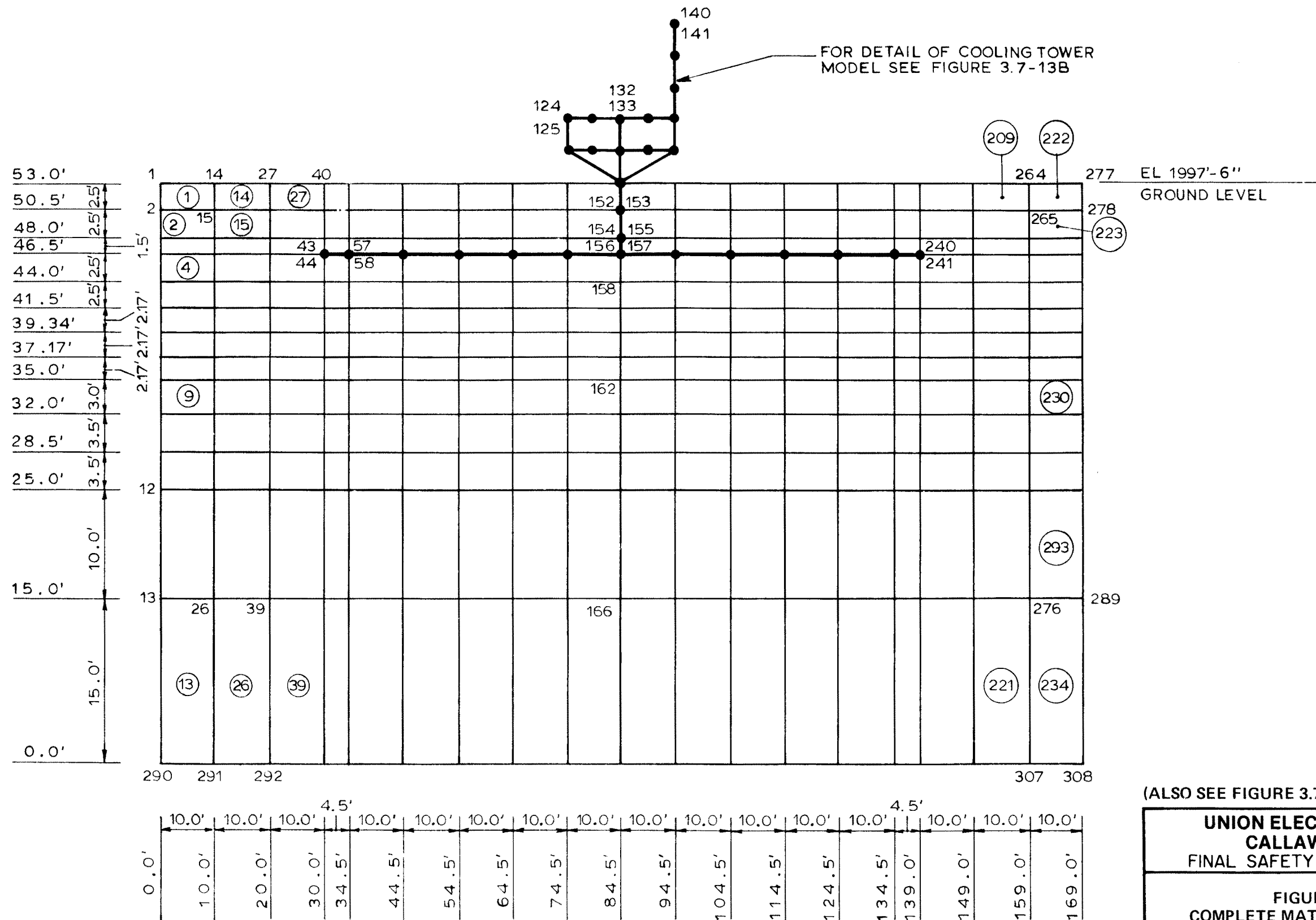


Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
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FIGURE 3.7-11
 FREE FIELD MEDIA
 TYPICAL SUBSURFACE PROFILE
 AND SOIL PROPERTIES
 SSE AND OBE



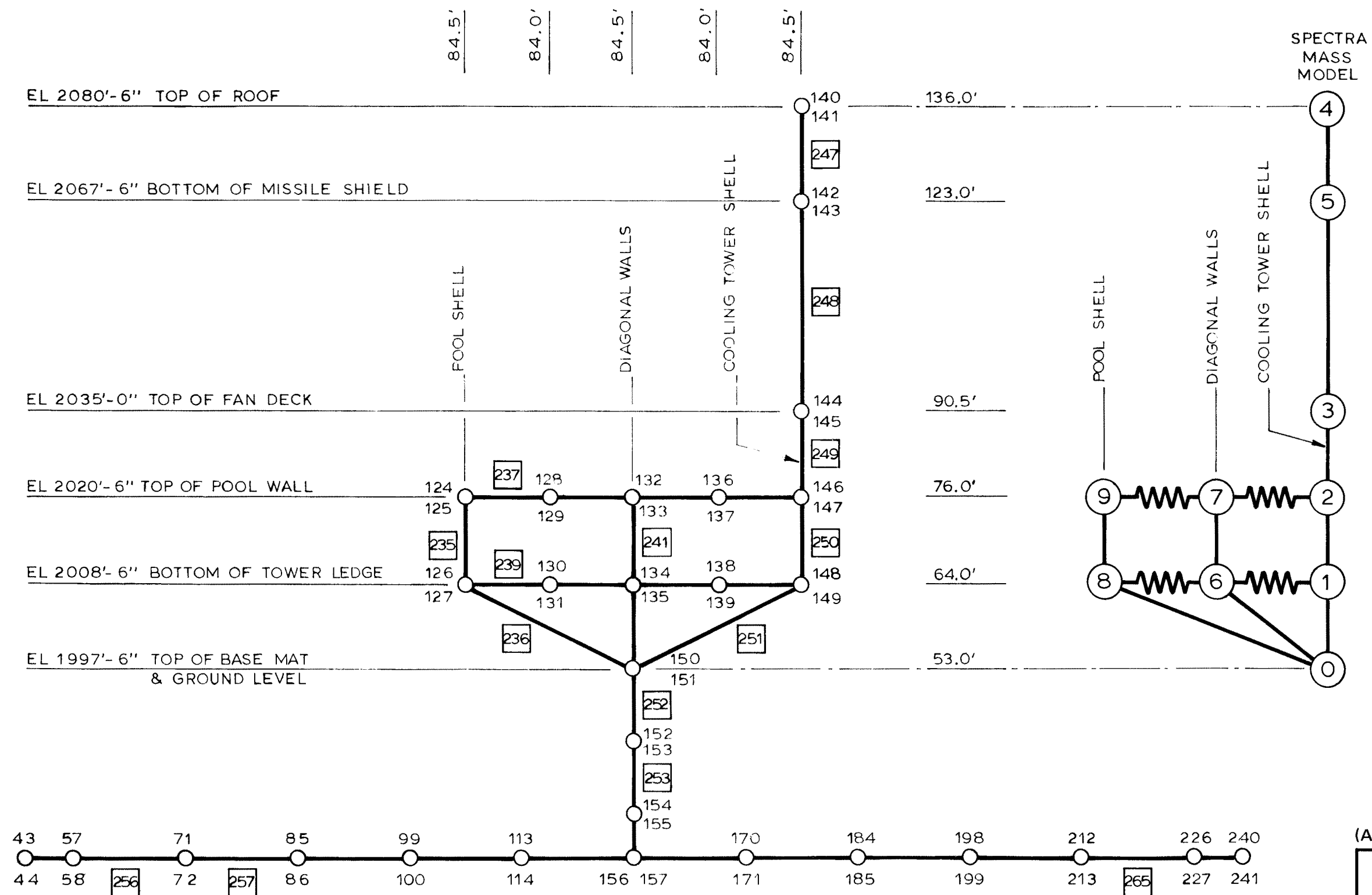


(ALSO SEE FIGURE 3.7-13B)

Rev. OL-0
6/86

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CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT**

**FIGURE 3.7-13A
COMPLETE MATHEMATICAL MODEL
UHS COOLING TOWER
NORTH-SOUTH ANALYSIS**



(ALSO SEE FIGURE 3.7-13A)

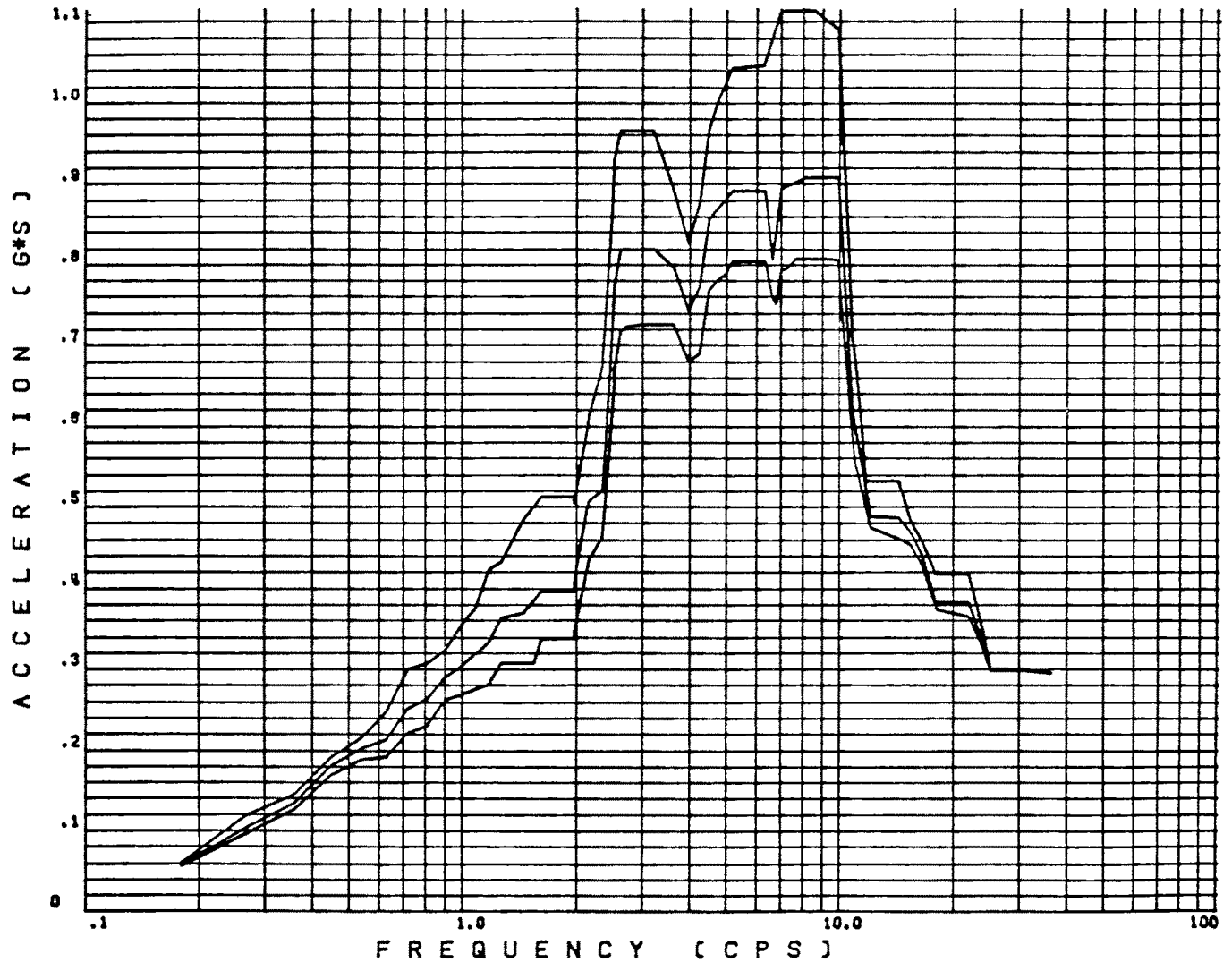
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FIGURE 3.7-13B
SUPPLEMENTAL MATHEMATICAL MODEL
UHS COOLING TOWER
NORTH-SOUTH ANALYSIS

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

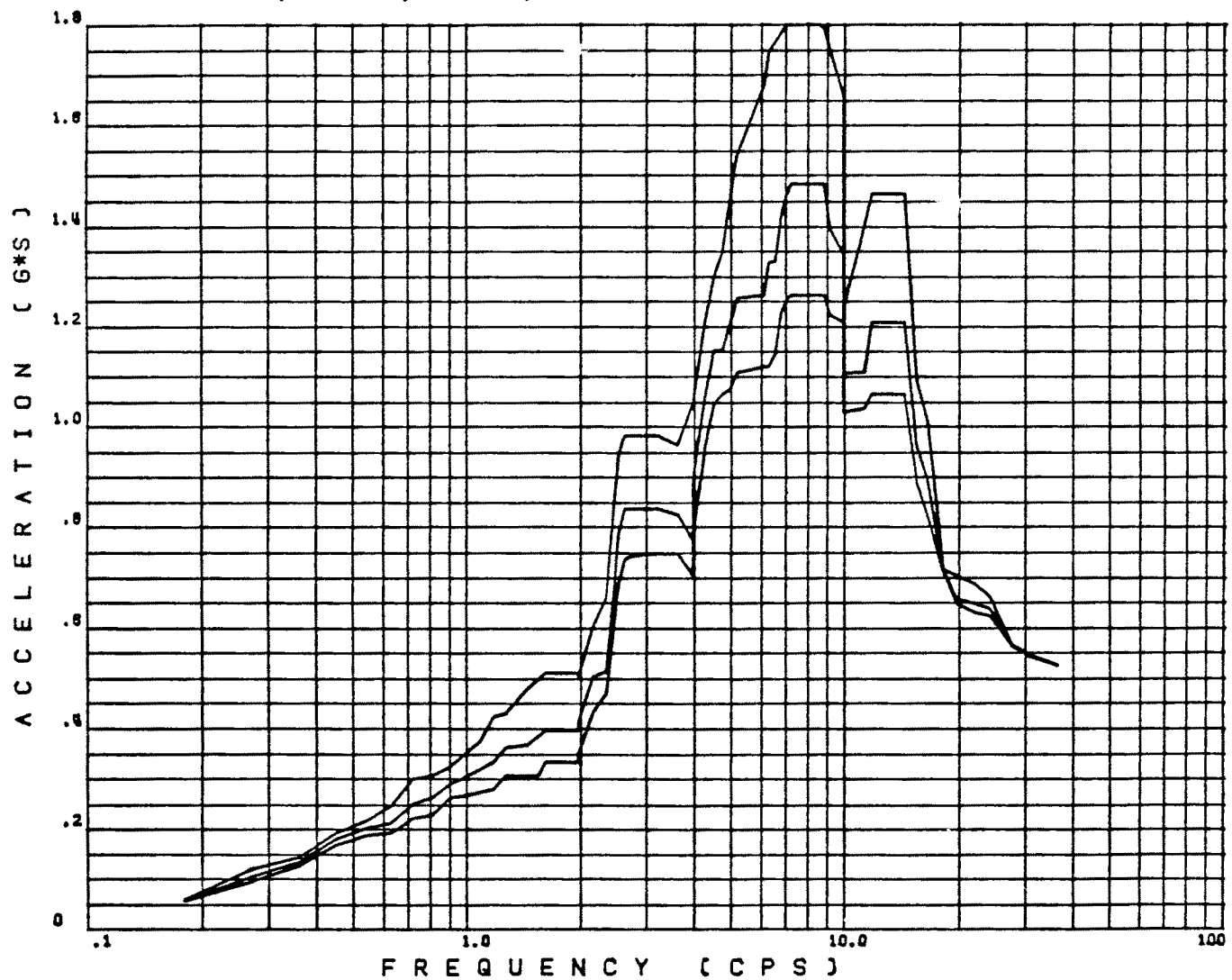
Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14A
SPECTRA - ESWP PUMPHOUSE
SSE
NORTH-SOUTH DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

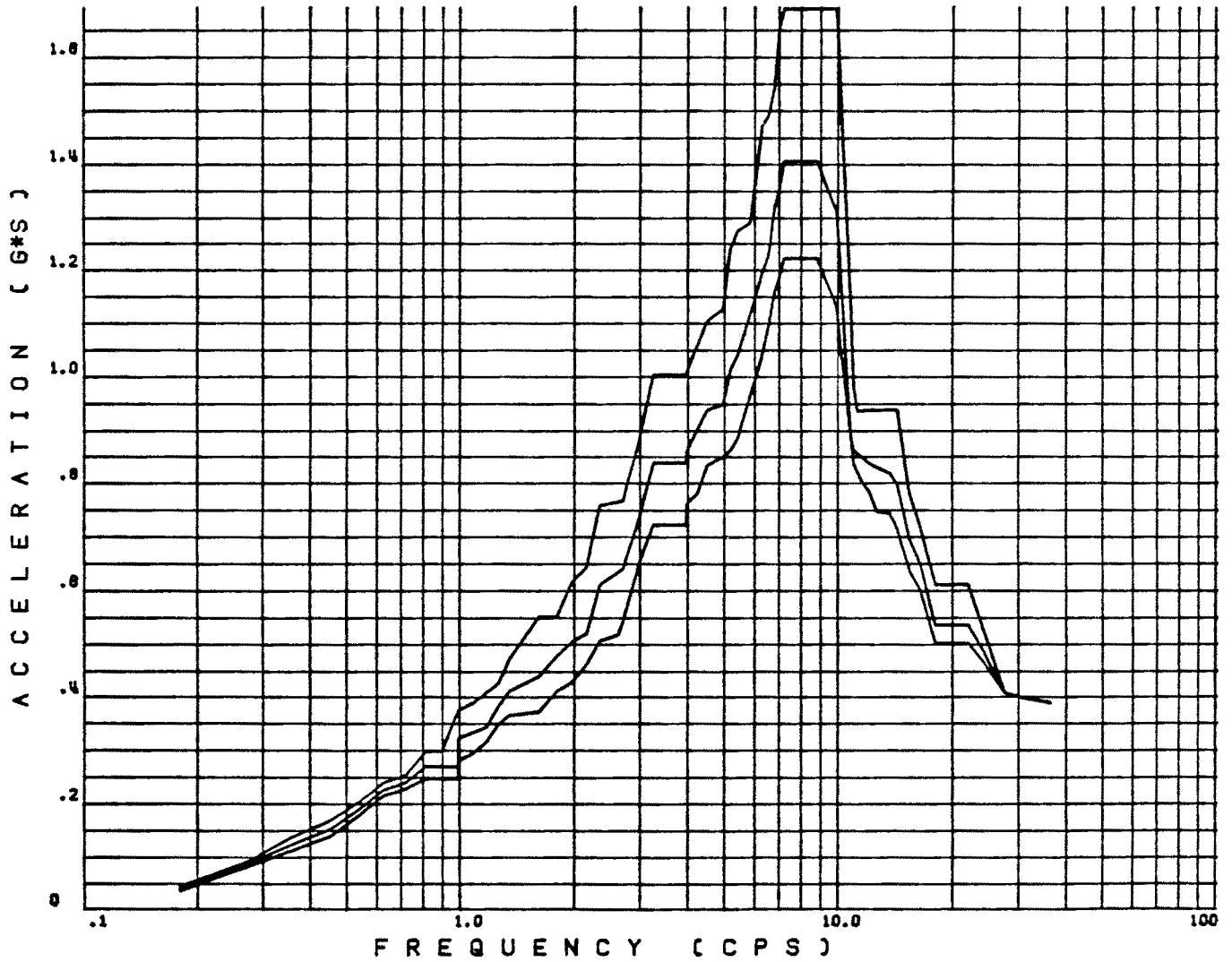
Rev. OL-0
6/86

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CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14B
SPECTRA — ESWP PUMPHOUSE
SSE
EAST-WEST DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

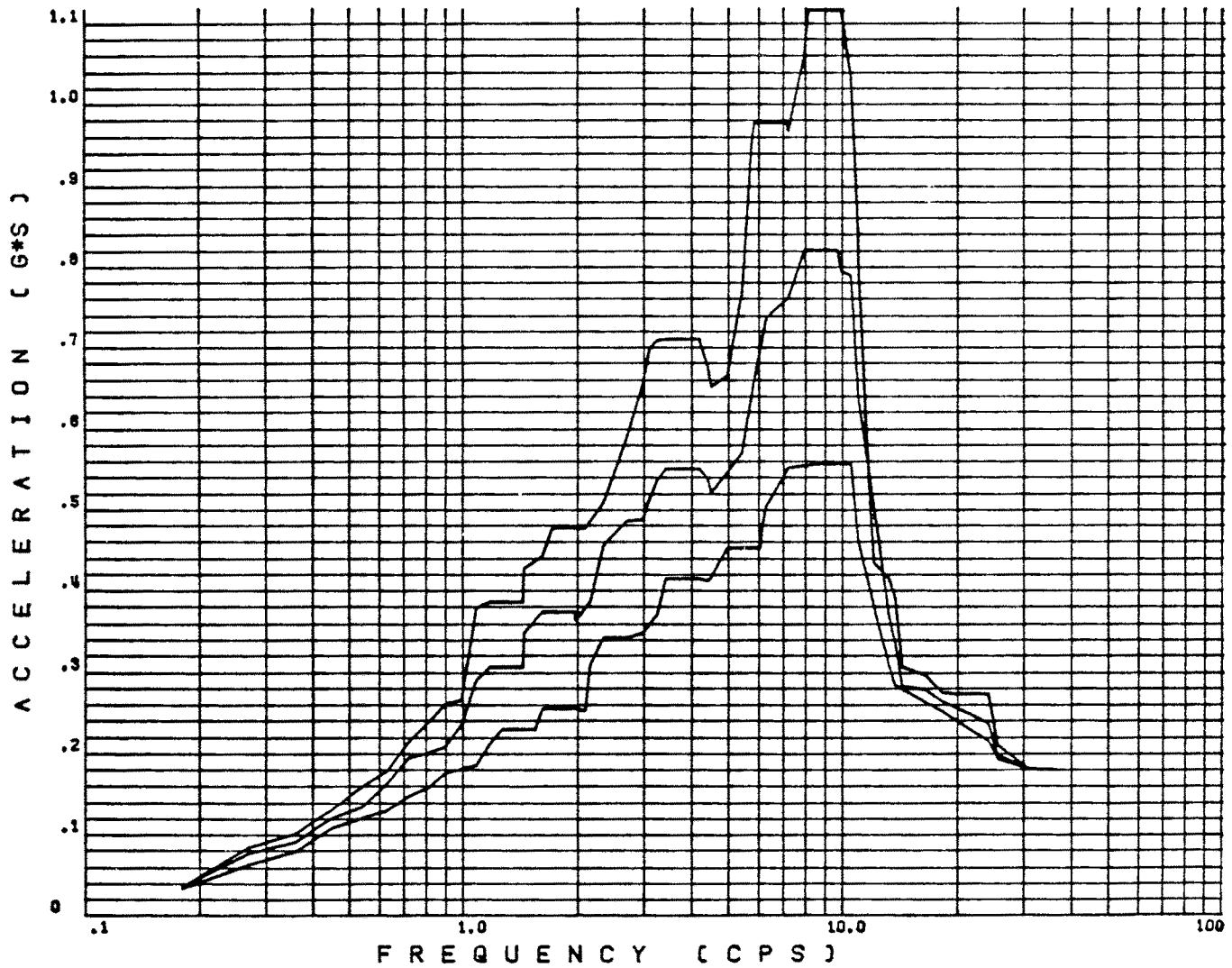
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6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14C
SPECTRA — ESWP PUMPHOUSE
SSE
VERTICAL DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0100, .0200, .0500,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

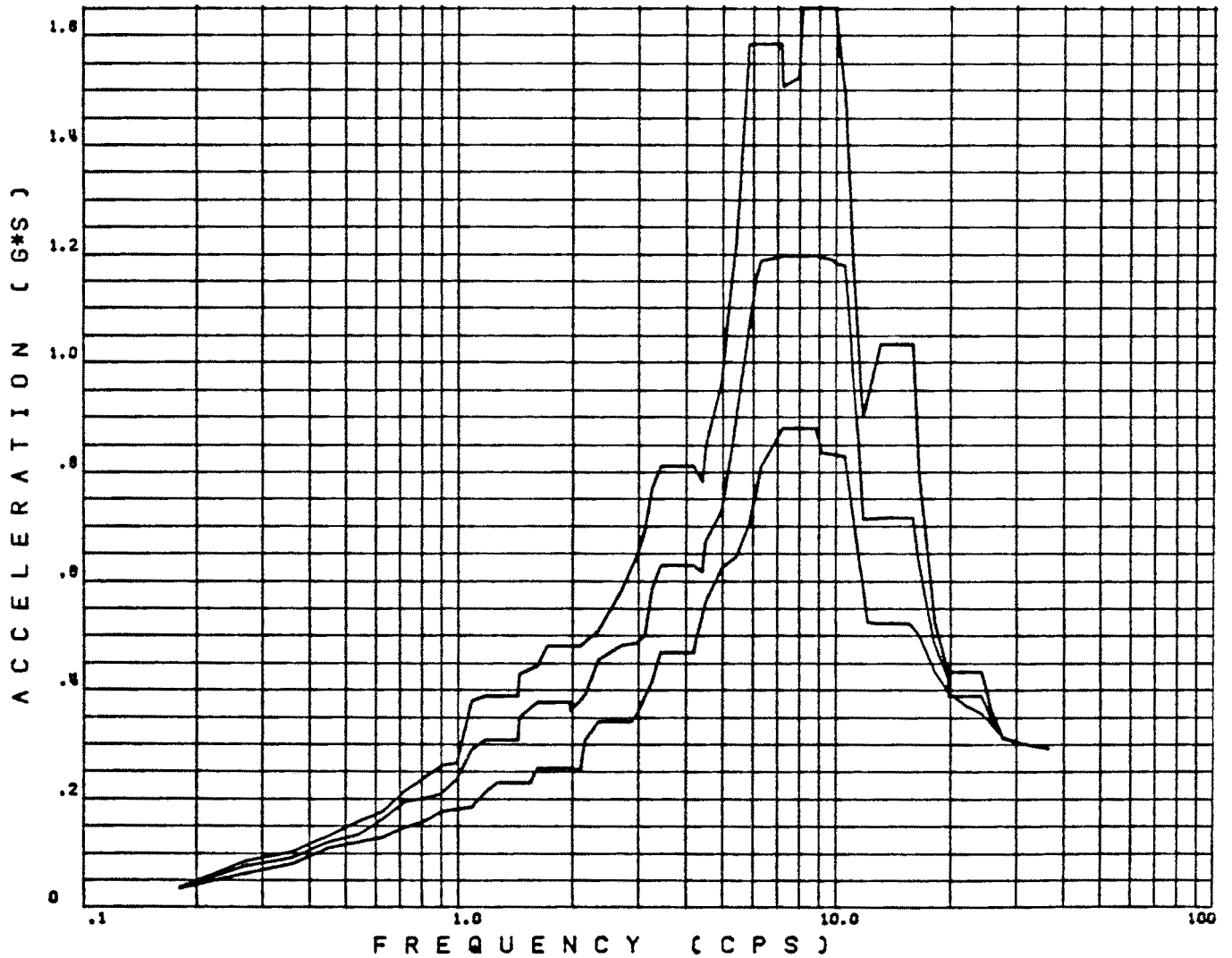
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6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14D
SPECTRA — ESWP PUMPHOUSE
OBE
NORTH-SOUTH DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0100, .0200, .0500,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

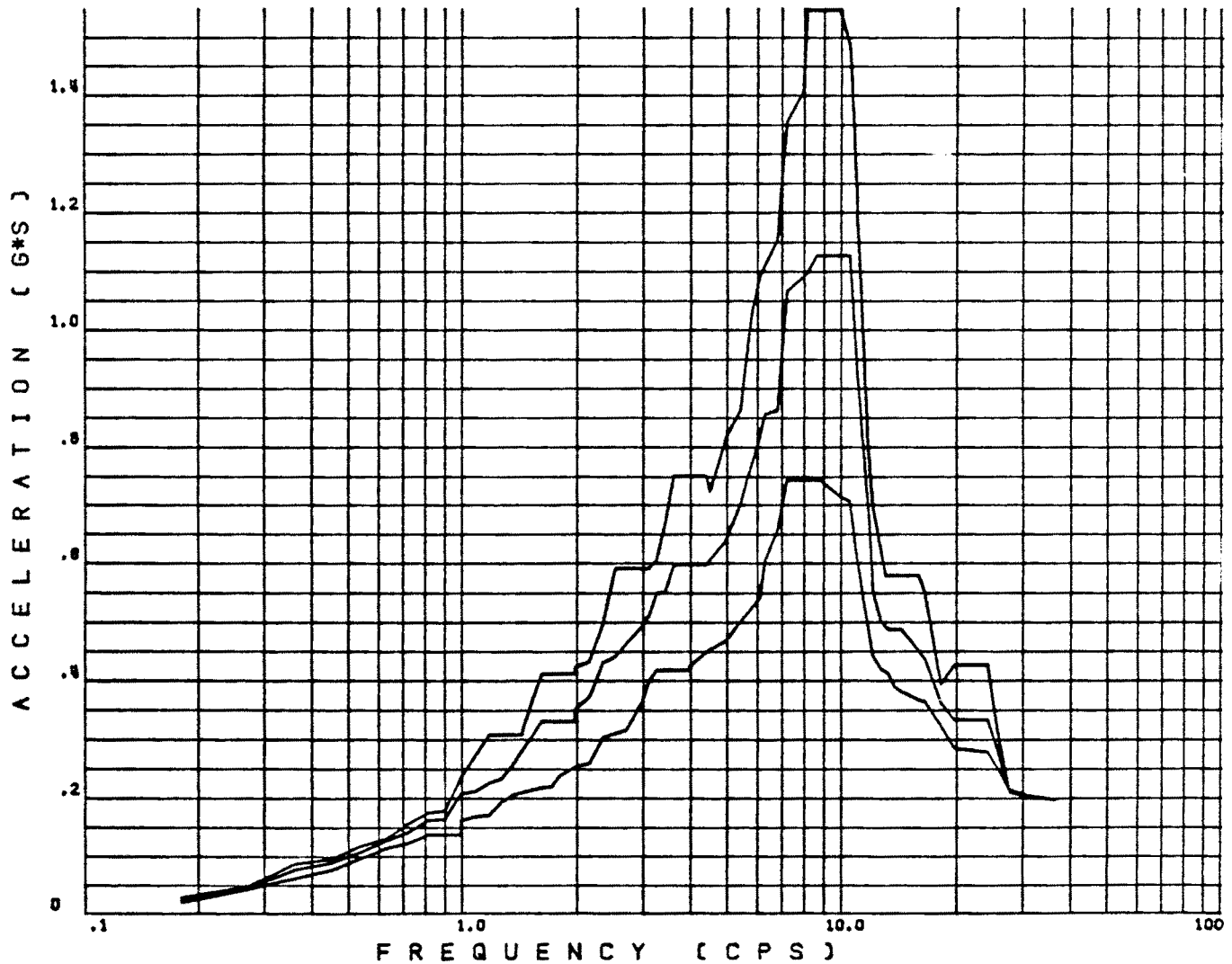
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6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14E
SPECTRA - ESW'S PUMPHOUSE
OBE
EAST-WEST DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0100, .0200, .0500,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-12

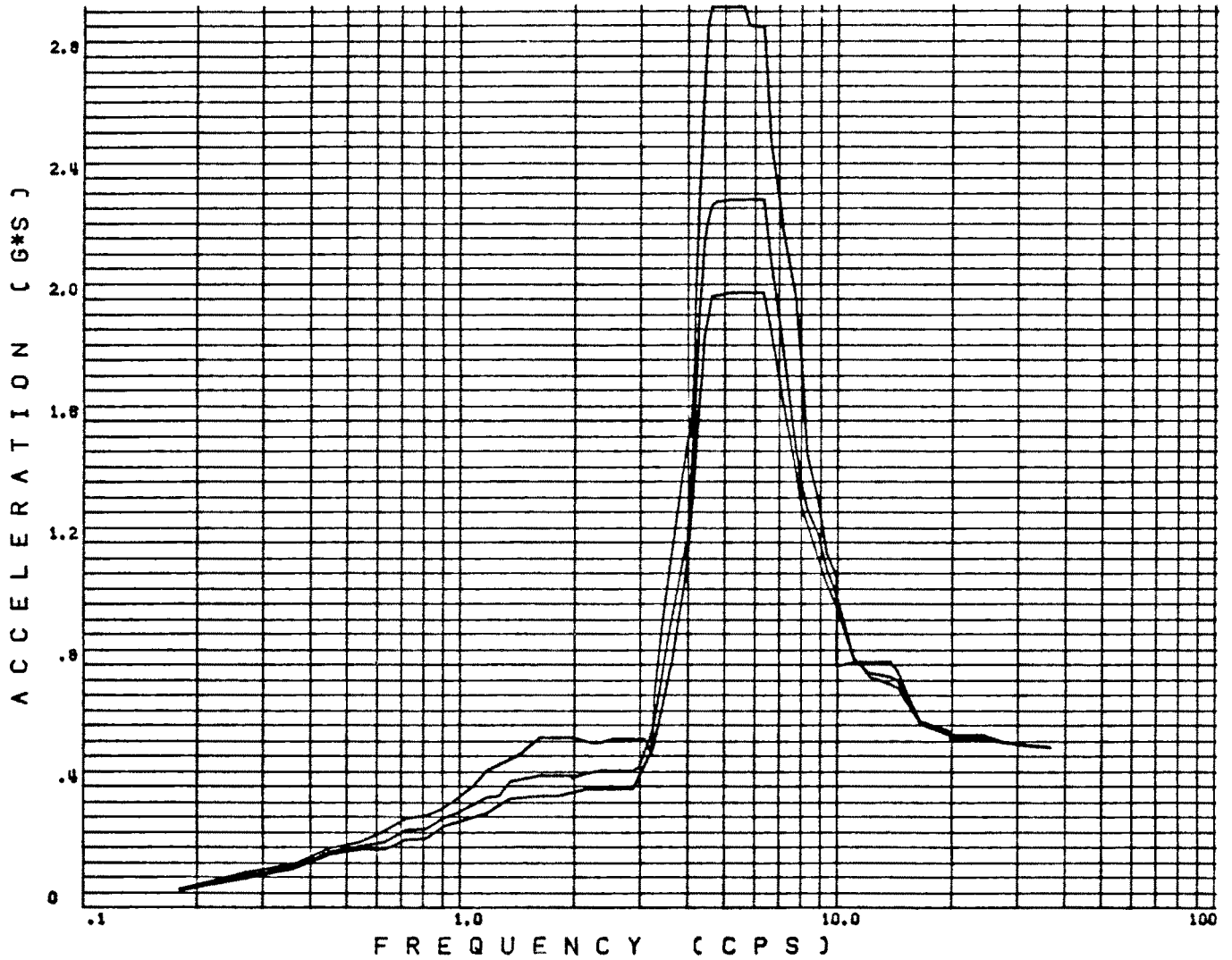
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CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-14F
SPECTRA — ESWS PUMPHOUSE
OBE
VERTICAL DIRECTION
TOP OF PENTHOUSE ROOF

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-13A & B

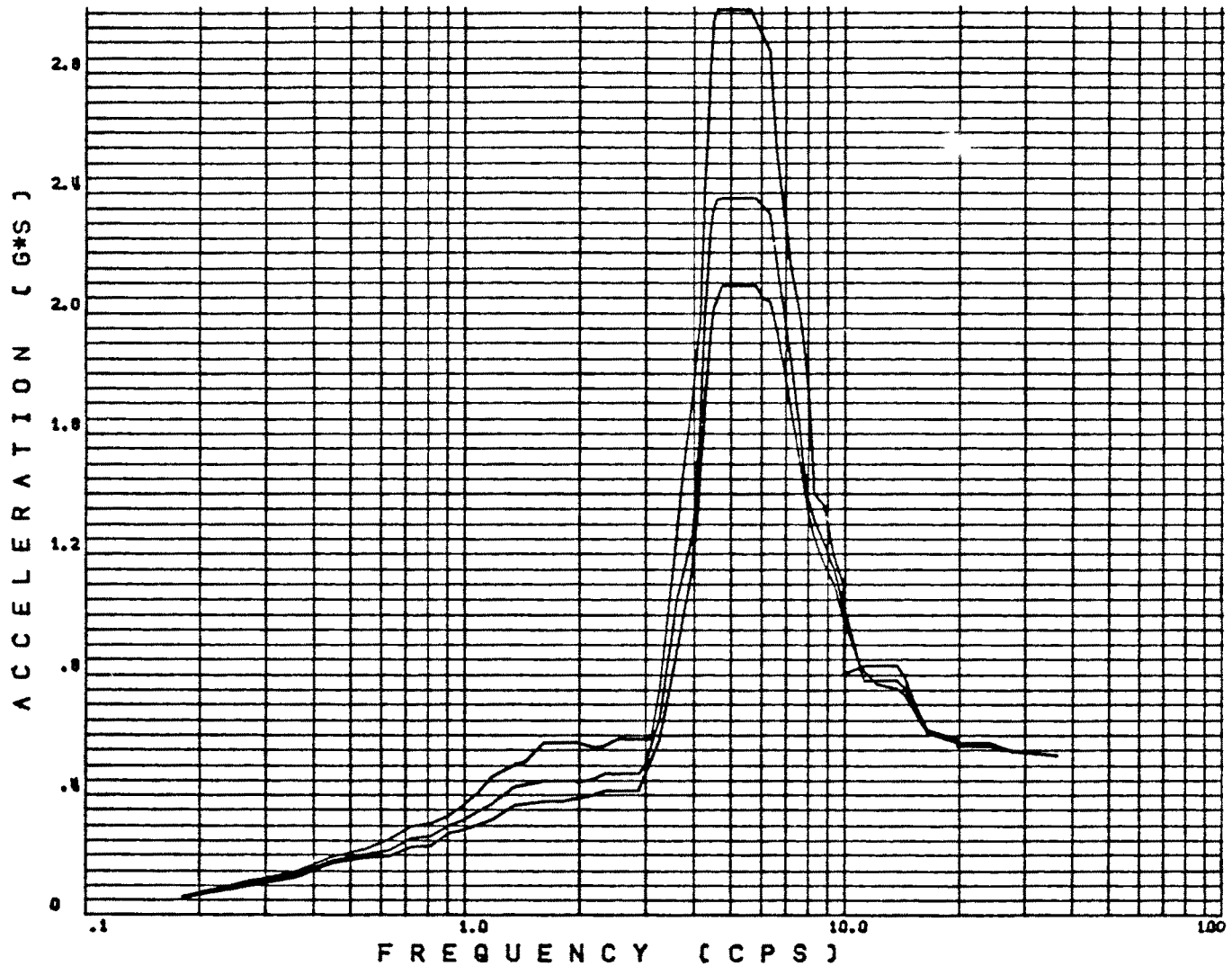
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6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT**

FIGURE 3.7-15A
SPECTRA - UHS COOLING TOWER
SSE
NORTH-SOUTH DIRECTION
TOP OF ROOF

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-13A & B

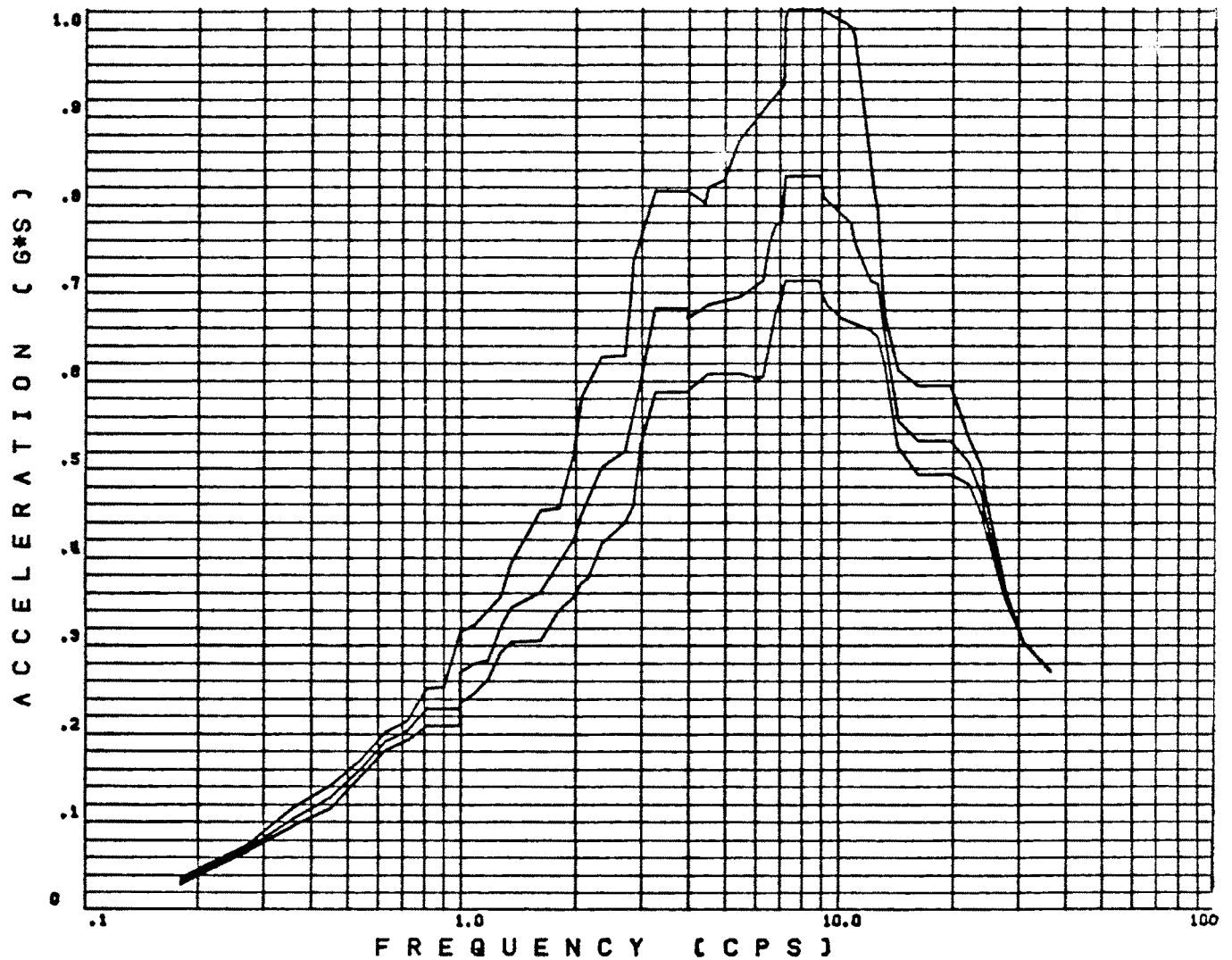
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6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-15B
SPECTRA - UHS COOLING TOWER
SSE
EAST-WEST DIRECTION
TOP OF ROOF

DAMPING VALUES

.0300, .0500, .0700,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-13A & B

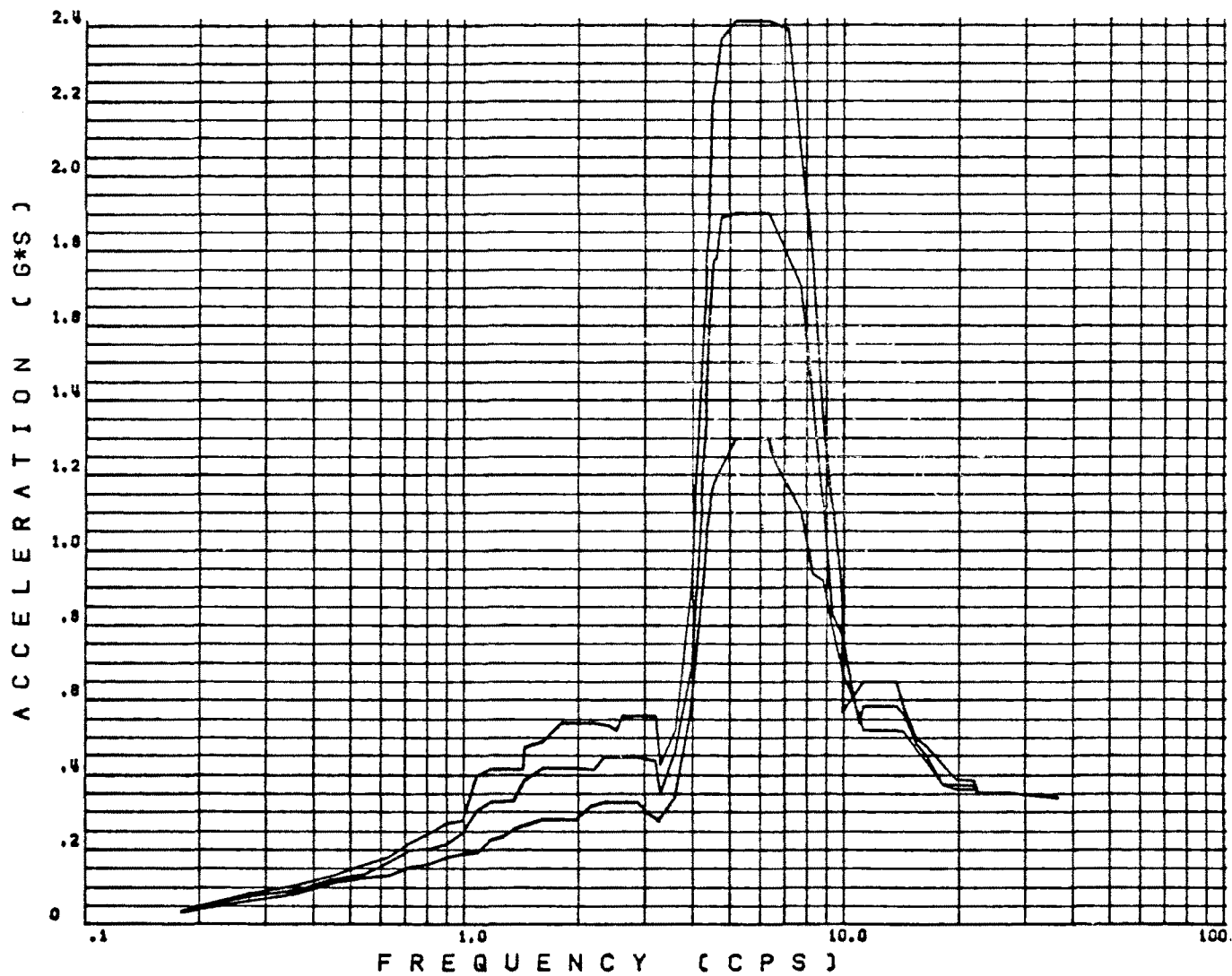
Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-15C
SPECTRA - UHS COOLING TOWER
SSE
VERTICAL DIRECTION
TOP OF ROOF

DAMPING VALUES

.0100, .0200, .0500,



DESIGN FLOOR RESPONSE SPECTRA

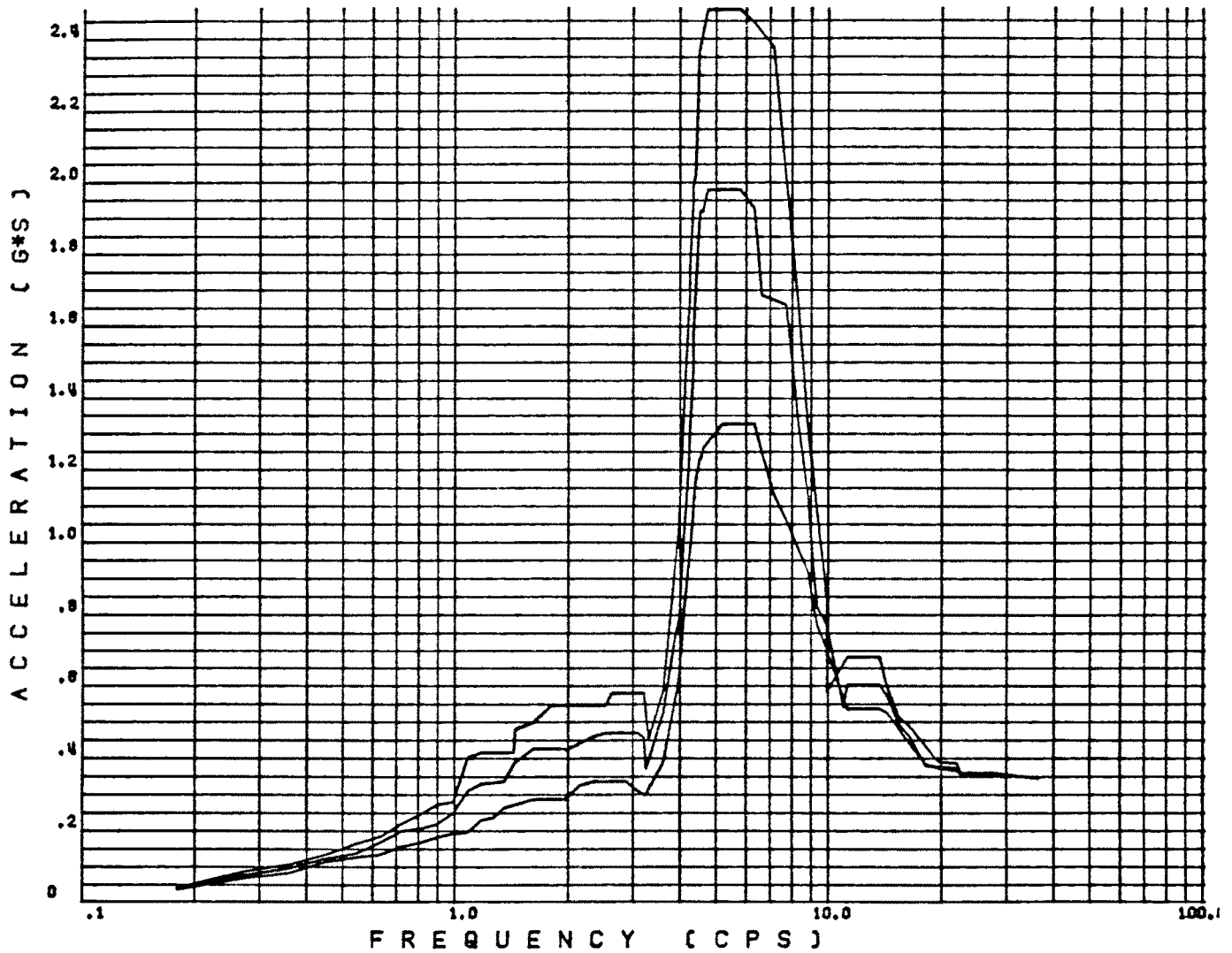
MASS POINT 4
REF. FIGURE 3.7-13A & B

Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT**
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-15D
SPECTRA - UHS COOLING TOWER
OBE
NORTH-SOUTH DIRECTION
TOP OF ROOF

DAMPING VALUES
.0100, .0200, .0500,



DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-13A & B

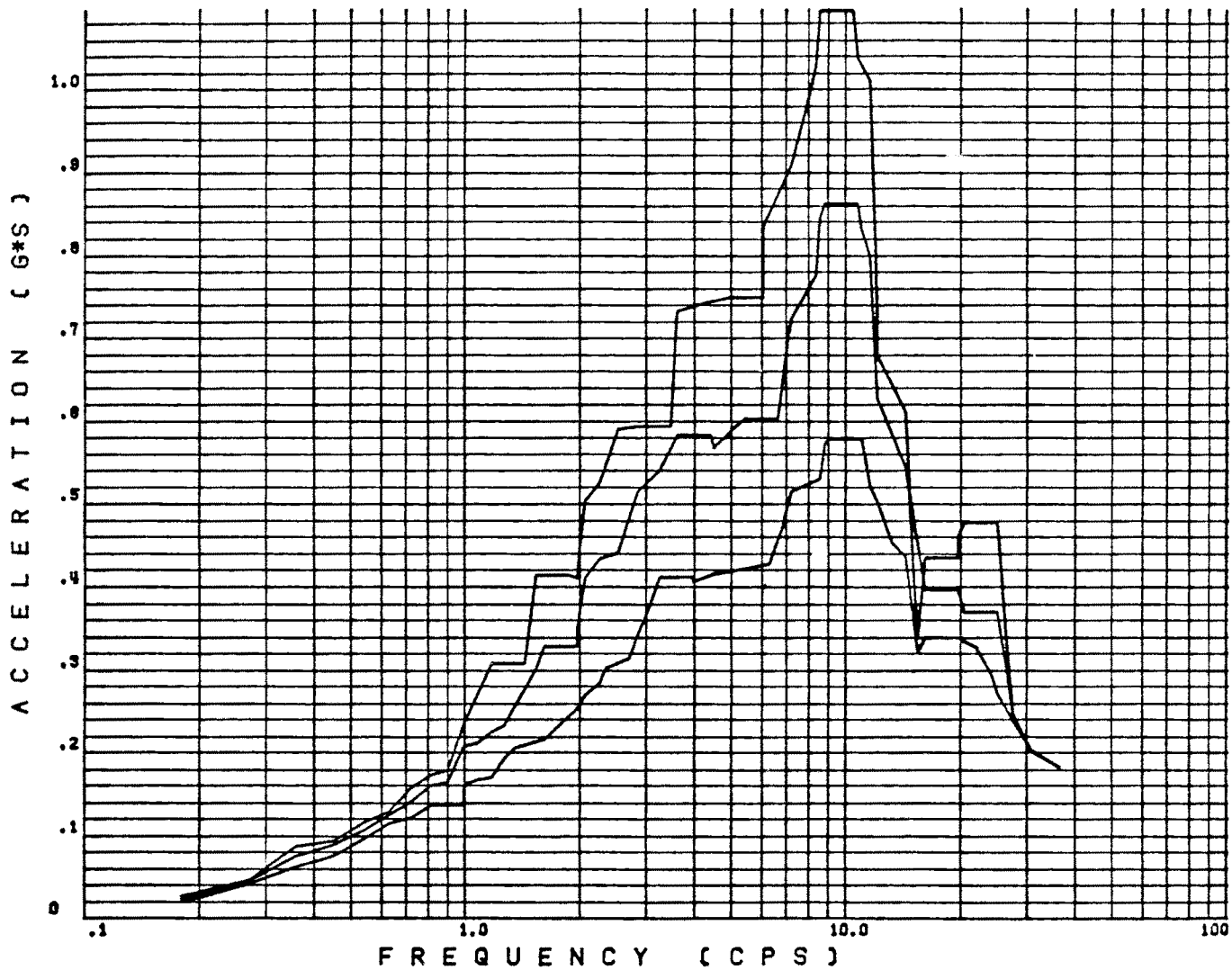
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6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-15E
SPECTRA -- UHS COOLING TOWER
OBE
EAST-WEST DIRECTION
TOP OF ROOF

DAMPING VALUES

.0100, .0200, .0500,



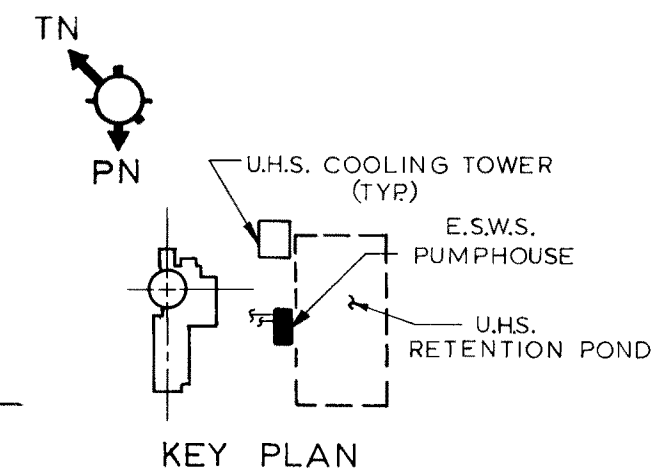
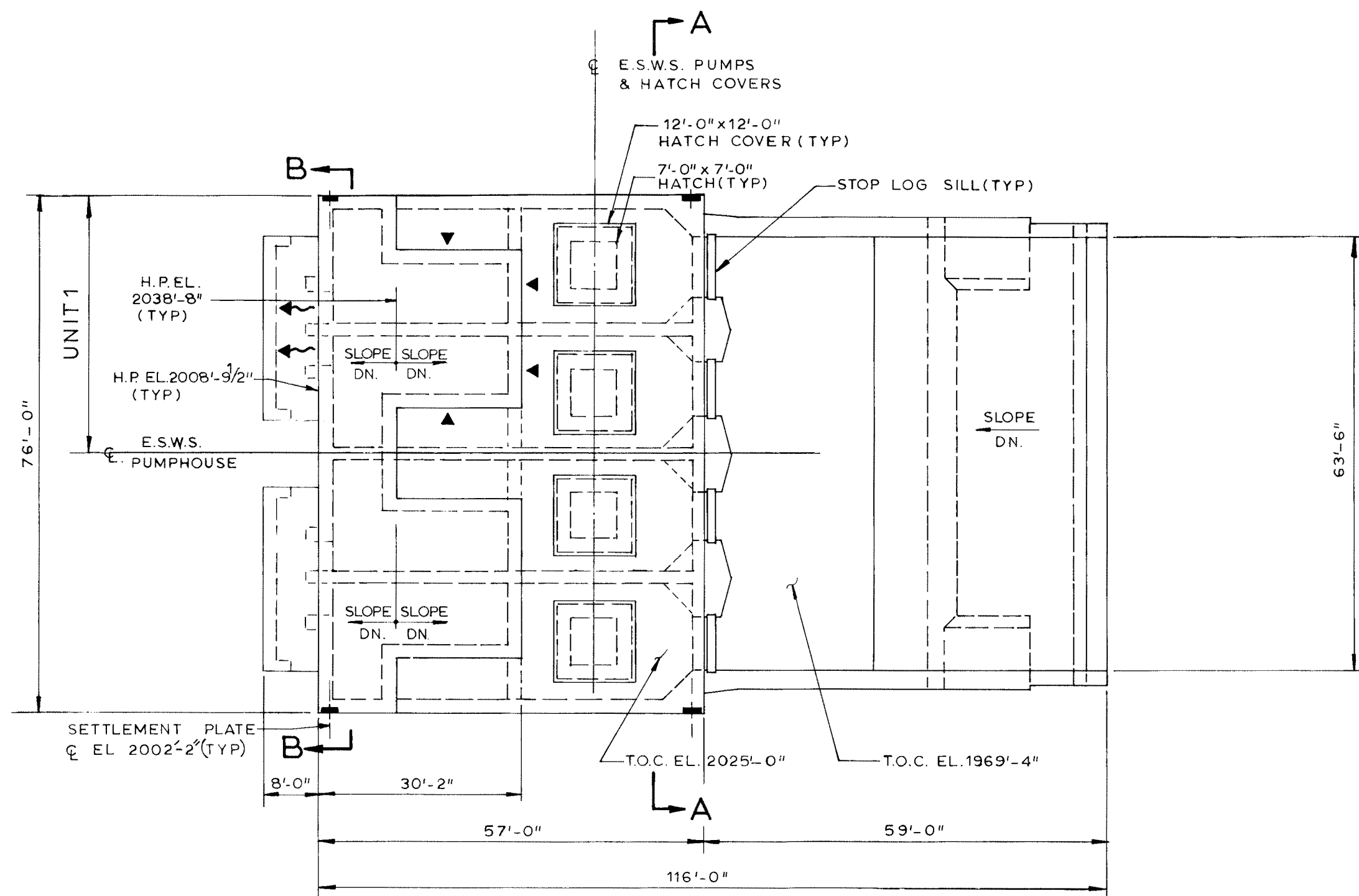
DESIGN FLOOR RESPONSE SPECTRA

MASS POINT 4
REF. FIGURE 3.7-13A & B

Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.7-15F
SPECTRA – UHS COOLING TOWER
OBE
VERTICAL DIRECTION
TOP OF ROOF



NOTE: ROOFS AND HATCHES AT EL 2038'-8", EL 2025'-0" AND EL 2008'-9 1/2" HAVE f'c = 5000 psi MINIMUM AT 90 DAYS. ALL OTHER CONCRETE IS f'c = 4000 psi MINIMUM AT 28 DAYS.

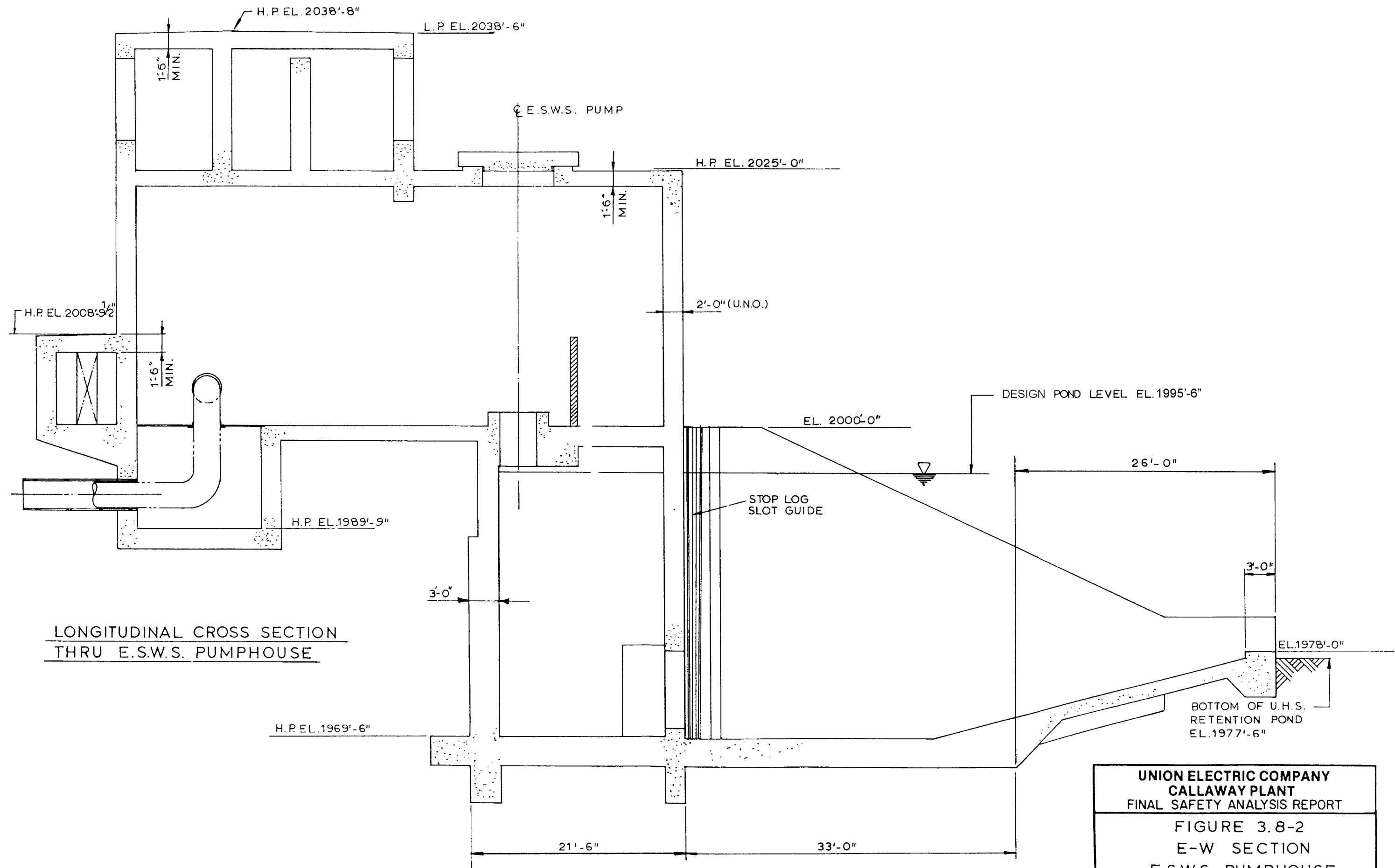
► AIR INTAKE
 ~► AIR EXHAUST

PLAN VIEW— E.S.W.S. PUMPHOUSE

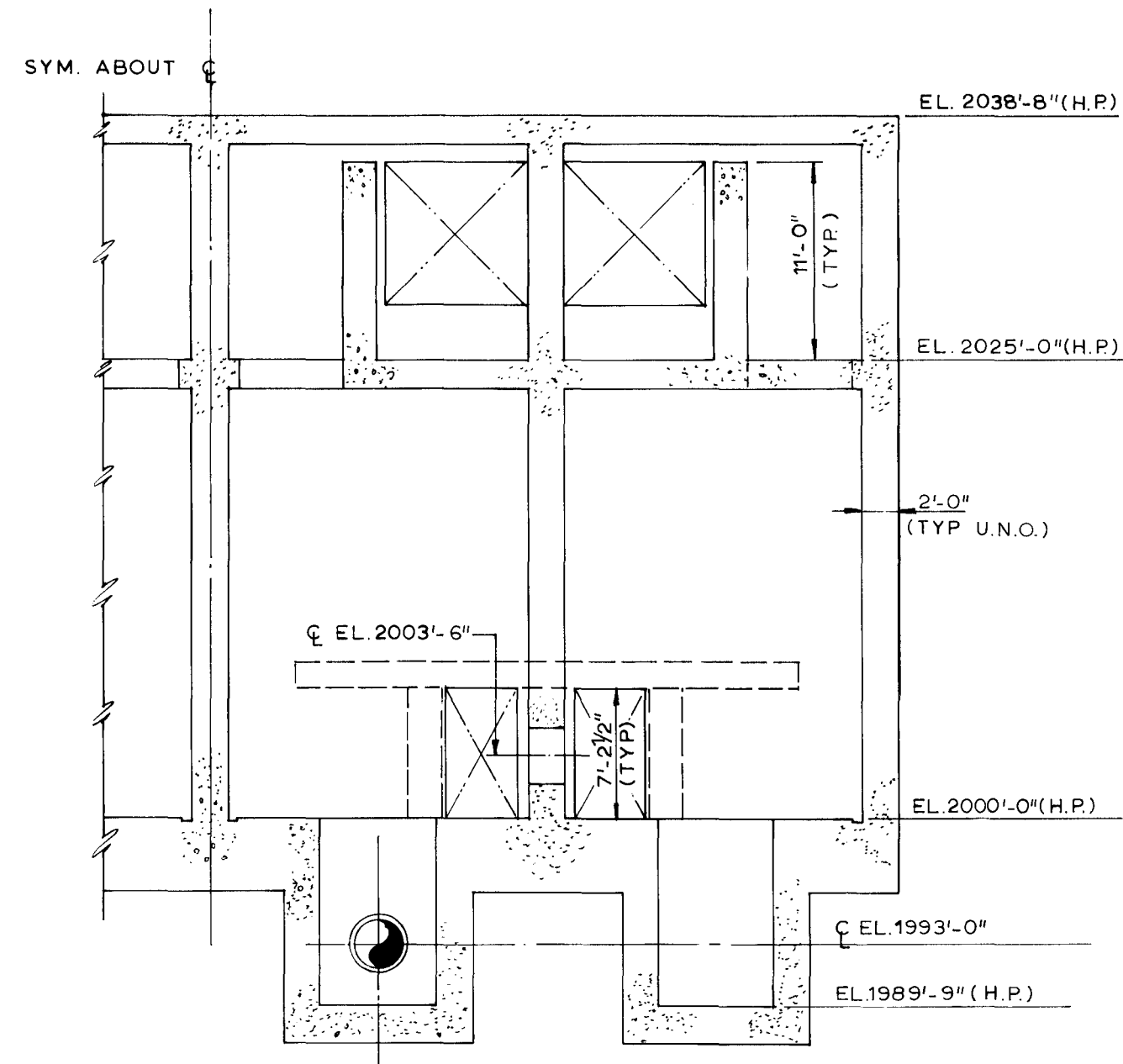
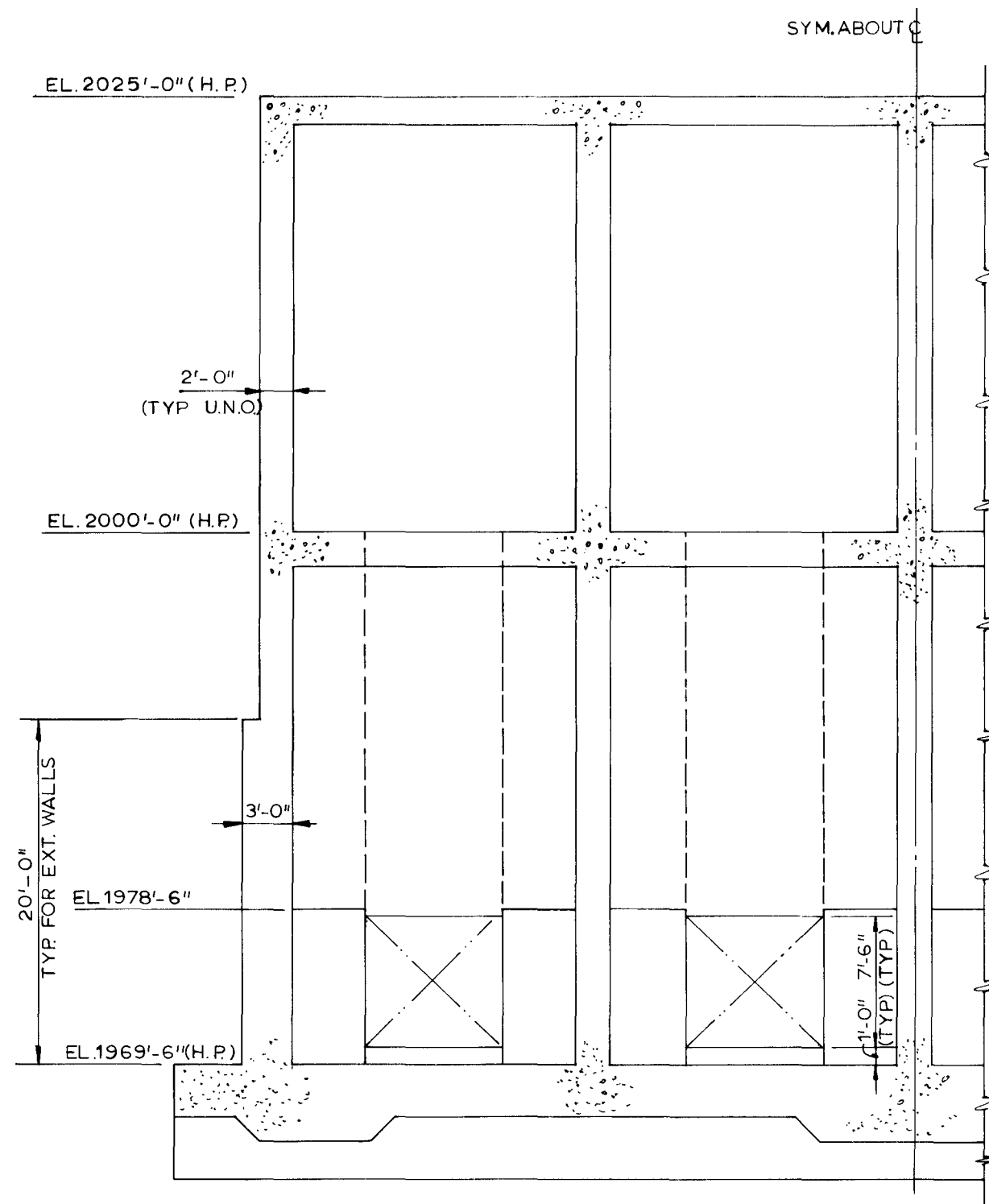
Rev. OL-0
 6/86

UNION ELECTRIC COMPANY
 CALLAWAY PLANT
 FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-1
 PLAN-E.S.W.S. PUMPHOUSE

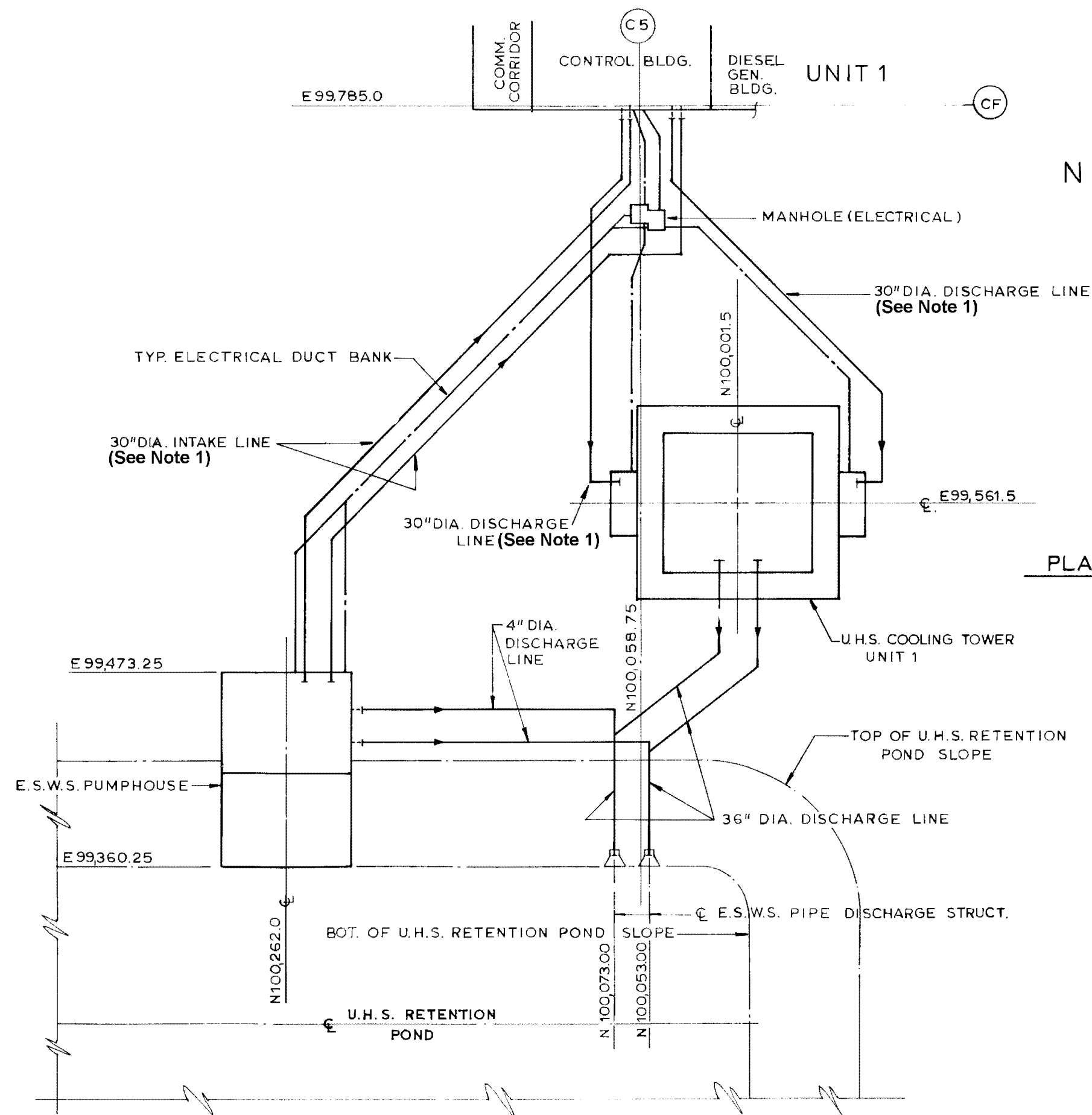


<p>UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT</p>
<p>FIGURE 3.8-2 E-W SECTION E.S.W.S. PUMPHOUSE REV. 5 9/14</p>



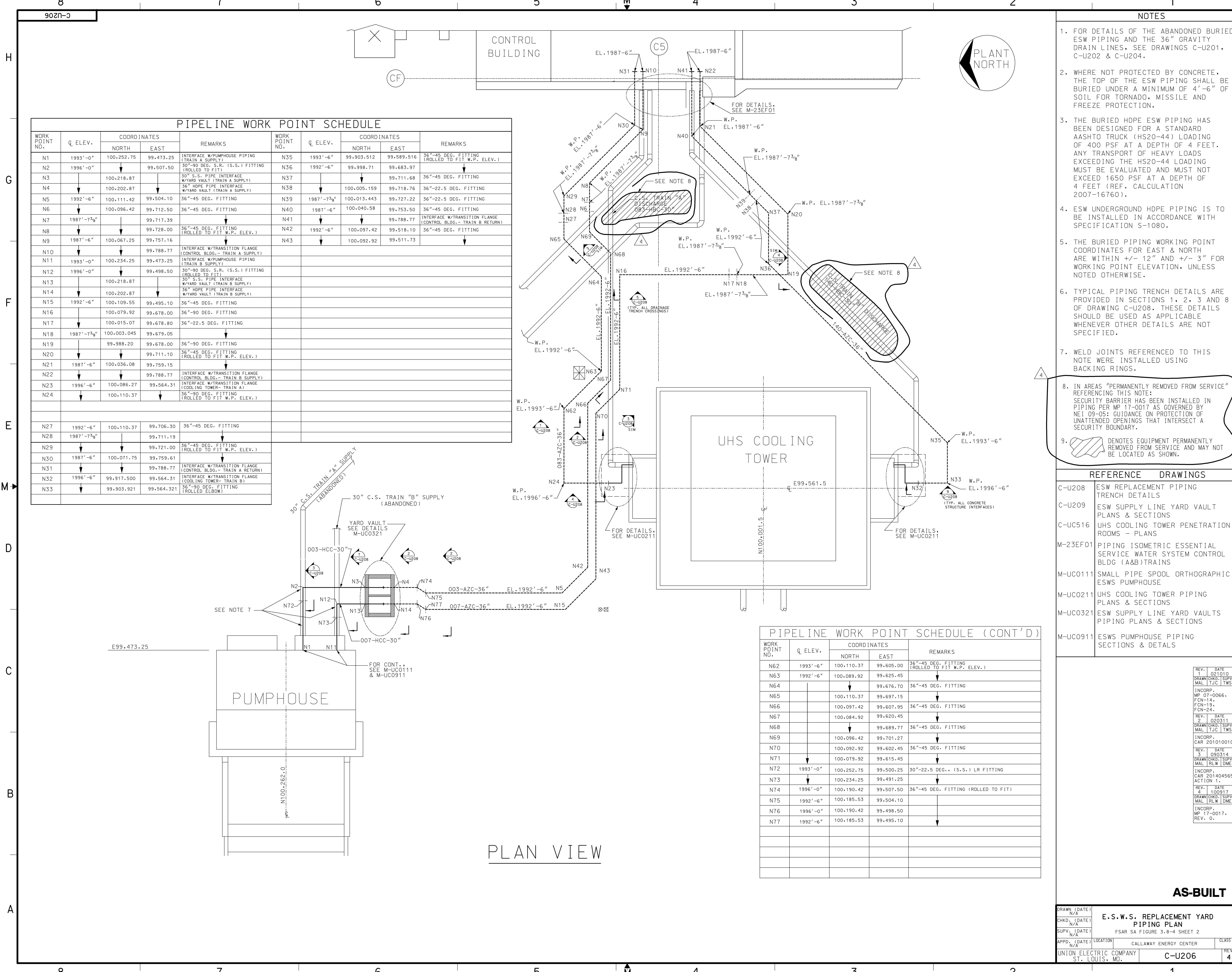
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6/86

<p>UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT</p>
<p>FIGURE 3.8-3 N-S SECTIONS E.S.W.S. PUMPHOUSE</p>



PLAN VIEW - E.S.W.S. UNIT 1 YARD PIPELINES
& ELEC. DUCT BANKS

Note 1:
The ESWS intake and discharge line between the control building and the ESWS pumphouse and UHS cooling tower shown on this figure has been abandoned in place. The new routing of the ESWS intake and discharge line between the control building and the ESWS pumphouse and UHS cooling tower are shown on Figure 3.8-4, Sheet 2.



PIPELINE WORK POINT SCHEDULE

WORK POINT NO.	Q. ELEV.	COORDINATES		REMARKS	WORK POINT NO.	Q. ELEV.	COORDINATES		REMARKS
		NORTH	EAST				NORTH	EAST	
N1	1993'-0"	100,252.75	99,473.25	INTERFACE W/PUMPHOUSE PIPING (TRAIN A SUPPLY)	N35	1993'-6"	99,903.512	99,589.516	36"-45 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)
N2	1996'-0"		99,507.50	30"-90 DEG. S.R. (S.S.) FITTING (ROLLED TO FIT)	N36	1992'-6"	99,998.71	99,683.97	
N3		100,218.87		30" S.S. PIPE INTERFACE W/YARD VAULT (TRAIN A SUPPLY)	N37			99,711.68	36"-45 DEG. FITTING
N4		100,202.87		36" HDPE PIPE INTERFACE W/YARD VAULT (TRAIN A SUPPLY)	N38		100,005.159	99,718.76	36"-22.5 DEG. FITTING
N5	1992'-6"	100,111.42	99,504.10	36"-45 DEG. FITTING	N39	1987'-7 3/8"	100,013.443	99,727.22	36"-22.5 DEG. FITTING
N6		100,096.42	99,712.50	36"-45 DEG. FITTING	N40	1987'-6"	100,040.58	99,753.50	36"-45 DEG. FITTING
N7	1987'-7 3/8"		99,717.39		N41			99,788.77	INTERFACE W/TRANSITION FLANGE (CONTROL BLDG.- TRAIN B RETURN)
N8			99,728.00	36"-45 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)	N42	1992'-6"	100,097.42	99,518.10	36"-45 DEG. FITTING
N9	1987'-6"	100,067.25	99,757.16		N43		100,092.92	99,511.73	
N10			99,788.77	INTERFACE W/TRANSITION FLANGE (CONTROL BLDG.- TRAIN A SUPPLY)					
N11	1993'-0"	100,234.25	99,473.25	INTERFACE W/PUMPHOUSE PIPING (TRAIN B SUPPLY)					
N12	1996'-0"		99,498.50	30"-90 DEG. S.R. (S.S.) FITTING (ROLLED TO FIT)					
N13		100,218.87		30" S.S. PIPE INTERFACE W/YARD VAULT (TRAIN B SUPPLY)					
N14		100,202.87		36" HDPE PIPE INTERFACE W/YARD VAULT (TRAIN B SUPPLY)					
N15	1992'-6"	100,109.55	99,495.10	36"-45 DEG. FITTING					
N16		100,079.92	99,678.00	36"-90 DEG. FITTING					
N17		100,015.07	99,678.80	36"-22.5 DEG. FITTING					
N18	1987'-7 3/8"	100,003.045	99,679.05						
N19		99,988.20	99,678.00	36"-90 DEG. FITTING					
N20			99,711.10	36"-45 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)					
N21	1987'-6"	100,036.08	99,759.15						
N22			99,788.77	INTERFACE W/TRANSITION FLANGE (CONTROL BLDG.- TRAIN B SUPPLY)					
N23	1996'-6"	100,086.27	99,564.31	INTERFACE W/TRANSITION FLANGE (COOLING TOWER- TRAIN A)					
N24		100,110.37		36"-90 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)					
N27	1992'-6"	100,110.37	99,706.30	36"-45 DEG. FITTING					
N28	1987'-7 3/8"		99,711.19						
N29			99,721.00	36"-45 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)					
N30	1987'-6"	100,071.75	99,759.61						
N31			99,788.77	INTERFACE W/TRANSITION FLANGE (CONTROL BLDG.- TRAIN A RETURN)					
N32	1996'-6"	99,917.500	99,564.31	INTERFACE W/TRANSITION FLANGE (COOLING TOWER- TRAIN B)					
N33		99,903.921	99,564.321	36"-90 DEG. FITTING (ROLLED ELBOW)					

PIPELINE WORK POINT SCHEDULE (CONT'D)

WORK POINT NO.	Q. ELEV.	COORDINATES		REMARKS
		NORTH	EAST	
N62	1993'-6"	100,110.37	99,605.00	36"-45 DEG. FITTING (ROLLED TO FIT W.P. ELEV.)
N63	1992'-6"	100,089.92	99,625.45	
N64			99,676.70	36"-45 DEG. FITTING
N65		100,110.37	99,697.15	
N66		100,097.42	99,607.95	36"-45 DEG. FITTING
N67		100,084.92	99,620.45	
N68			99,689.77	36"-45 DEG. FITTING
N69		100,096.42	99,701.27	
N70		100,092.92	99,602.45	36"-45 DEG. FITTING
N71		100,079.92	99,615.45	
N72	1993'-0"	100,252.75	99,500.25	30"-22.5 DEG. (S.S.) LR FITTING
N73		100,234.25	99,491.25	
N74	1996'-0"	100,190.42	99,507.50	36"-45 DEG. FITTING (ROLLED TO FIT)
N75	1992'-6"	100,185.53	99,504.10	
N76	1996'-0"	100,190.42	99,498.50	
N77	1992'-6"	100,185.53	99,495.10	

- NOTES
- FOR DETAILS OF THE ABANDONED BURIED ESW PIPING AND THE 36" GRAVITY DRAIN LINES, SEE DRAWINGS C-U201, C-U202 & C-U204.
 - WHERE NOT PROTECTED BY CONCRETE, THE TOP OF THE ESW PIPING SHALL BE BURIED UNDER A MINIMUM OF 4'-6" OF SOIL FOR TORNADO, MISSILE AND FREEZE PROTECTION.
 - THE BURIED HDPE ESW PIPING HAS BEEN DESIGNED FOR A STANDARD AASHTO TRUCK (HS20-44) LOADING OF 400 PSF AT A DEPTH OF 4 FEET. ANY TRANSPORT OF HEAVY LOADS EXCEEDING THE HS20-44 LOADING MUST BE EVALUATED AND MUST NOT EXCEED 1650 PSF AT A DEPTH OF 4 FEET (REF. CALCULATION 2007-16760).
 - ESW UNDERGROUND HDPE PIPING IS TO BE INSTALLED IN ACCORDANCE WITH SPECIFICATION S-1080.
 - THE BURIED PIPING WORKING POINT COORDINATES FOR EAST & NORTH ARE WITHIN +/- 12" AND +/- 3" FOR WORKING POINT ELEVATION, UNLESS NOTED OTHERWISE.
 - TYPICAL PIPING TRENCH DETAILS ARE PROVIDED IN SECTIONS 1, 2, 3 AND 8 OF DRAWING C-U208. THESE DETAILS SHOULD BE USED AS APPLICABLE WHENEVER OTHER DETAILS ARE NOT SPECIFIED.
 - WELD JOINTS REFERENCED TO THIS NOTE WERE INSTALLED USING BACKING RINGS.
 - IN AREAS "PERMANENTLY REMOVED FROM SERVICE" REFERENCING THIS NOTE: SECURITY BARRIER HAS BEEN INSTALLED IN PIPING PER MP 17-0017 AS GOVERNED BY NEI 09-051 GUIDANCE ON PROTECTION OF UNATTENDED OPENINGS THAT INTERSECT A SECURITY BOUNDARY.
 - DENOTES EQUIPMENT PERMANENTLY REMOVED FROM SERVICE AND MAY NOT BE LOCATED AS SHOWN.

REFERENCE DRAWINGS

C-U208	ESW REPLACEMENT PIPING TRENCH DETAILS
C-U209	ESW SUPPLY LINE YARD VAULT PLANS & SECTIONS
C-UC516	UHS COOLING TOWER PENETRATION ROOMS - PLANS
M-23EF01	PIPING ISOMETRIC ESSENTIAL SERVICE WATER SYSTEM CONTROL BLDG (A&B) TRAINS
M-UC0111	SMALL PIPE SPOOL ORTHOGRAPHIC ESW'S PUMPHOUSE
M-UC0211	UHS COOLING TOWER PIPING PLANS & SECTIONS
M-UC0321	ESW SUPPLY LINE YARD VAULTS PIPING PLANS & SECTIONS
M-UC0911	ESWS PUMPHOUSE PIPING SECTIONS & DETAILS

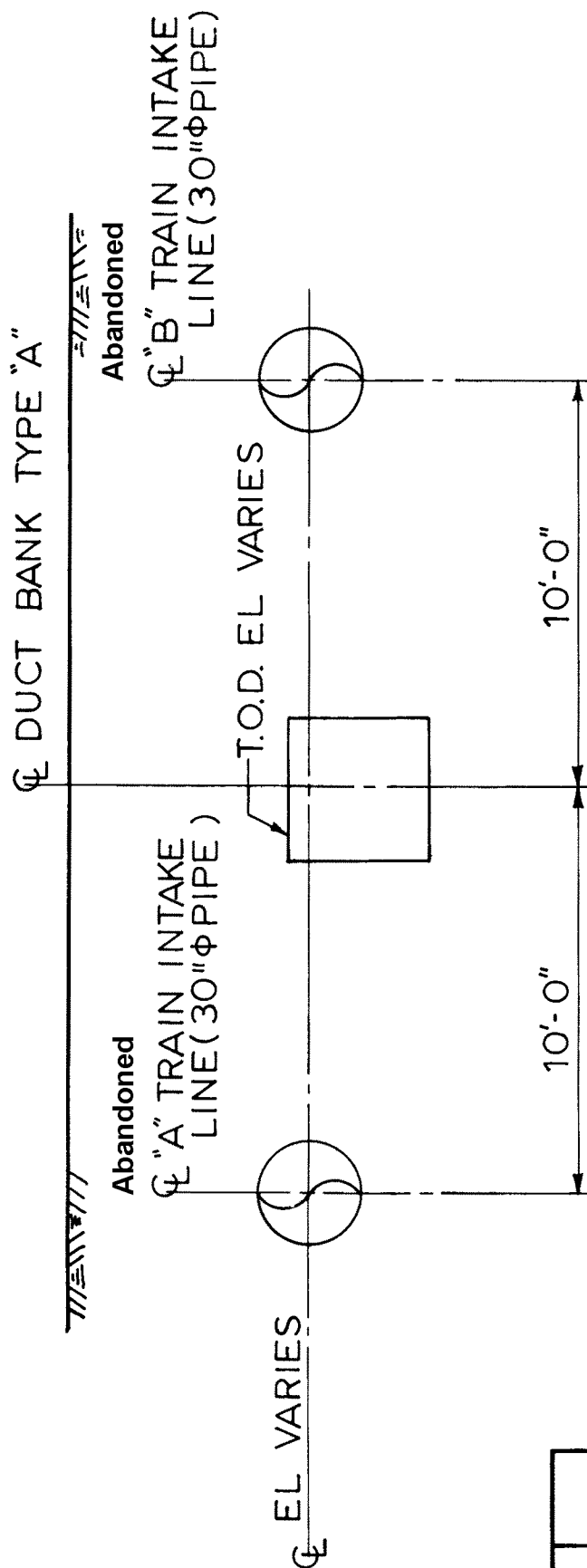
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INCORP. MP 07-0066, FCN-14, FCN-19, FCN-24.				
REV.	DATE	DRAWN	CHKD.	SUPV.
2	020311	MAL	TJC	TWS
INCORP. CAR 201010010.				
REV.	DATE	DRAWN	CHKD.	SUPV.
3	090314	MAL	RLW	DME
INCORP. CAR 201404565, ACTION 1.				
REV.	DATE	DRAWN	CHKD.	SUPV.
4	100917	MAL	RLW	DME
INCORP. MP 17-0017, REV. 0.				

AS-BUILT

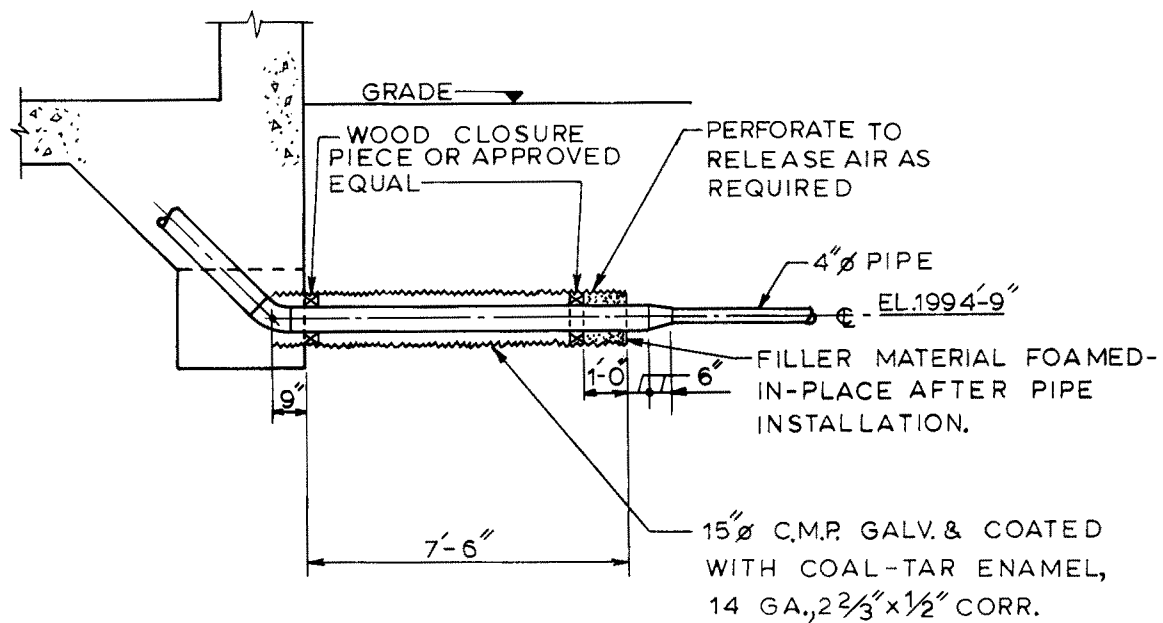
DRAWN (DATE) N/A		E.S.W.S. REPLACEMENT YARD PIPING PLAN	
CHKD. (DATE) N/A		FSAR SA FIGURE 3.8-4 SHEET 2	
SUPV. (DATE) N/A		UNION ELECTRIC COMPANY ST. LOUIS, MO.	
APPD. (DATE) N/A		LOCATION CALLAWAY ENERGY CENTER	CLASS REV. 4

Figure 3.8-5 has been deleted

Figure 3.8-6 has been deleted



<p>UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT</p>
<p>FIGURE 3.8-7 SECTION THROUGH E.S.W.S. PIPES & DUCT BANKS REV. 1 11/10</p>

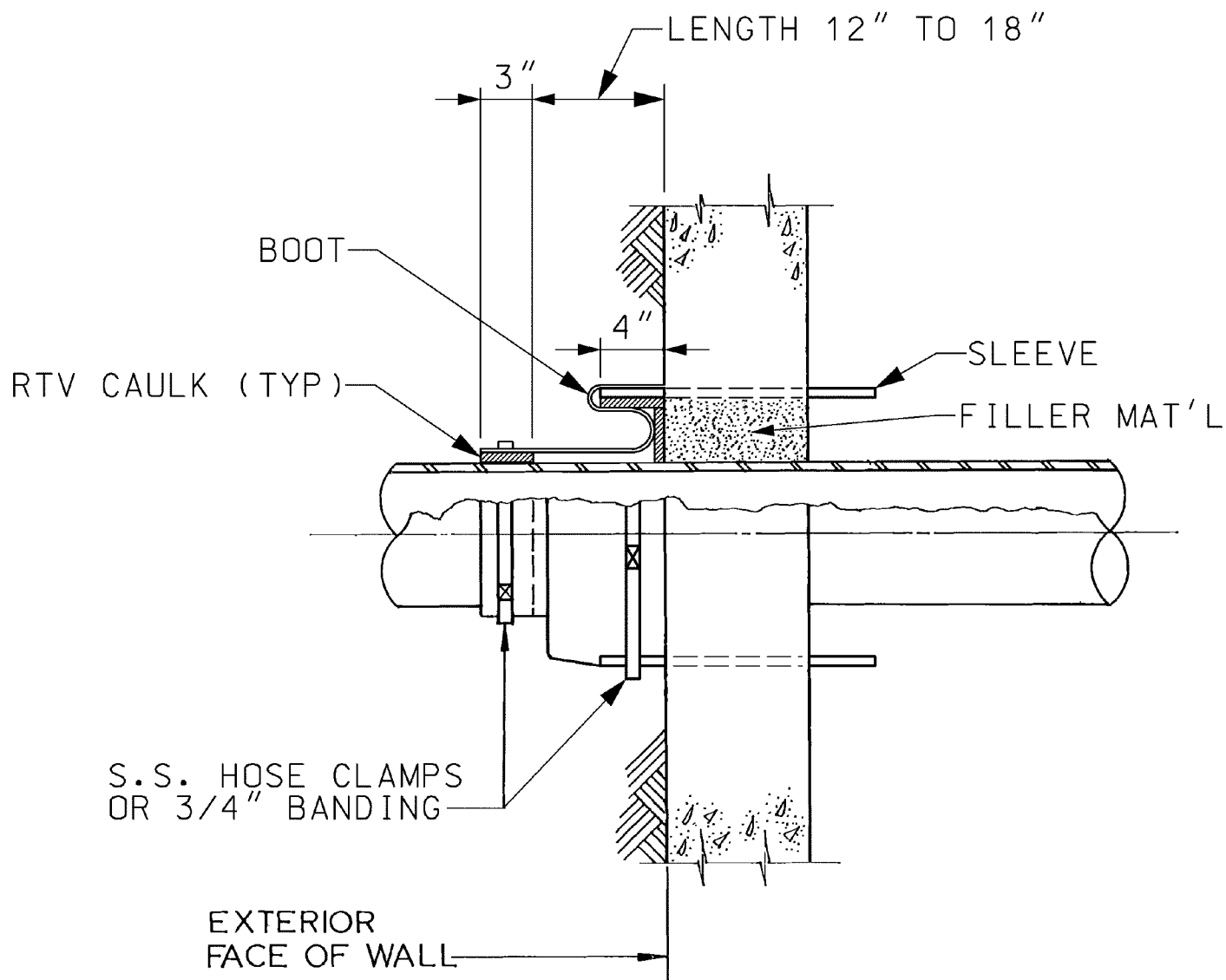


4" \varnothing DISCHARGE PIPE PENETRATION-E.S.W.S. PUMPHOUSE

Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-8
4" & 30" DIA. PIPE PENATRATION
DETAILS SHEET-1

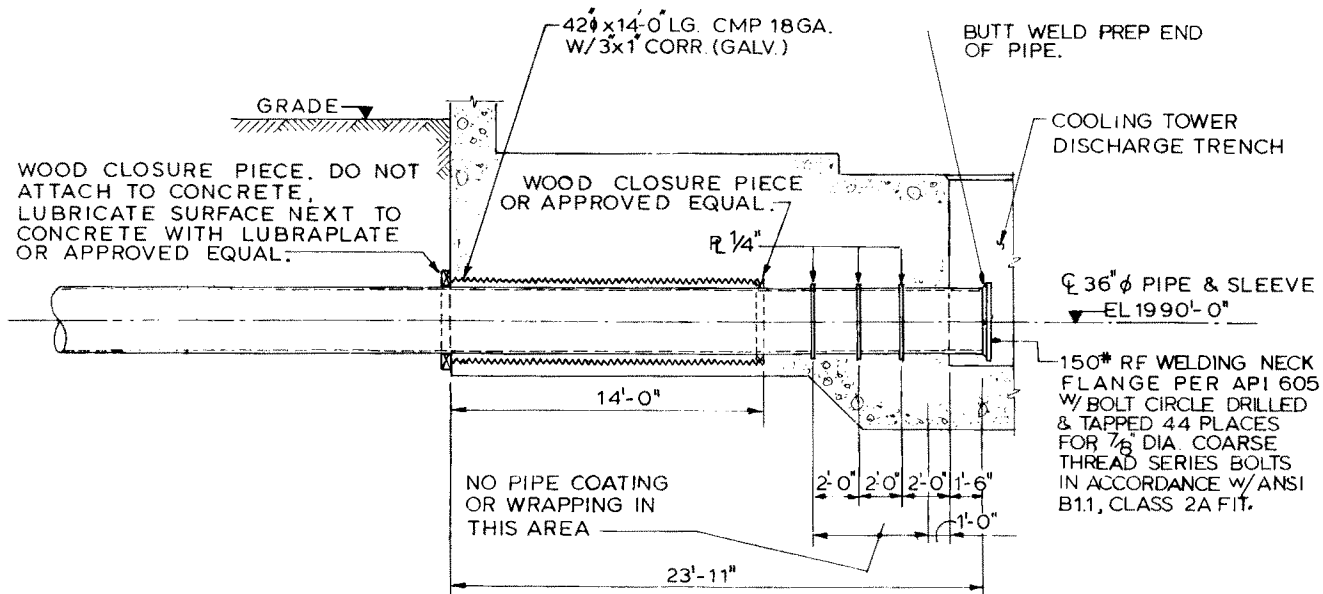


BOOT PENETRATION SEALS

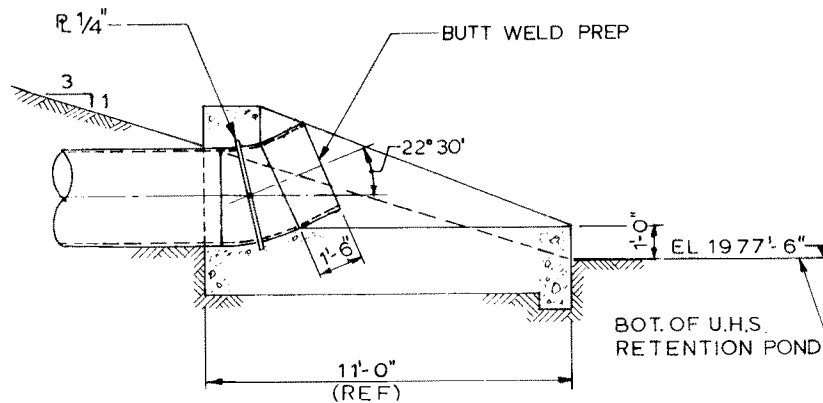
NOTES:

1. Fill sleeve with filler material (RTV foam) with in approximately 2 to 3 inches of exterior end & 1 to 2 inches from interior end.
2. Install approximately 1/2" of RTV caulk on sleeve & filler material interface as shown.

<p align="center">UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT</p>
<p align="center">FIGURE 3.8-8 4" & 30" DIA. PIPE PENETRATION DETAILS SHEET-2 REV. 1 11/10</p>



36" ϕ DISCHARGE PIPE PENETRATION - U.H.S. COOLING TOWER



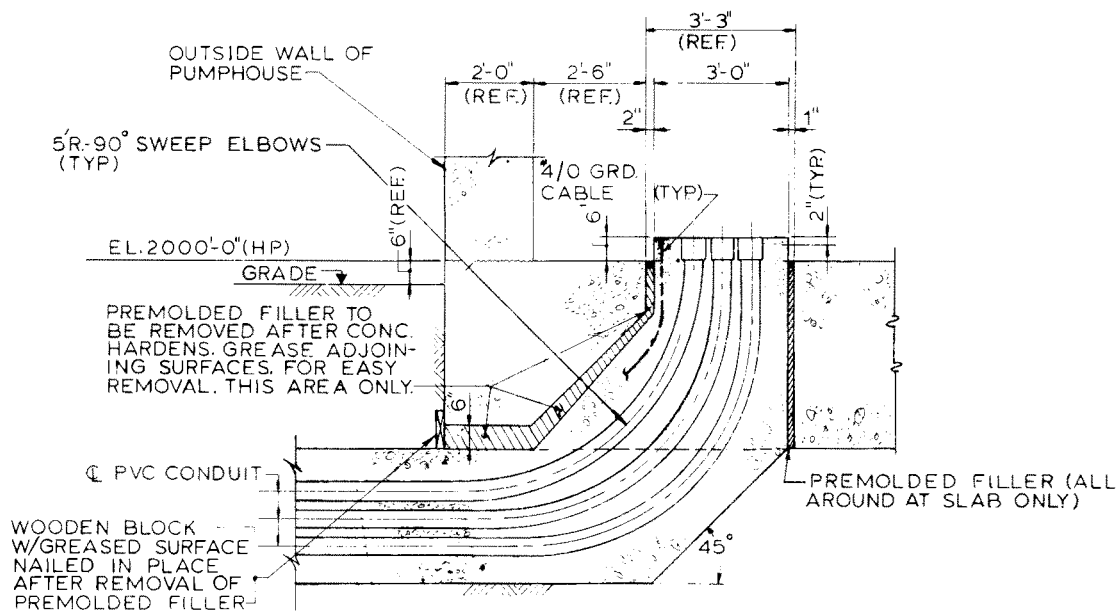
36" ϕ DISCHARGE PIPE PENETRATION - U.H.S. DISCHARGE STRUCTURE

Rev. OL-0
6/86

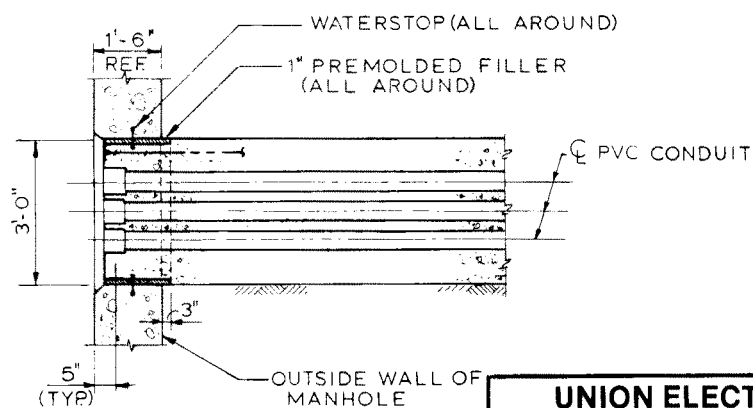
UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-9

36" DIA PIPE PENETRATION
DETAILS



DUCT BANK ENTRANCE DETAILS AT E.S.W.S. PUMPHOUSE
SCALE $\frac{1}{2}$ " = 1'-0"

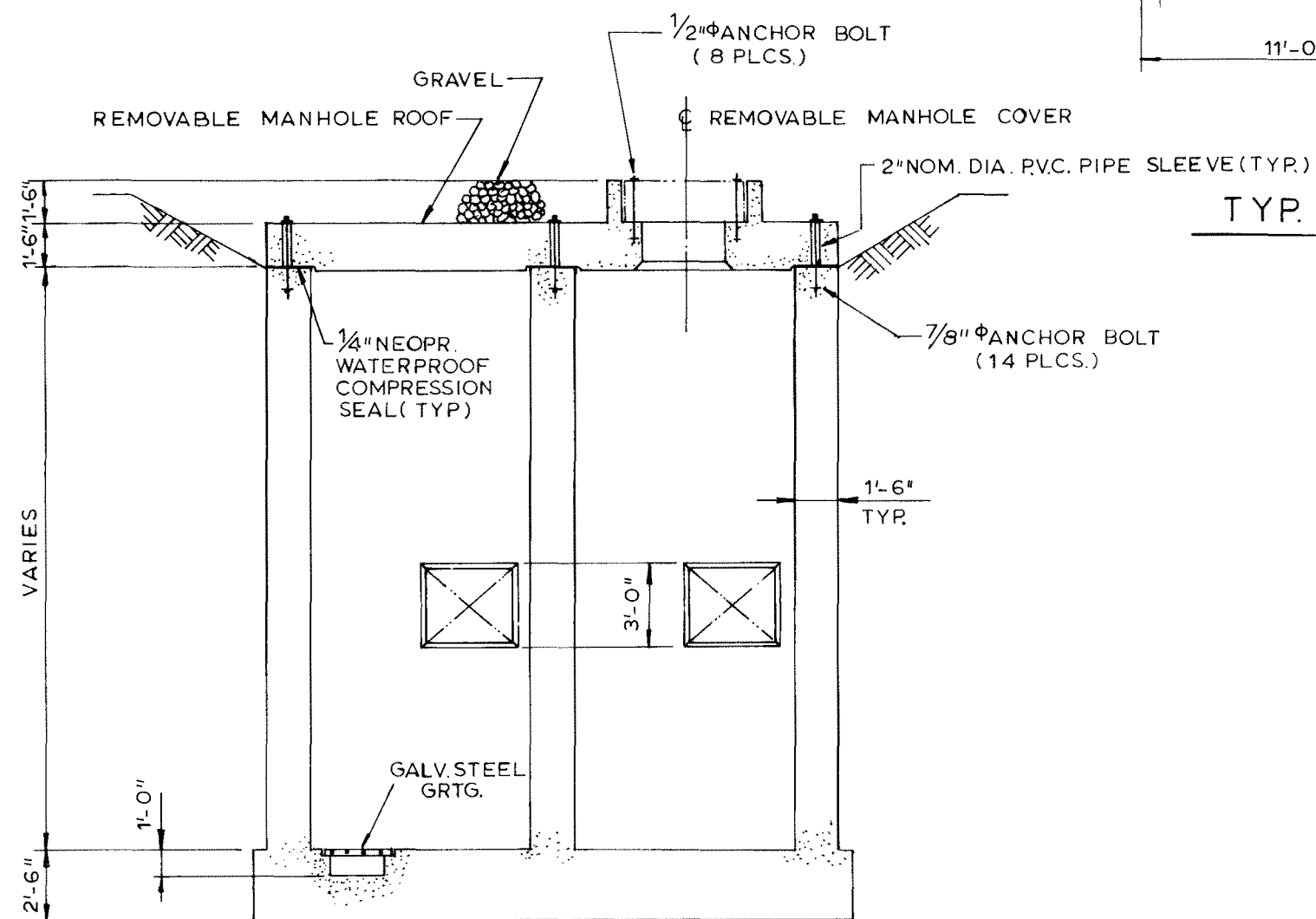
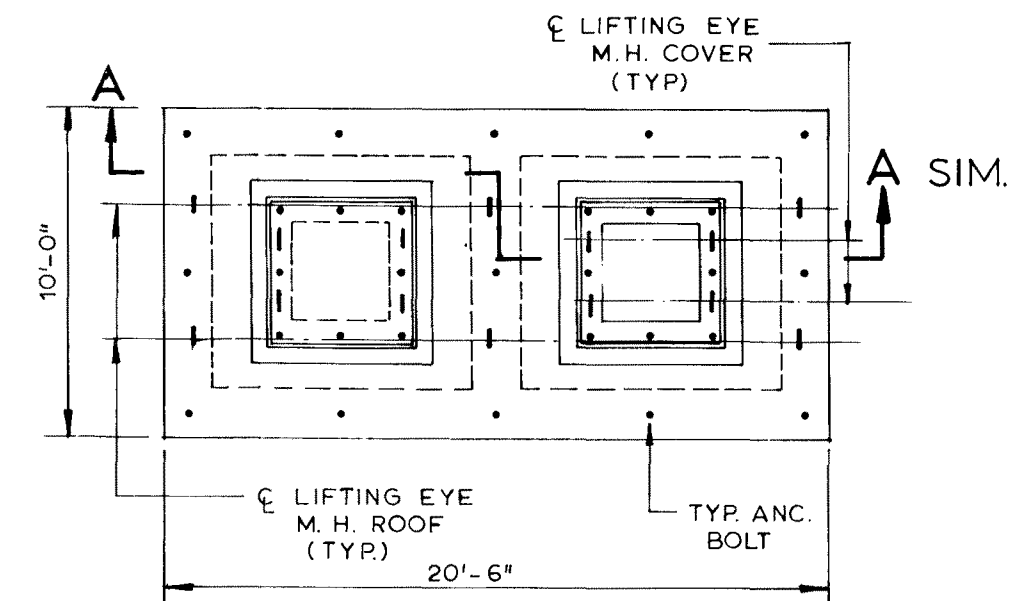
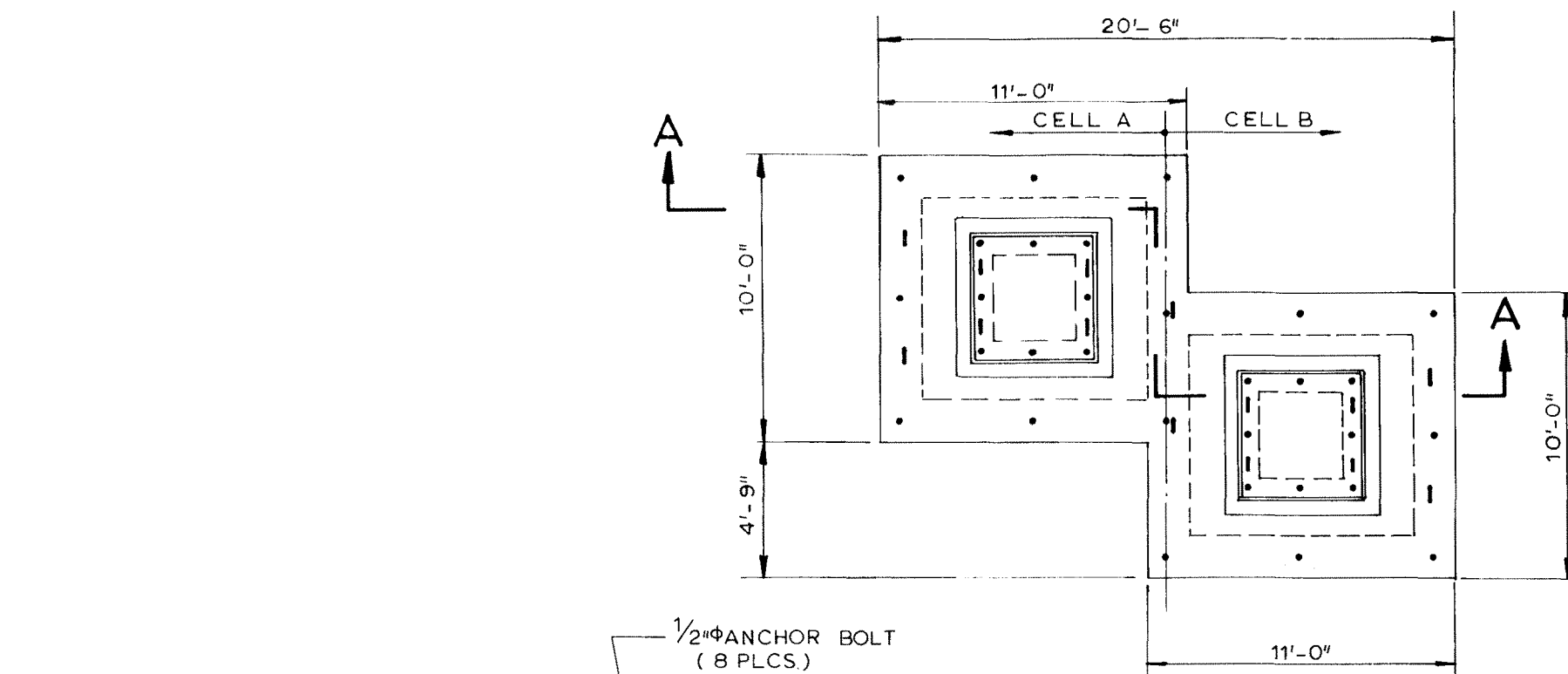


DUCT BANK ENTRANCE DETAIL AT
MANHOLES & U.H.S. COOLING TOWER (SIM.)

Rev. OL-0
6/86

**UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT**

**FIGURE 3.8-10
DUCT BANK ENTRANCE
DETAILS**



TYP. ROOF PLANS - ELEC. MANHOLES

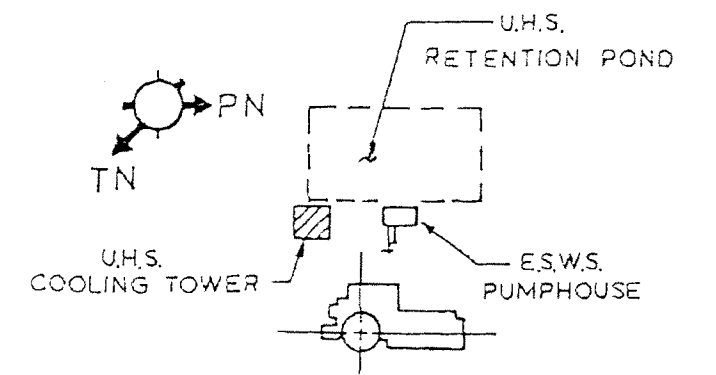
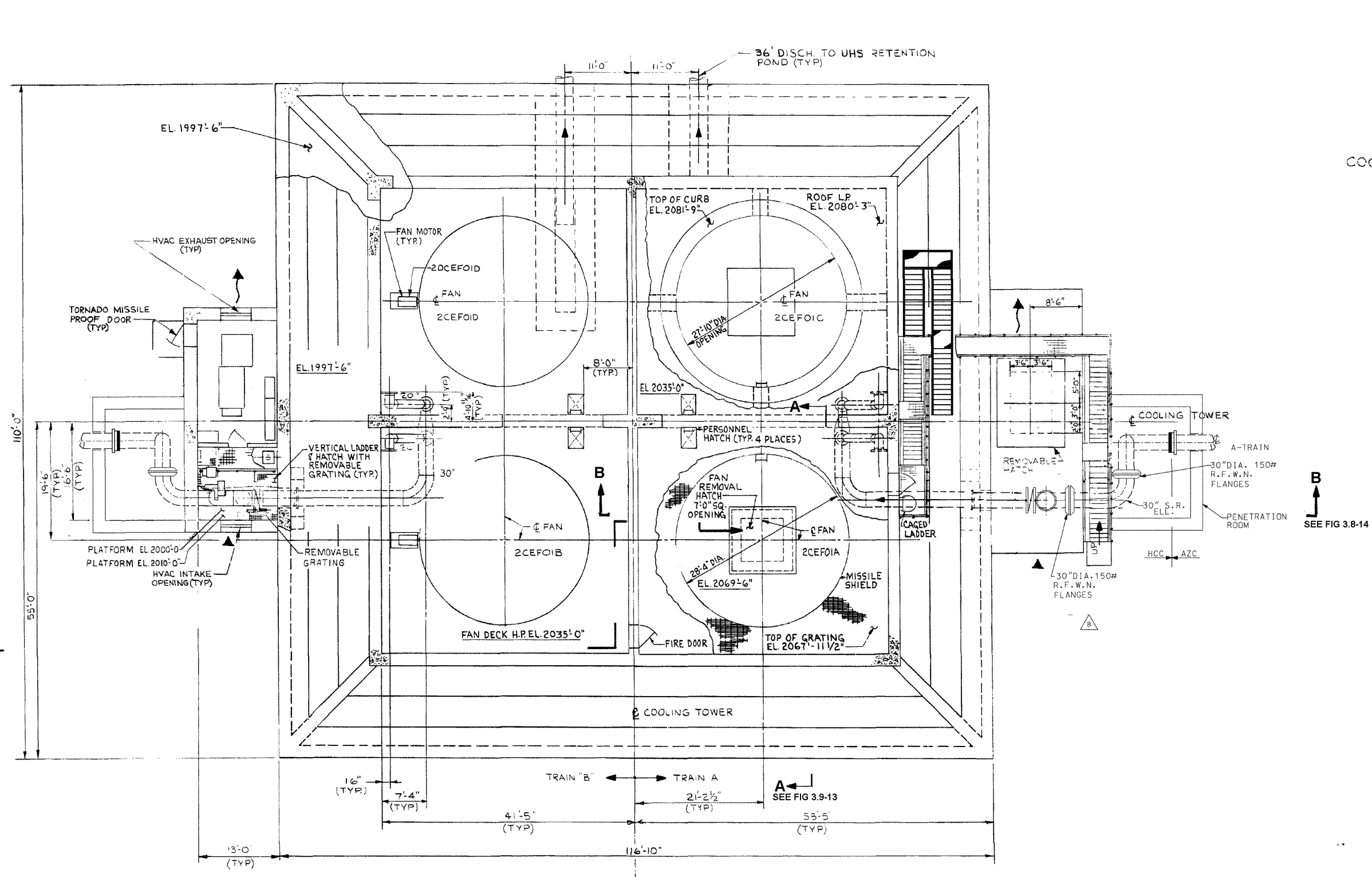
NOTE: FOR MANHOLE ROOF AND COVER $f'c = 5000$
psi MINIMUM AT 90 DAYS

Rev. OL-0
6/86

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-11
E.S.W.S. MANHOLES

SECTION A - A



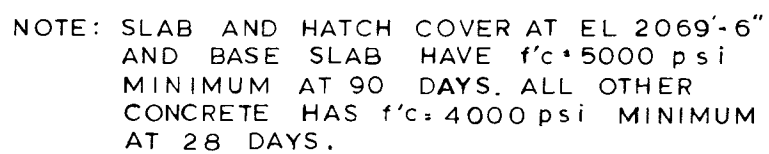
KEY PLAN

- ▶ AIR INTAKE
- ~ AIR EXHAUST

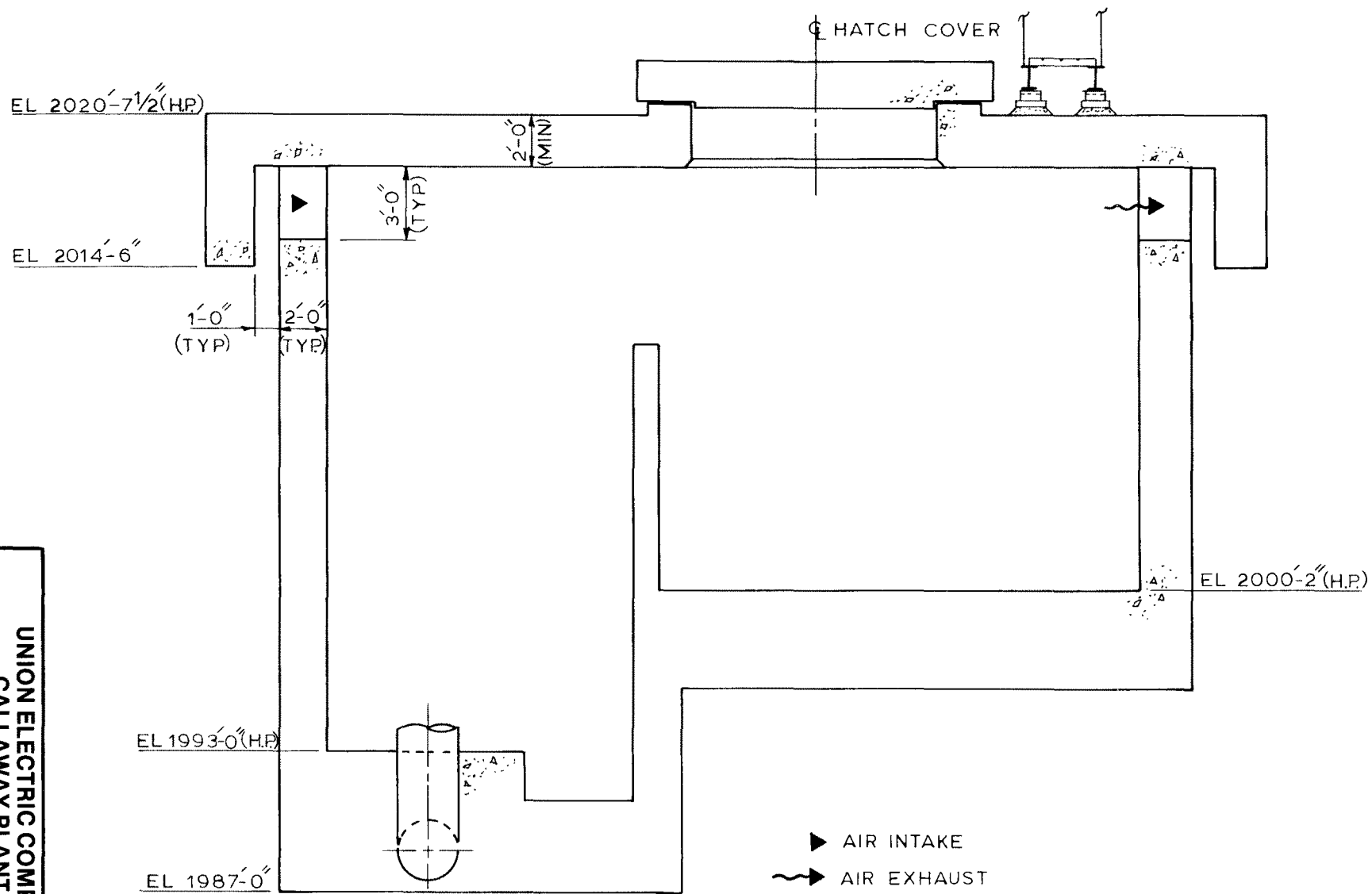
PLAN VIEW - U.S. COOLING TOWER

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

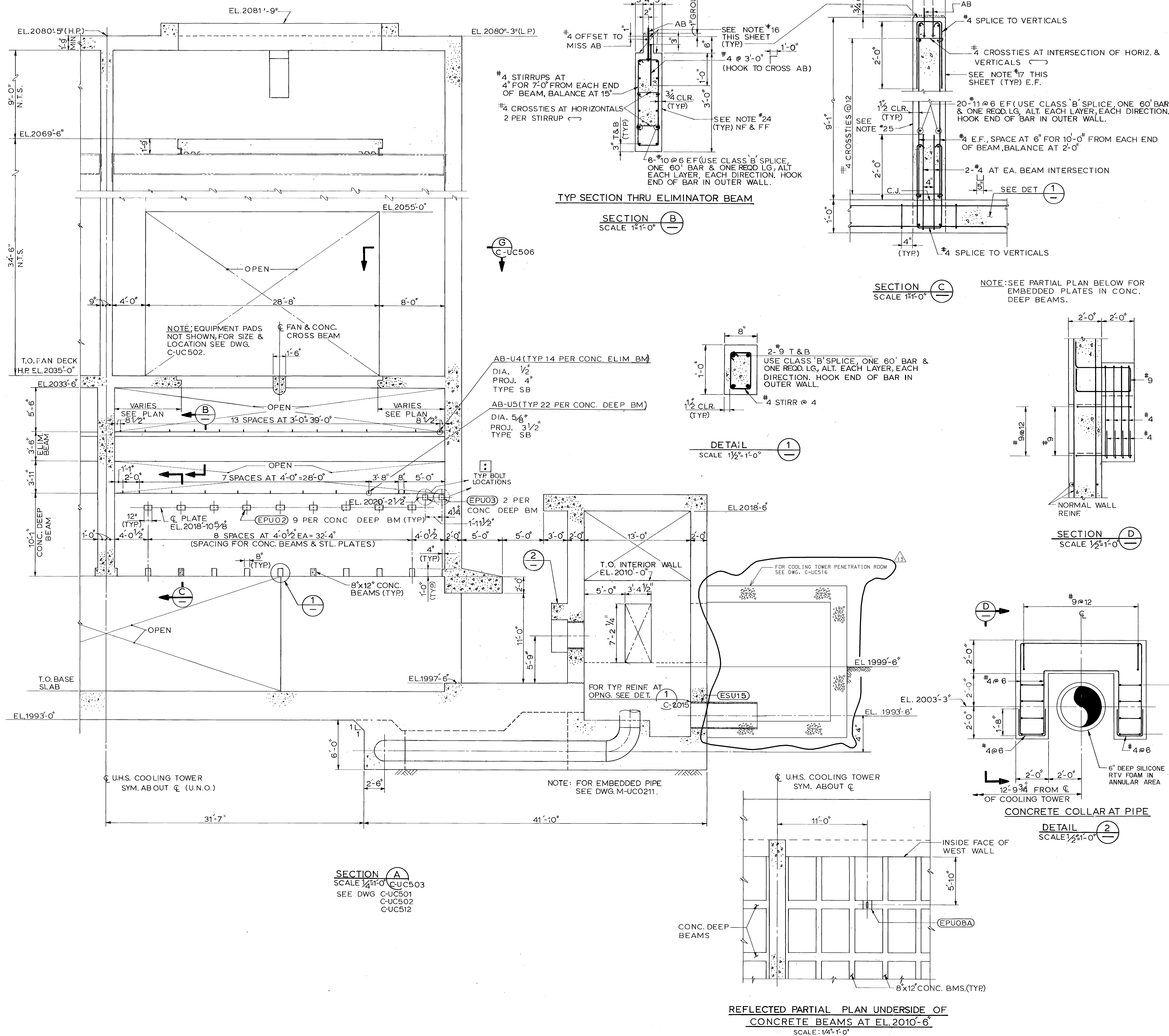
FIGURE 3.8-12
PLAN - U.S. COOLING TOWER
REV. 12 11/10



Rev. OL-0
6/86



SECTION C-C



- NOTES**

CONTINUED FROM DWG. C-UC502.

 16. THESE SURFACES SHALL BE FINISHED SMOOTH & BE IN PLANE TO $\pm \frac{1}{4}"$.
 17. THESE SURFACES SHALL BE FLAT & IN VERT. PLANE TO $\pm \frac{3}{8}"$.
 18. HOR. REINF LAP SPLICES AT VERT. C.J. SHALL BE CLASS "C" AS DEFINED IN A.C.I. 318-71. (PER TABLE VIII, CRSI REINF. BAR SPLICES) U.N.O.
 19. HOR. REINF LAP SPLICES SHALL BE STAGGERED WHERE POSSIBLE. SPLICES (U.N.O.) WHEN STAGGERED SHALL BE CLASS "B" AS DEFINED IN A.C.I. 318-71. (PER TABLE VIII, CRSI REINF. BAR SPLICES)
 20. CABLE SUPPORT INSERTS TO BE FIELD CUT AT INTERFERENCES WITH EMBED PLATES.
 21. ALL DOWELS (REINFORCING STEEL) EXTENDING FROM THE UNIT 2 BASE SLAB SHALL BE GALV. PER ASTM A123-73 (U.N.O.)
 22. CONCRETE FINISHING, AFTER REMOVAL OF FORMS, SHALL BE IN ACCORDANCE WITH SPECIFICATION C103 AS FOLLOWS:
 INTERIOR WALLS & CEILINGS AS PER PARAGRAPH 14.1.1
 INTERIOR FLOORS AS PER PARAGRAPH 13.1.3
 EXTERIOR WALLS AS PER PARAGRAPH 14.1.1
 EXTERIOR FLAT SLABS AS PER PARAGRAPH 13.1.2
 23. DOWELS 16 FT. OR LONGER EXTENDING FROM THE UNIT-1 BASE SLAB MAY BE CUT & MECHANICALLY SPLICED AT THE CONTRACTOR'S OPTION WITH OWNER'S APPROVAL PROVIDING THE FOLLOWING REQUIREMENTS ARE MET:
 - a. SPEC. C-115 (Q)
 - b. SPEC. C-112(Q), ESPECIALLY SECT. 8.4
 - c. SPLICES ARE STAGGERED AT LEAST ONE (1) FOOT FROM SPLICES ON ADJACENT REINF. BARS.
 - c. CENTERLINES OF SPLICES ARE LOCATED NO CLOSER THAN THREE(3) FEET FROM THE CONCR. FACE.
 24. CONCRETE CLEAR COVER AT ELIMINATOR BEAMS SHALL HAVE A TOLERANCE OF MINUS 0" PLUS $\frac{1}{2}"$
 25. DOWELS EXTENDING FROM UNIT 2 BASE SLAB MAY BE PAINTED WITH "DIMETOCOTE 6" IN LIEU OF GALVANIZING. PRIOR TO PLACING CONCRETE AROUND THE PAINTED PORTION OF REBAR, SANDBLASTING SHALL BE USED TO REMOVE ALL PAINT

FOR CONTINUATION SEE DWG. C-UC504.

REFERENCE DRAWINGS

CONTINUED FROM DWG. C-UC502	
M-WCO211 U.H.S. COOLING TOWER PIPING PLAN & SECTIONS	
C-2012	CIVIL STRUCTURAL STANDARDS
C-2020	
C-2033	
C-2035	
C-U001	CIVIL STRUCTURAL STANDARDS
C-U002	ANCHOR BOLT DETS.
C-U003	EMBEDDED FRAME DETS.
C-U004	EMBEDDED SLEEVE DETS.
C-U005	EMBEDDED PLATE DETS.
	MISC. EMBEDS DETS.

MATERIAL RESPONSIBILITY

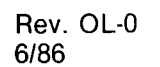
CONTINUED FROM DWG. C-UC502.

14. FURNISHING OF HANDRAILS & TOE PLATES UNDER SPEC. C-131.
15. FURNISHING OF REINFORCING MECHANICAL SPLICES UNDER SPEC. C-114.
16. ANCHOR SLEEVES HIGH DENSITY POLY-ETHYLENE PLASTIC AS MANUFACTURED BY WILSON PLASTIC SLEEVE INC., OR APPROVED: EQUAL SHALL BE PROCURED BY OWNER.

FOR CONTINUATION SEE DWG. C-UC504.

13	021010	INCORP. MP 07-0066, FCN-24.	MAL	TJC	N/A	TWS
12	1069	INCORP. RFR-10059.	MAL	TJC		<i>[Signature]</i>
11	514 92	REFLECTS TURNOVER TO U.E. INCORP. RFR-09867A.	JK	SPB	N/A	<i>[Signature]</i>
NO.	DATE	REVISIONS	BY	CHK	DES SUP	ENGR PROJ ENGR APPR
SCALE/NOTED	DATE 11/1/10	DESIGNED T	DRAWN RS		CHIEF	<i>[Signature]</i>

[illegible]



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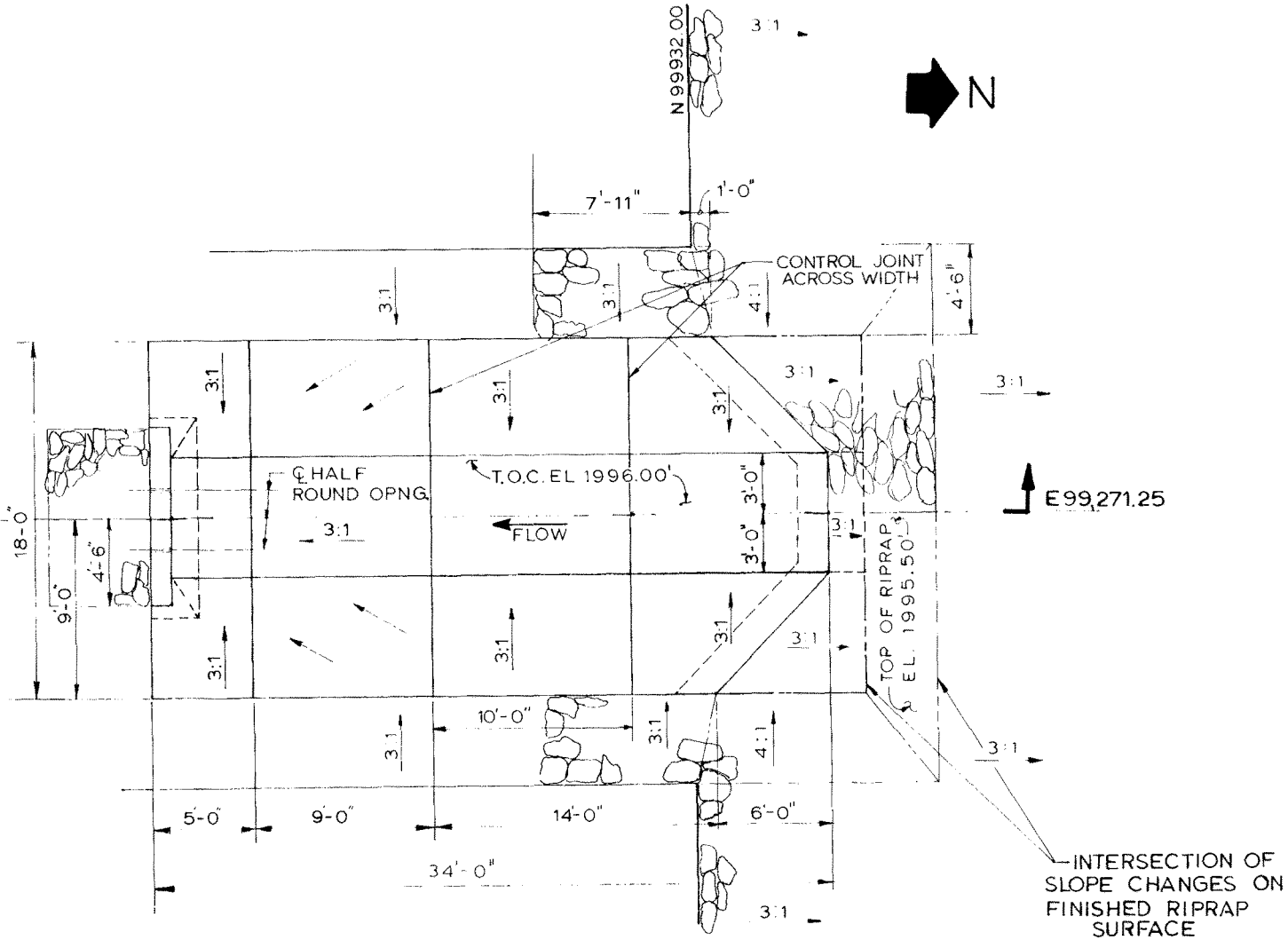
FIGURE 3.8-15
PLAN
U.H.S. RETENTION POND

<p>UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT</p>
<p>FIGURE 3.8-16 PLAN OUTLET STRUCTURE U.H.S. RETENTION POND</p>

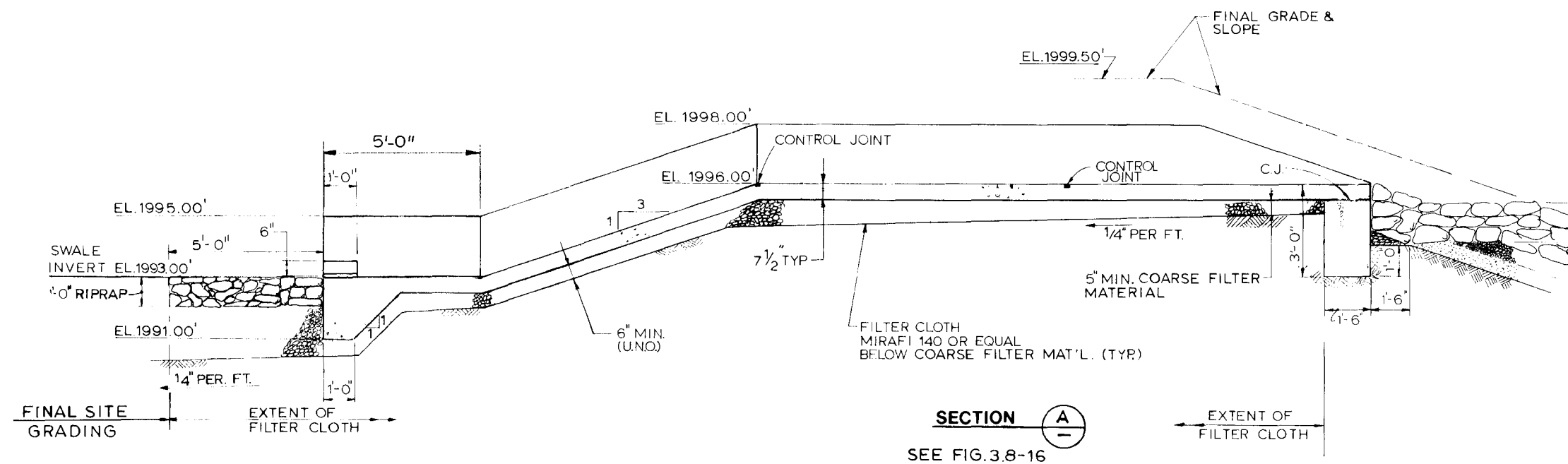
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6/86

SYM. ABOUT
OUTLET STRUCTURE

SEE FIG.
3.8-17

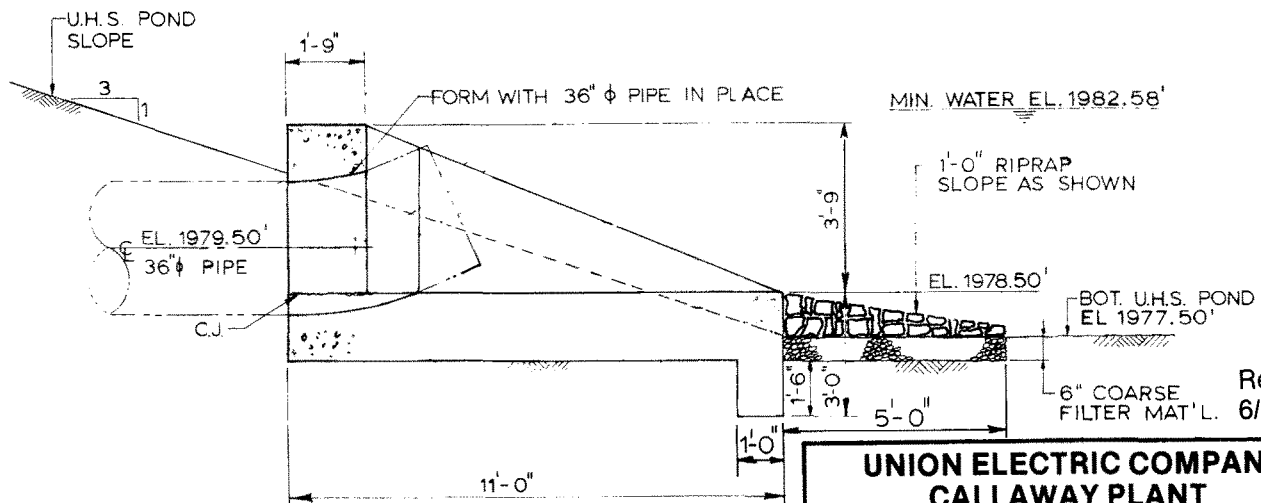
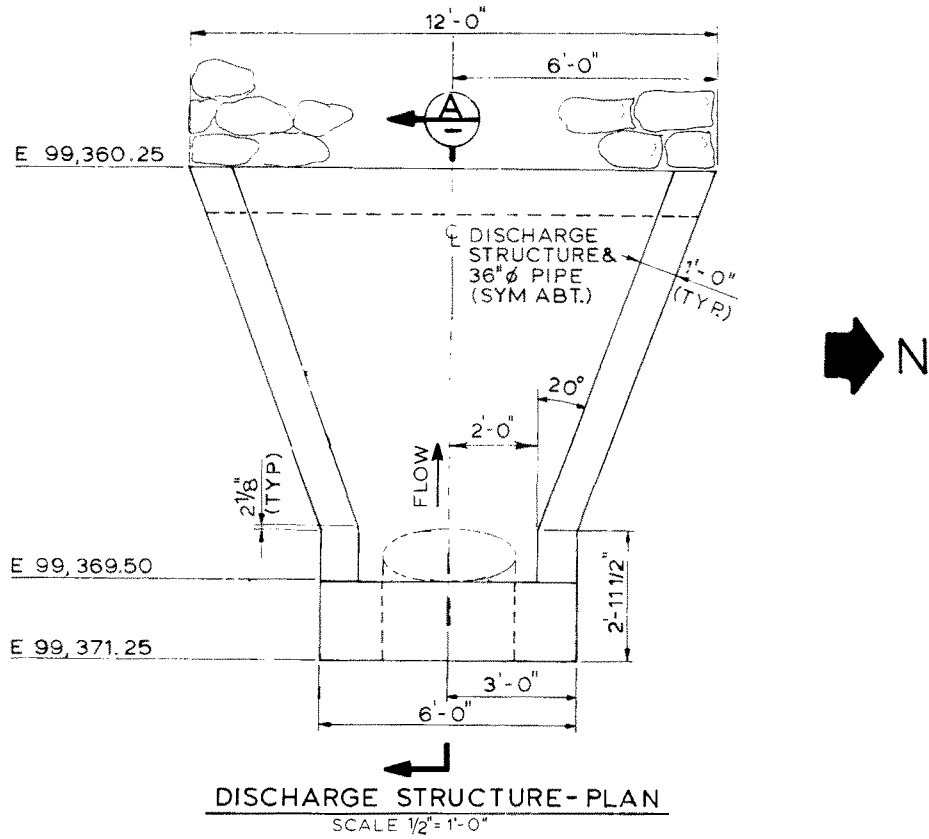


OUTLET STRUCTURE-PLAN



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6/86

UNION ELECTRIC COMPANY CALLAWAY PLANT FINAL SAFETY ANALYSIS REPORT
FIGURE 3.8-17 SECTION, OUTLET STRUCTURE U.H.S. RETENTION POND

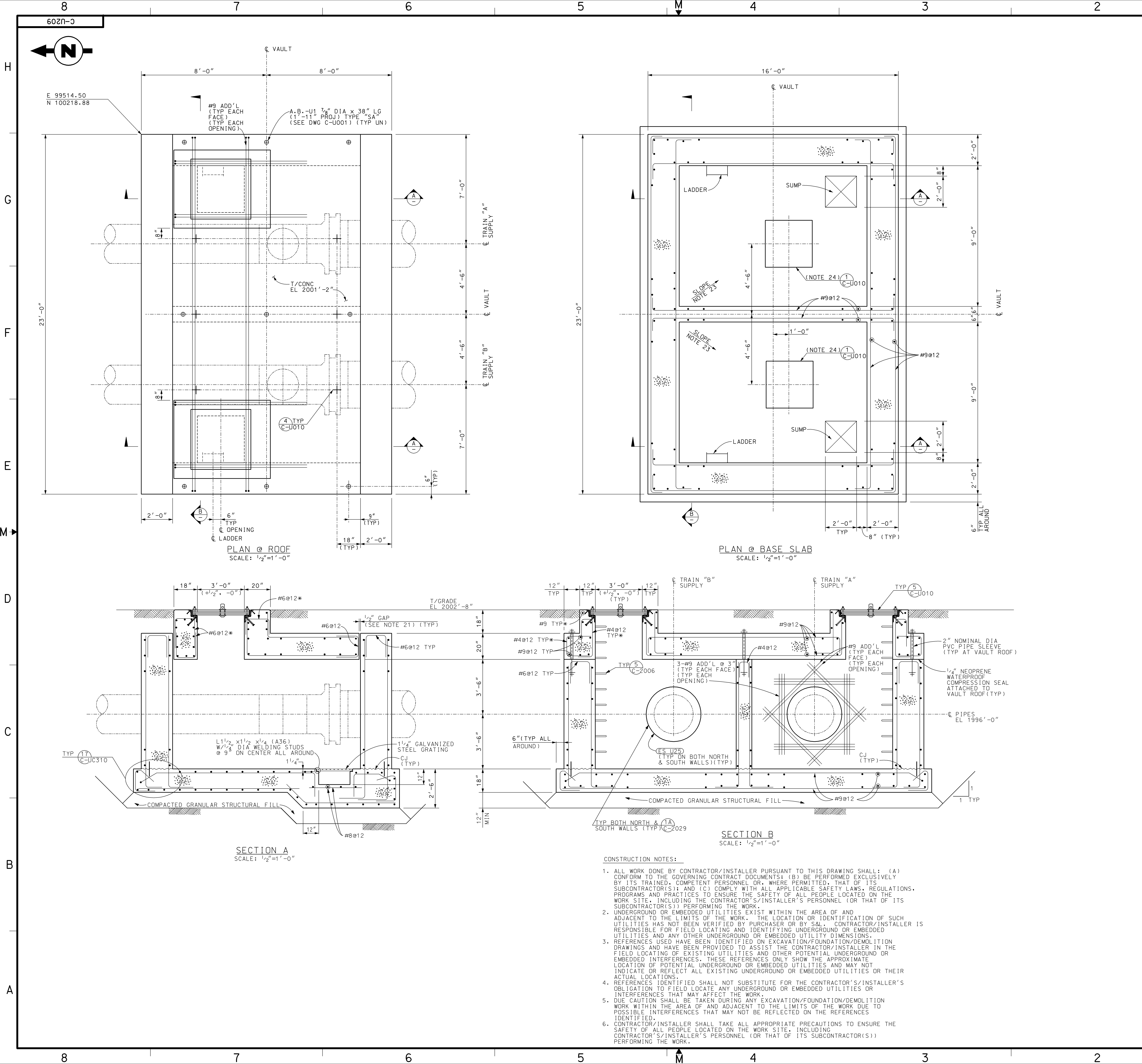


SECTION

UNION ELECTRIC COMPANY
CALLAWAY PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.8-18
DISCHARGE STRUCTURE
U.H.S. RETENTION POND

Rev. OL-0
6/86



- NOTES
- NOT USED.
 - ALL WORK SHOWN ON THIS DRAWING SHALL BE FURNISHED & INSTALLED PER PROJECT CONSTRUCTION SPECIFICATION C-101, C-107 & C-111.
 - ALL LIFTING EYES PROVIDED IN ROOF ARE REQUIRED TO BE UTILIZED WHEN LIFTING TOP OF SUMP GRATING TO BE 3/4" BELOW BASEMAT HIGH POINT ELEVATION.
 - VAULT SHALL BE PROPERLY VENTILATED BEFORE ENTERING.
 - CONCRETE COMPRESSIVE STRENGTH, f_c' (28 DAY STRENGTH), SHALL BE AT LEAST 5,000 PSI UNLESS NOTED OTHERWISE. VAULT ROOF SHALL BE PRECASTED WITH A CONCRETE COMPRESSIVE STRENGTH f_c' (90 DAY STRENGTH) OF AT LEAST 5,000 PSI.
 - REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60, DEFORMED BARS, UNLESS NOTED.
 - DETAILING OF REINFORCING BARS TO BE IN ACCORDANCE WITH ACI PUBLICATION SP-66 "ACI DETAILING MANUAL, LATEST EDITION."
 - REINFORCING BARS ADJACENT TO THE FACE OF CONCRETE SHALL HAVE THE FOLLOWING MINIMUM CONCRETE COVER UNLESS NOTED ON DESIGN DRAWING:
 - CONCRETE CAST AGAINST EARTH OR OTHER SURFACE NOT FORMED
 - FORMED CONCRETE SURFACES PERMANENTLY IN CONTACT WITH SOIL OR EXPOSED TO WEATHER
 - TOP BARS OF CONCRETE MATS AT GRADE
 - ALL OTHER CONDITIONS
 - FOR LAP AND DEVELOPMENT AND HOOK LENGTH:

LENGTHS GIVEN IN INCHES											
BAR SIZE	LAP SPLICE LENGTH		DEVELOPMENT LENGTH		HOOK (90 DEG)		H	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
	TOP BARS LST	OTHER BARS LSO	TOP BARS ELT	OTHER BARS ELO	TOP BARS	OTHER BARS					
4	22	16	17	12	10	10	5				
5	28	20	21	15	12	12	6				
6	33	24	26	18	14	16	7				
7	39	28	30	21	16	21	8				
8	49	35	38	27	19	27	10				
9	62	45	48	34	23	34	13				

- NOT USED.
- FOR CONSTRUCTION TOLERANCE REFER TO ACI 117 LATEST EDITION, UNLESS OTHERWISE NOTED.
- TYPICAL CONSTRUCTION JOINT DETAIL MAY BE USED BY CONCRETE WORK CONTRACTOR. THE LOCATION & NUMBER OF CONSTRUCTION JOINT SHALL BE APPROVED BY OWNER PRIOR TO FABRICATING REINFORCING BARS.
- ALL CONSTRUCTION JOINTS (CJ) SHALL BE THOROUGHLY CLEANED AND MOISTENED. A LAYER OF MORTAR OF THE SAME STRENGTH OR GREATER AS THAT OF THE ADJACENT CONCRETE SHALL BE PLACED ON CONSTRUCTION JOINT SURFACES PRIOR TO PLACING FRESH CONCRETE. AS AN ALTERNATE TO PLACEMENT OF MORTAR, THE ENTIRE SURFACE MAY BE ROUGHENED IN ACCORDANCE WITH ACI 301 LATEST EDITION.
- ALL GRANULAR BACKFILL SHALL BE FURNISHED & INSTALLED IN ACCORDANCE WITH SPECIFICATION 4645-32A(0).
- CONCRETE SHALL NOT BE PLACED UNTIL THE FORMS, REINFORCEMENT AND EMBEDDED ITEMS HAVE BEEN INSPECTED AND APPROVED BY OWNER.
- TOP SURFACE OF CONCRETE SHALL RECEIVE A "BROOMED FINISH" AS DEFINED ACI 301-99.
- "WS" INDICATES WATER STOP SHALL BE 9" WIDE CENTER DUMBBELL TYPE HIGH GRADE RUBBER CONFORMING TO CRD-C513.
- FOR PENETRATION SLEEVE DETAILS MARKED (ES XXX) SEE DRAWING C-U003.
- BACKFILL INSIDE OF RETAINING WALL SHALL BE CONCURRENT WITH BACKFILL OF OUTSIDE RETAINING WALL.
- FILL GAP WITH HBR BACKER ROD BY NOMACO OR EQUAL. SEAL TOP WITH SILICONE SEALANT OR EQUIVALENT.
- FOR TYPICAL REINFORCING BAR DETAILS SEE DWG C-UC310. FOR OTHERS SEE DWG C-2003.
- TOP OF BASE MAT CONCRETE TO BE SLOPED FROM EDGE OF CONCRETE WALL TO THE SUMP WITH A MINIMUM TOTAL ELEVATION DROP OF 1/4" FROM HIGH POINT TO LOW POINT.
- EMBED PLATES NOT TO BE SLOPED WITH CONCRETE FLOOR.
- "*" INDICATES BARS REQUIRED AT MANWAY EXTENTIONS ONLY.

REFERENCE DRAWINGS	
C-U001	E.S.W.S. ANCHOR BOLT DETAILS
C-U010	E.S.W.S. & U.H.S. EMBEDDED PLATE & MISC DETAILS
C-2006	CIVIL - STRUCTURAL STANDARD DETAILS
C-U003	E.S.W.S. & U.H.S. EMBEDDED SLEEVE DETAILS
C-U310	ESW PUMPHOUSE VAULTS ADDITIONAL SECTIONS & DETAILS
C-2029	CIVIL - STRUCTURAL STANDARD DETAILS

REV.	DATE
0	062509
DRAWN/CHKD. SUPV. MAL. JLC/TWS	
INITIAL ISSUE	
PER	MP 07-0066
FCN-09	
FCN-23	
FCN-15	
REV.	DATE
1	090314
DRAWN/CHKD. SUPV. MAL. RLW/DME	
INCORP. CAR 201404565 ACTION 1.	

AS-BUILT			
DRAWN (DATE) N/A			
CHKD. (DATE) N/A			
SUPV. (DATE) N/A			
APPD. (DATE) N/A			
LOCATION		CLASS	
ST. LOUIS, MO.		C-U209	
ELECTRIC COMPANY		REV. 1	