ATTACHMENT 1

TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN
CIVIL DESIGN BRANCH

SEQUOYAH NUCLEAR PLANT

DESIGN CRITERIA FOR REINFORCED CONCRETE BLOCK WALLS

SQN-DC-V-1.1.1

April 7, 1972

Sponsor Engineer Floyd A. Stone

Submitted Robert W. Cameron

Recommended J. W. Smith

Approved F. P. Gaines

Approved (Not Required)
(NSSS Vendor as Required)

Mechanical	Electrical	Civil	Architectural

Revisions

No. 1 Pages 2 Spon Engr FAS Subm RWC Recm JWS Appd FPG Date 12/11/72
No. 2 Page Fig. A Spon Engr FAS Subm RWC Recm JWS Appd FPG Date 3/22/72

Mechanical	Electrical	Civil	Architectural	NSSS Vendor

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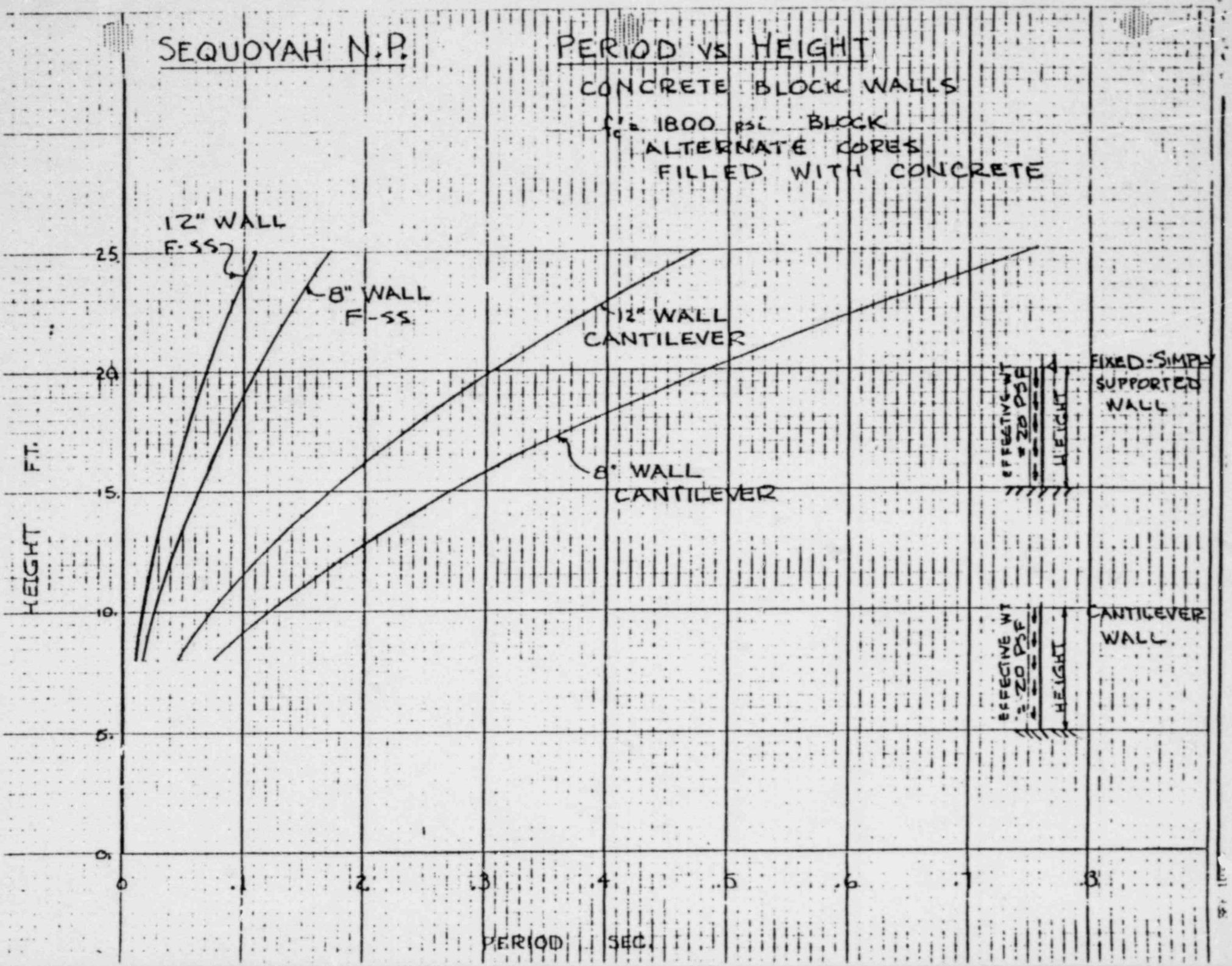
SEQUOYAH N.P.
PERIOD VS HEIGHT
CONCRETE BLOCK WALLS
f'_c = 1800 PSI BLOCK
ALTERNATE CORES
FILLED WITH CONCRETE
12" WALL
F-SS
8" WALL
F-SS
12" WALL
CANTILEVER
8" WALL
CANTILEVER
EFFECTIVE WT
= 20 PSF
HEIGHT
FIXED-SIMPLY
SUPPORTED
WALL
EFFECTIVE WT
= 20 PSF
HEIGHT
CANTILEVER
WALL
HEIGHT FT.
25.
20.
15.
10.
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PERIOD SEC.

1.0 Purpose

The purpose of this design criteria is to establish a guide for the designer and checker to assure design uniformity and to assure that a safe and complete design of reinforced concrete block walls is achieved.

2.0 General Description

This criteria is provided for use in the design of reinforced concrete block walls for all Class I structures of this project. In addition, it may be used for Class II and III structures.

Standard concrete blocks with closed ends and two cores will be used to permit the placement of one or two layers of vertical reinforcement at 8 inches on center or 16 inches on center. Only the cores that have reinforcement in them will be filled with concrete. The wall will be designed to withstand horizontal and vertical forces due to earthquake and equipment loads.

All openings at floor level will have to be sized so dowels in the structural slabs can be designed and located before the structural slabs are constructed. Other openings in the walls, including spare openings and sleeves by the Mechanical and Electrical sign Branches will have to be sized, located, and designed before the block walls are installed. The spare openings and sleeves are to be filled in with concrete by the Field if they are not required.

The lintels will be designed for load distribution by TVA standards for short loose lintels. Only the portion of the lintel that is cast in place concrete will be used for design. For blocks in the vertical direction

only the section filled with concrete will be used for design using the allowable stress f'_c of the block. 1

Concrete block wire reinforcement shall be used in the bed joints of alternate courses of all concrete block walls. Corner and tee partition lock fittings shall be used at all wall intersections. Walls that extend to the ceiling above will either be doweled into the slab or restrained by continuous angles on both sides of the wall.

Concrete in the cores shall be placed in lift intervals or layers not to exceed 24 inches. Each layer shall be thoroughly consolidated and tied into the layer below by either rodding or internal vibration.

3.0 Design Considerations

3.1 Materials

Materials	Specifications
Concrete block	Full length lightweight two core closed end. ASTM Designation C90, Grade UI. Compressive strength = 1000 psi on gross area; concrete strength f'_c = 1800 psi.
Sand	ASTM Designation C144
Portland cement	ASTM Specification C150, Type I or II
Coarse aggregate	ASTM Specification C33, maximum size aggregate 3/4 inch; slag is not acceptable.
Concrete	One part cement, 2-1/2 part sand 2-3/4 part coarse aggregate, by weight 6 gallons of water per bag of cement for lintels (maximum), 7 gallons of water per bag of cement for core fill (maximum).
Reinforcement	ASTM Specification A615, Grade 60. 1

4.0 Responsibility

The Nuclear Concrete Section of the Civil Design Branch is assigned responsibility for the design of the reinforced concrete block walls except that the Structural Steel Section will design steel restraints where needed to resist reactive forces applied to these walls. These reactive forces will be specified by the Nuclear Concrete Section.

Detailed construction drawings will be made by the Architectural Design Branch. The Architectural drawings will show each section of these walls in full elevations.

SUBJECT ATTACHMENT 2 SHEET 1 OF

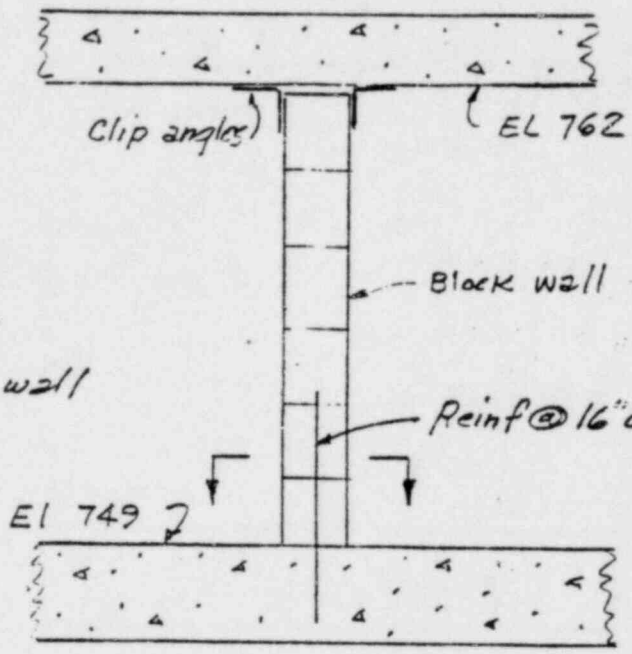
Architectural Reinf — SQN

Masonry Block Walls — Aux. Bldg

COMPUTED DHC DATE 2-27-74

Ref: Design Criteria SQN-DC-V-1.1.1 — CHECKED ERC DATE 2-27-74

Determine amount of reinforcement for 8" block wall El 749



Use 2% damping ratio
DL = 62 psf (Design Criteria)
LL = 20 psf on on side of wall
or 10 psf on each side of wall

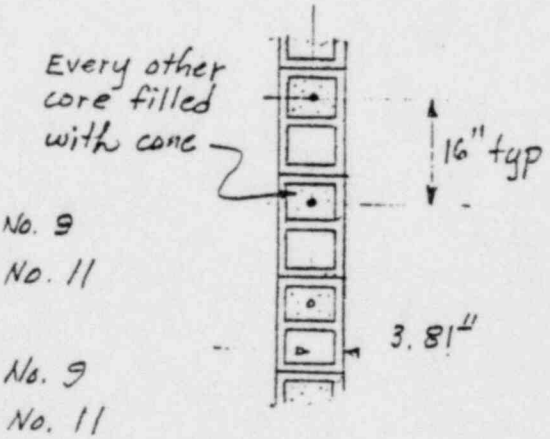
Assume walls are fixed at bottom and pinned at top.

From Fig A (Design Criteria) for 8" wall F-SS and a height of 13'-0".

Period — 0.05 ± sec

N-S hor accel — 0.2 @ Mass point No. 9
N-S hor accel — 0.2 @ Mass point No. 11

E-W hor accel — 0.2 @ Mass point No. 9
E-W hor accel — 0.2 @ Mass point No. 11



SECTION

$DL + LL = 62 + 20$
$= 82$ psf

$M = 82(0.20)(13)^2/8$
$= 346 \frac{\text{lb-ft}}{\text{ft}}$ ($\frac{1}{2}$ SSE)

$A_s = \frac{0.346(12)}{30(0.9)(3.81)} = 0.04 \frac{in^2}{ft}$
($\frac{1}{2}$ SSE)

$A_s = \frac{0.346(2)(12)}{54(0.9)(3.81)} = 0.05 \frac{in^2}{ft}$ ← Controls
(SSE)

Use #6 @ 16" oc

$A_{s\,supplied} = 0.33 in^2$ >> $0.05 in^2$ reqd

TVA 11010 (WBT-75)

Check stresses for LL = 20 psf on one side of wall only.

From Reinforced Concrete Design Handbook, ACI Publication SP-3, 1965 Edition, Example 14.

$b = 12''$
$d = 3.81''$
$A_s = 0.33 in^2$
$M = 346(2) = 692\ ^{lb\text{-}ft}/_{lin\ ft}$ (SSE)

According to ASTM, conc weight for lightweight C90 blocks is less than $105\ ^{lb}/_{ft^3}$ - say $w = 100$ pcf

$$n = \frac{29,000,000}{100^{1.5}\ 33\sqrt{1800}} = 20.7$$

$$N = 0.082(13) = 1.066\ ^{k\text{-}1}/_{lin\ ft}$$

$$e = \frac{12M}{N} = \frac{12(0.692)}{1.066} = 7.8''$$

$$e/d = 7.8/3.81 = 2.05$$ Assume $j = 0.87$ estimated

$$i = \frac{1}{1 - j/e/d} = \frac{1}{1 - \frac{0.87}{2.05}} = 1.74$$

$$m = q = \frac{n A_s i}{bd} = \frac{20.7(0.33)(1.74)}{12(3.81)} = 0.26$$

$$k = \sqrt{m^2 + 2q} - m = \sqrt{0.0676 + 0.52} - 0.26 = 0.507$$

$$j = 1 - \frac{1}{3}k = 1 - \frac{1}{3}(.507) = 0.83 \text{ (actual)}$$

$$\therefore i = \frac{1}{1 - \frac{0.83}{2.05}} = 1.68$$

$$f_s = \frac{1000N}{jAsi} \times \frac{e}{d} = \frac{1066}{.83(0.33)(1.68)} \times 2.05$$

$$= \underline{4749 \text{ psi}} < 54{,}000 \text{ psi}$$

$$f_c = \frac{f_s}{n} \times \frac{K}{1-K} = \frac{4749}{20.7} \times \frac{0.507}{1-0.507} = \underline{236 \text{ psi}} < 1350 \text{ psi}$$

Check shear

$$V_{max} = 5\left(\frac{82}{8}\right)(0.22)(13.0)$$

$$= 133 \text{ lbs / lin ft}$$

$$v = \frac{133}{12(3.81)} = 3 \text{ psi} << 78 \text{ psi allowable}$$

BLOCK ALIGNMENTS — SNP-AUX. BLDG.
UNITS 1 & 2

COMPUTED CEH DATE 6-22-77
CHECKED JVO DATE 6-30-77

EL. W 405

9"x9"x3/4" PLATES ARE TO BE ATTACHED TO 8" BLOCK WALLS ON THE 749 EL. WALLS AND LOADS ARE SIMILAR, ∴ CHECK FOR WORST CASE CONDITIONS.

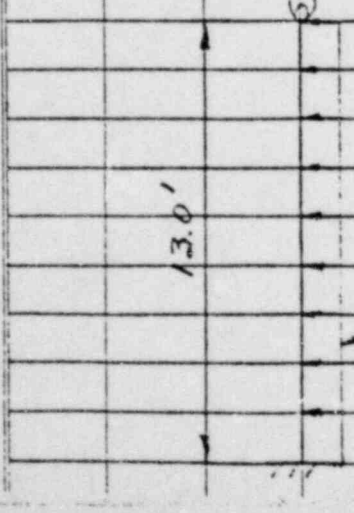
PLATES ARE TO BE ATTACHED AT INTERVALS OF 10' TYP.

WALL HEIGHT = 13'
" REINF. = 0.33% ± (#4 @ 16" O.C.)
ASSUME WALLS ARE FIXED AT BOTTOM AND PINNED AT TOP.

ALLOWABLE STRESSES FOR SSE CONDITION:
f_s = 54000 PSI
f_c = 1350 PSI (BLOCK)
$(DL+LL)_{MAX}$ = 82 PSF (FROM DESIGN CRITERIA)

FROM FIG. A (PERIOD VS. HEIGHT CONCRETE BLOCK WALLS SNP-AUX. BUILDING)
PERIOD ~ 0.04 ± 0.01
USE DAMPING RATIO OF 2% (REF: BLOCK WALLS DESIGN BOOK FOR SNP).
a/g = 0.30 (MASS POINT #9) E-W ELEVATION 762.5 ±
FOR SSE USE: (2 x .30) 82 PSF = 0.0492 K/Ft. WIDTH OF WALL.

LOADING ON WALL:



EXAMINE TWO LOADINGS TO DETERMINE WORST CASE:
CASE 1). LOADS APPLIED AT TOP OF WALL
CASE 2). LOADS APPLIED AT CENTER OF WALL

BLOCK ATTACHMENTS — SNF-AUX. BLDG
UNITS 1 & 2

COMPUTED CEH DATE 6-20-77
CHECKED JVD DATE 6-30-77

CASE 1).

M @ BASE DUE TO UNIFORM LOAD = 0.092 (13)² / 3 = 1.04'
M @ BASE DUE TO CONC. LOAD = $\frac{0.6(.375)(12.62)(.375+13)}{2(13)^2}$ = .11'
M @ BASE DUE TO CONC. MOM. = 0.499(.7) = 0.349 K'/Ft

EFFECTIVE WIDTH = $\frac{4(.375)}{3}$ + 0.75 = 1.25'

$M_{TOTAL} = 1.04 + \frac{.11 + .349}{1.25} = 1.41$ K'/Ft WIDTH

CASE 2).

M @ BASE DUE TO UNIFORM LOAD = 1.04 K'/Ft
M @ BASE DUE TO CONC. LOAD = $\frac{3(.6)(13)}{1/6}$ = 1.46 K'/Ft
M @ BASE DUE TO CONC. MOM. = 0.125(.7) = 0.088 K'/Ft

EFFECTIVE WIDTH = $\frac{4(6.12)}{3}$ + .75 = 8.91'

$M_{TOTAL} = 1.04 + \frac{1.46 + .088}{8.91} = 1.21$ K'/Ft WIDTH

CASE 1 CONTROLS $M_{MAX.} = 1.41$ K'/Ft WIDTH.

AXIAL LOAD /ft. WIDTH = (0.092 X 13' X 1') + .115 = 1.19 K/Ft WIDTH
(UNIT Wt. OF BLOCK WALL = 100 PCF)

$n = \frac{29,000,000}{100^{1.5} 33\sqrt{1900}} = 20.7$ SAY 21

CHECK STRESSES:
USE METHOD OF (REINF. CONC. DESIGN BOOK, ACI-1965 Edition
EX. 14)

BLOCK ATTACHMENTS — S.V.P. - AUX. BUILDI

COMPUTED CEH DATE 6-21-7
CHECKED JVO DATE 6-30-77

$b = 12''$ $\quad M = 1.41^{K}/Ft$

$d'' = 0$ $\quad N = 1.18^{K}/Ft$

$A_s = 0.33^{\square''}/Ft$ $\quad d = 3.81''$

$$c = \frac{12M}{N} + d'' = \frac{12(1.41)}{1.18} = 14.3 \qquad \frac{c}{d} = \frac{14.3}{3.81} = 3.75$$

FROM TABLE 10 FOR $c/d = 3.75$ AND $j = 0.85$ (LET'S TRY) $; i = 1.3$

$$p = q = \frac{nA_s i}{bd} = \frac{21(.33)(1.30)}{12(3.81)} = 0.198$$

FROM TABLE IX FOR $M = 0.20$ AND $q = 0.198$; $K = 0.46$

FROM TABLE 13 FOR $Z = 1/3$ AND $K = 0.46$; $j = 0.85$

FROM TABLE 10 FOR $c/d = 3.75$ AND $j = 0.85$; $i = 1.30$

$$f_s = \frac{1000N}{jA_s i} \times \frac{c}{d} = \frac{1000(1.18)}{0.85(1.33)(1.3)}(3.75) = 12,100\ PSI < 54,000$$

OK

$$f_c = \frac{f_s}{n} \times \frac{K}{1-K} = \frac{12,100}{21} \times \frac{.46}{1-.46} = 491\ PSI < 1350\ PSI$$

OK

CHECK SHEAR:

$$V_{MAX} \cong \left[\frac{1.6}{L} + \frac{3(.0492)(13)}{8}\right] + 1.5 = 0.56^{K}$$

$$V = \frac{560}{12 \times 3.81} = 12.2\ PSI < 78\ PSI\ ALLOWABLE$$

O.K.

WALLS ARE O.K. BUT PLATES SHOULD BE LOCATED AT LEAST 2' BEYOND EDGE OF OPENINGS SUCH AS DOORS ETC.

ATTACHMENT 3

2.7 Attachments

2.7.1 Attachment to a Block Wall

When attaching to a cement-block wall, three conditions must be satisfied.

A) The compressive stress imposed on the face of the wall by the anchor plate or the back-up plate shall not exceed 680 PSI.

B) The shear stress imposed on the wall by the anchor plate or the back-up plate shall not exceed 70 PSI.

C) The internal forces within the wall shall prevent the cement blocks from rotating due to the applied loads.

Allowable compressive stress of concrete blocks = 680 PSI.

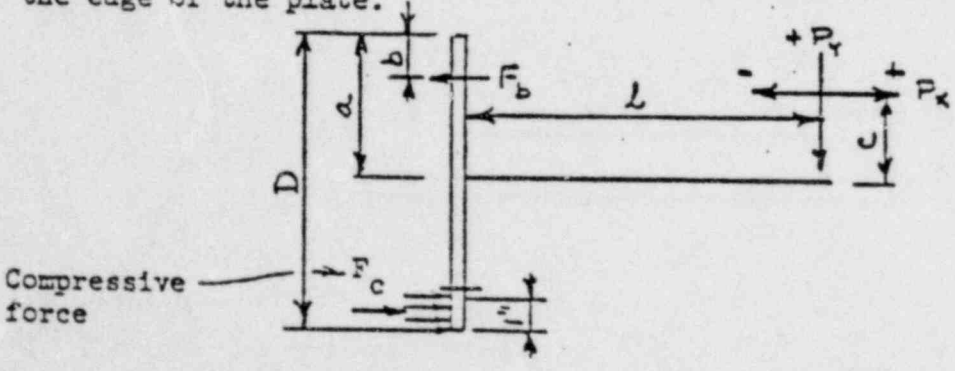
Allowable shear stress for concrete blocks = 70 PSI.

Weight of a concrete-brick wall = $.6 \times 150$ #/ft.^{3}
= .052 #/in.^{3}

Symbols: (Load in LBS., Dist. in Inches)

P_x & P_y - Applied Loads
a - Distance from center line of load at anchor plate to edge of plate
b - Edge distance for hole in anchor plate
ℓ - Distance from applied load to surface of wall
B - Width of anchor plate
D - Length of anchor plate
F_b - Tensile load on anchor bolt(s)
H - Height of cement block
L - Length of cement block
S - Distance from center line of applied load at the surface of the wall to the top of the wall
T - Thickness of the wall

2.7.1.1 When calculating the compressive stress imposed on the wall from the anchor plate, all the forces are assumed to be concentrated within a one inch strip along the edge of the plate.



.7.1.1 (Continued)

Take moments about a point $\frac{1}{2}$" from edge of plate.

$$F_b = \frac{P_y \ell + P_x(D-a+c-.5")}{D-b-.5"}$$

$$F_c = F_b - P_x$$

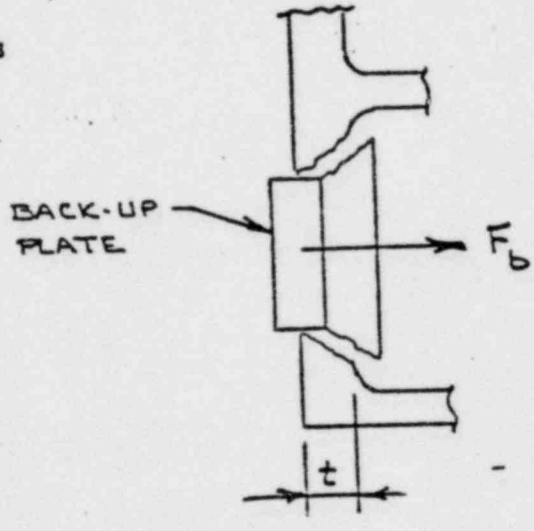
$$f_c = \frac{F_c}{B} \leq 680 \text{ PSI}$$

NOTE: The sign convention of force P_x must be followed.

2.7.1.2 When analyzing the forces imposed on a wall by a back up plate, compression and shear stresses must be considered.

Assume a back-up plate c inches by d inches

Let t = Block thickness from surface to inner cavity



Compressive Stress

$$f_c = \frac{F_b}{\text{Area of Plate}} \leq 680 \text{ PSI}$$

$$\text{The Shear Stress} = \frac{F_b}{\text{Shear Area}}$$

$$\text{Shear Area} = (2)(1.4)(t)(c+d+t)$$

$$\therefore \text{ Shear Stress} = \frac{F_b}{2.8t\,(c+d+t)} \leq 70 \text{ PSI}$$

EXAMPLE: Find maximum bolt load that can be applied to 3" x 3" plate with t = 0.8 inches.

$$F_{b(\text{Compression})} = f_c\,(c)(d) = 680 \text{ PSI} \times 3" \times 3" = 6120\#$$

$$F_{b\ \text{Shear}} = f_s(A) = 70 \text{ PSI} \times 2.8 \times .8 \times (3+3-2\times.8)$$

$$= 690\#$$

.7.1.3 When attaching to a block wall, the rotating forces, exerted on the block, must be determined.

Assumptions:

As the block rotates, the total resisting force reacts along a one inch strip across the top and bottom edges of the block. See Fig. I. The forces react for a length equal to "H", see Fig. II.

The resisting force is supplied by the weight of a triangle of a wall above the point of attachment, see Fig. II.

The maximum resisting force = .052#/in.^{3} x wall thickness x the square of the distance from the point of loading to the top of the wall,

$$F = \frac{P_y(\ell + \frac{T}{2})}{T - 1"}$$

The compressive stress

$$f_c = \frac{F}{A} = \frac{F}{H} \lesssim 680 \text{ PSI}$$

AND

$$F_{max} = .053(T)(S)^2 \text{ Lbs.}$$

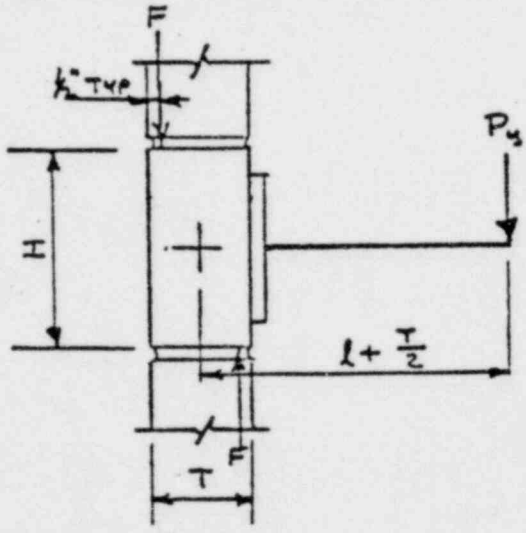


Figure I

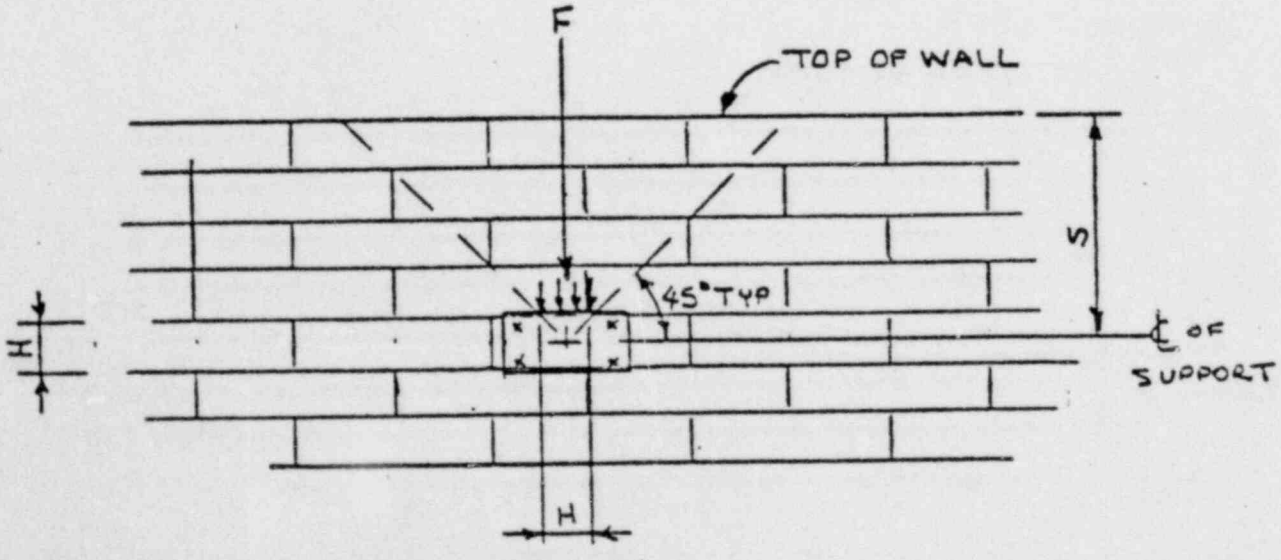


Figure II

NOTES: ALIGNMENT

1. All conduit in Seismic Class 1 buildings shall be supported using the typical conduit supports in this drawing series.

2. Conduit shall be routed as close to ceilings and/or walls as practicable and and installed per Construction Specification N2E-850 (except where specific instructions for support distances are given for all types of conduit commonly used). When a pull box is installed in an exposed conduit run, a support shall be placed as close as possible to each side of the box.

3. All welds shall be per Construction Specification G-29 using E7018 electrodes. Visual inspection is required.

4. All material shall be ASTM A 36 unless otherwise noted. Certification of compliance by manufacturer is required. Unistrut per ASTM A 570, Gr 9 and C.

5. Installation of bolt anchors shall be per Construction Specification G-32, except nine diameters on center and/or six diameters to any edge is the minimum installation distance. A bolt anchor assembly consists of the anchor, A 307 bolt, and a standard flat circular carbon steel washer.

6. All bolts shall be ASTM A 307, or equal, unless noted otherwise.

7. For conduit runs not mounted directly to walls or ceilings, one axially braced support shall be provided in each horizontal run up to 50 feet. Straight runs require an axial support at least every 50 feet. For conduit mounted directly to walls and ceiling using Unistrut and 2558 series clamps, no additional axial restraint is required provided support distances are as given in SQT-DC-V-13.10. No Axial restraint is required on non divisional conduit.

8. For quality assurance see Construction Specification NQG-077, Identification of Structures, Systems, and Components covered by the Sequoyah Nuclear Plant Quality Assurance Program.

9. In cases where anchor plates are specified, these may be omitted if embedded plates can be used.

10. Single or groups of conduits carrying Train A, Train B, Channel I, II, III, or IV cable shall not be routed adjacent to each other nor shall they be supported on a common support, except in areas protected from missiles where the only source of fire is of an electrical nature. (as noted on conduit & grounding drawings)

11. Use 1/4" fasteners for -5 through -15, and 3/8" for -20 through -50.

12. For material see 47E[illegible]50-1,2,3,4.

14. Steel support material shall have an initial field coat Carbo Weld 11 primer with a minimum thickness of 1.[illegible] mils. Galv & cad. plated materials are exempted.

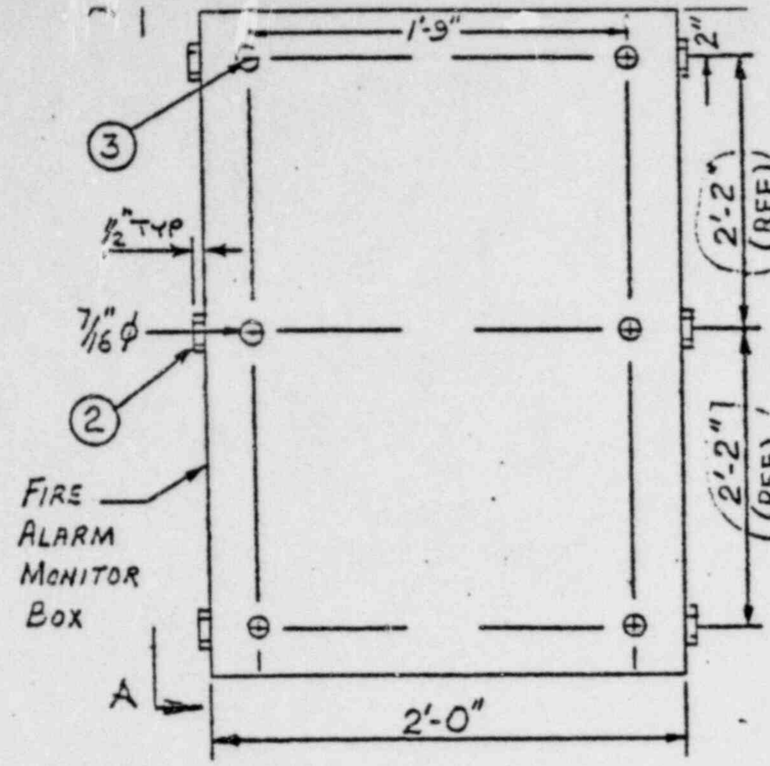
SEISMIC CATEGORY I STRUCTURES

MECHANICAL
SEISMIC SUPPORTS
CONDUIT

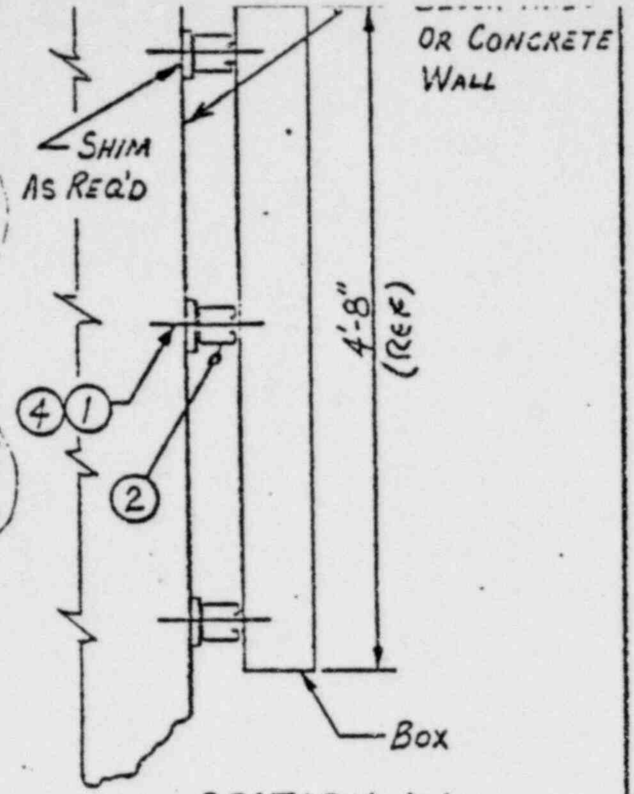
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED J.C. Cox | APPROVED

KNOXVILLE



ELEVATION



SECTION A-A

NOTES:

1. FOR GENERAL NOTES SEE 47A056-1
2. THIS SUPPORT WILL QUALIFY ONLY FIRE ALARM MONITOR BOXES, MAX. WT. 160#
3. PULL TEST OF BOLT ANCHORS ARE WAVED PER CIVIL DESIGN STD DS-C6.1
4. CONDUIT MUST BE SUPPORTED WITHIN 18" OF MONITOR BOX
5. THIS DRAWING PROVIDES A METHOD FOR INSTALLING THE BOXES BUT DOES NOT AUTHORIZE THE INSTALLATION ON BLDG. STEEL OR BLOCK WALLS EXCEPT AS COVERED IN GENERAL NOTES.

COMPANION DWG. 47A056-133A

ITEM	QTY	MATERIAL DESCRIPTION FOR ONE SUPPORT
5	AS REQ'D	PL ½" x 3" x 0'-3" W/ 7/16" ϕ HOLE
4	AS REQ'D	3/8" ϕ BOLT W/NUT & LOCK WASHER (OPT. 3/8" ϕ THREADED ROD)
3	AS REQ'D	¼" OR 3/8" ϕ UNISTRUT BOLT & SPRING NUT
2	AS REQ'D	UNISTRUT P1000
1	AS REQ'D	3/8" ϕ BOLT ANCHOR ASSEMBLY

REV NO	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECD	APPD
1	[illegible]	[illegible]	[illegible]	ALE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

REVISED NOTE 3 AND REF. DIM. OF BOX

DSGN C.A. RICHARDSON
DRWN DAVE LOEB
CHKD [illegible]
SUPV [illegible]
INSP [illegible]
ENGINEER [illegible]

SEISMIC CLASS I STRUCTURES

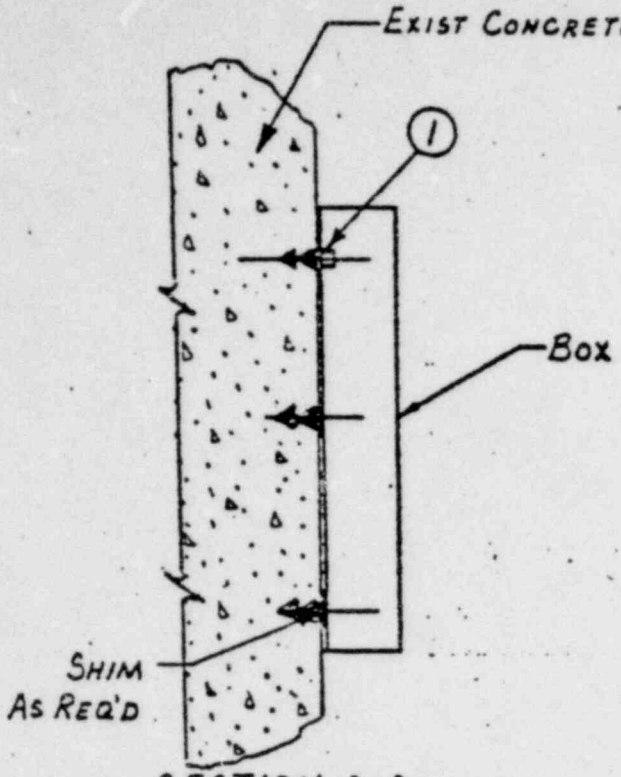
MECHANICAL
SEISMIC SUPPORTS
CONDUIT

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

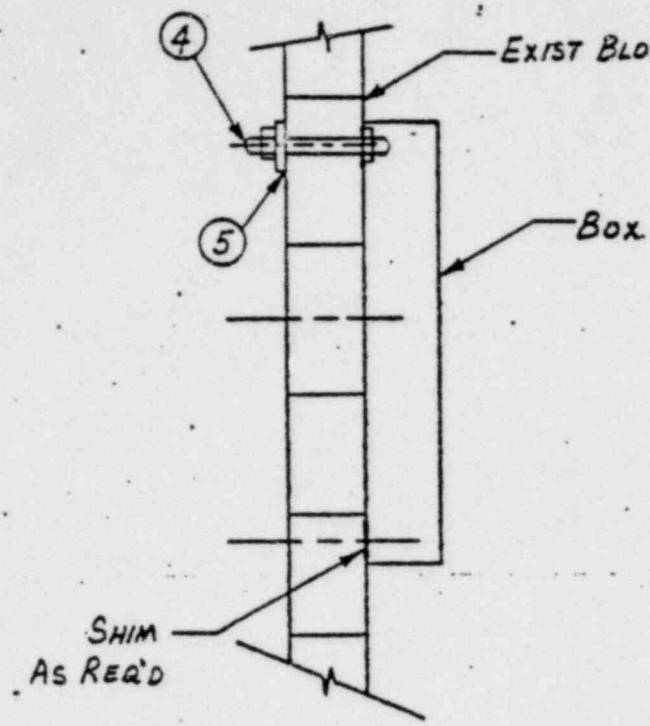
SUBMITTED [illegible] RECOMMENDED [illegible] APPROVED [illegible]

KNOXVILLE [illegible] 47A056-133 R1

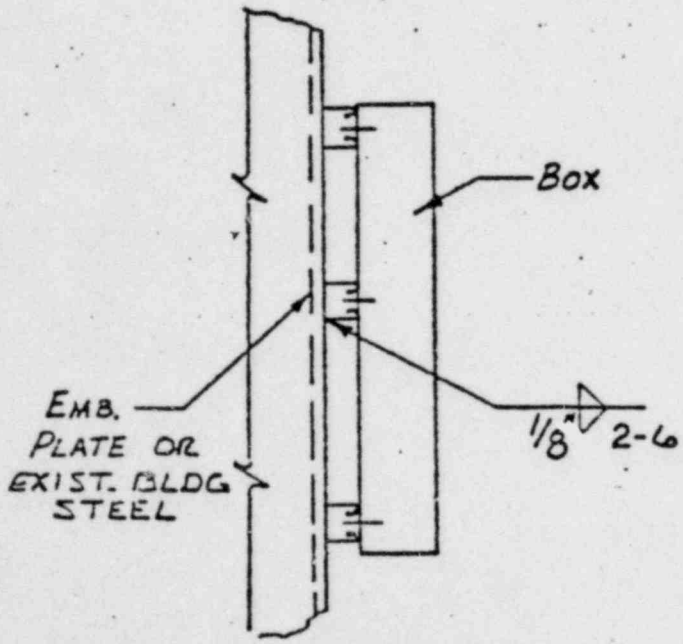
RECORD DRAWING AS CONSTRUCTED



SECTION A-A
ALT. INST'L ON CONCRETE WALL



SECTION A-A
ALT. INST'L ON BLOCK WALL



SECTION A-A
INSTL ON EMB. PLATE
OR BLDG. STEEL

COMPANION DWG. 47A056-133

SEISMIC CLASS I STRUCTURES

MECHANICAL
SEISMIC SUPPORTS
CONDUIT

REV NO	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	RESP	SUBM	RECM	APPD

DSGN C A RICHARDSON
DRWN DAVE LUSK
CHKD D L TREW
SUPV A J TWOMEY

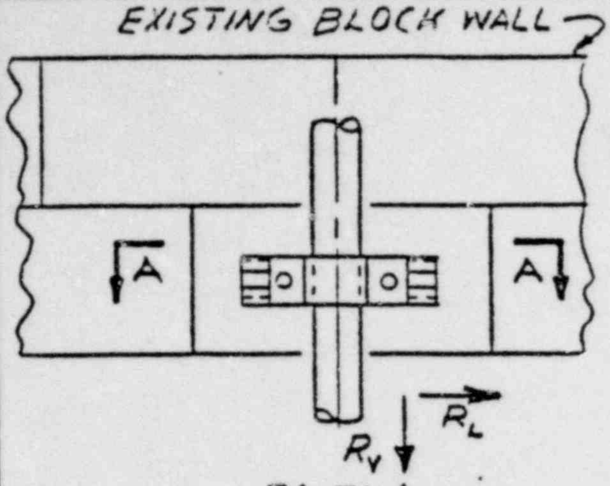
MGR A J TWOMEY
ENGINEER

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED

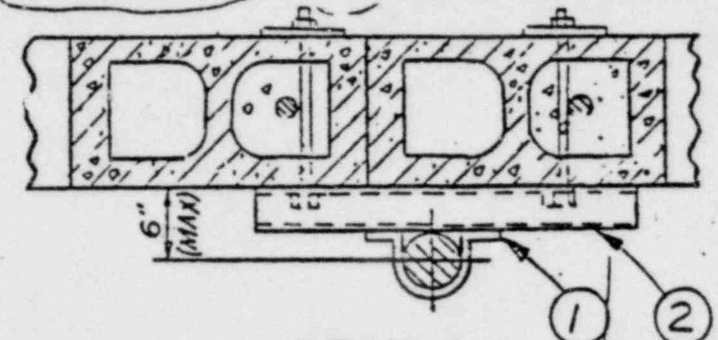
EARLY CYCLE 12-7-78 | 45M | 47A056-133A | RC

INCLUDE DRAWING AS CONSTRUCTED

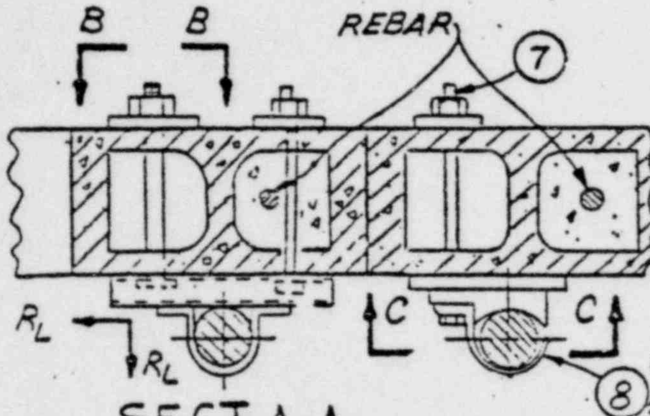


ELEV.

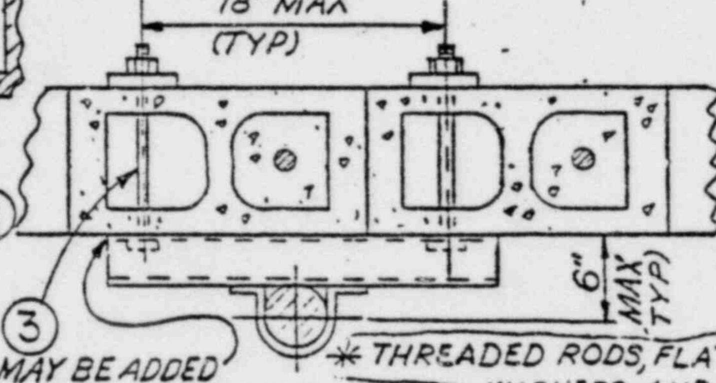
COND SIZE	R VERT	R HORIZ	COND SIZE	R VERT	R HORIZ
5"	238#	110#	2"	59#	42#
4"	190#	78#	1"	22#	71#
3"	132#	73#	3/4"	14#	6#
2½"	103#	61#	½"	10.3#	4.6#



SECT A-A
(ALTERNATE A)

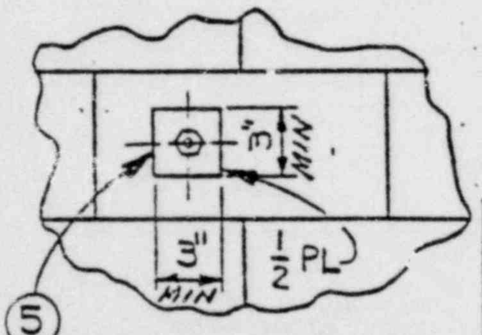


SECT. A-A



SECT A-A
(ALTERNATE B)

* THREADED RODS, FLAT WASHERS, AND LOCKWASHERS ARE OPTIONAL



SECT. B-B

SECT C-C

ITEM NO.	NO. REQ'D	MATERIAL DESCRIPTION
1	AS REQ'D	UNISTRUT (P-2558) CLAMP W/NUTS & BOLTS
2	AS REQ'D	P-1000 A UNISTRUT OR P1001A SERIES
3	AS REQ'D	3/8" Ø BOLT W/NUTS & LOCKWASHERS *
5	AS REQ'D	1/2" PL W/7/16" HOLE
6	AS REQ'D	PL MIN THICKNESS 1/4"
7	AS REQ'D	BOLT. FOR Ø SEE DWG 47A056-2 *
8	AS REQ'D	ONE HOLE PIPE STRAP & SPACER 47A056-2

NOTES:

1. FOR GEN NOTES SEE 47A056-1
2. THE MAXIMUM ALLOWBLE LOADING ON ONE SUPPORT SPAN IS 264# IN THE VERTICAL DIRECTION AND 355# IN THE HORIZONTAL DIRECTION

REV NO	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECV	APPR
[illegible]											
REV TO SHOW [illegible]											
3	S1	[illegible]									
REMOVED BOLT ANCHORS TO CONCRETE ROOTS [illegible] NOTES & DIMN											
2	S1	[illegible]									
REVISED SEC A-A, ADDED ITEMS 6,7,8											
1	S1	[illegible]									
ADDED SHIM PL NOTE SECT A-A & MAX DIM [illegible]											

DSGN W.G. MONROE
DRWN R.E. LANTZ
CHKD C.L. TREW
SUPV H.S. ARRINGTON
INSP
ENGINEER [signature]

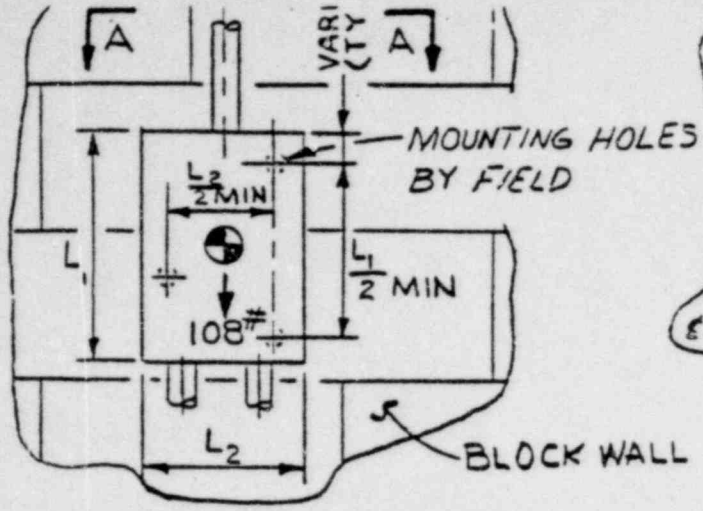
SEISMIC CLASS I STRUCTURES

MECHANICAL
SEISMIC SUPPORT
CONDUIT

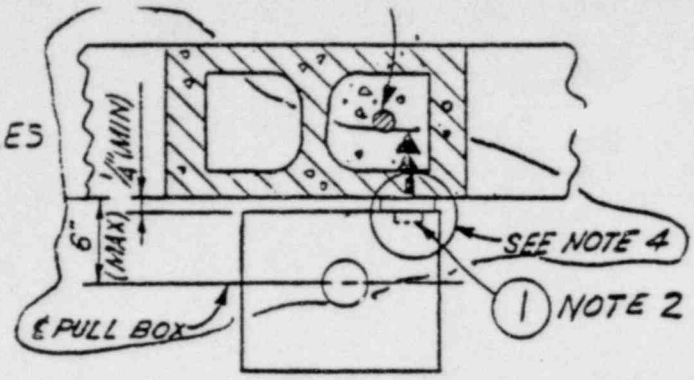
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
[signature]	[signature]	[signature]

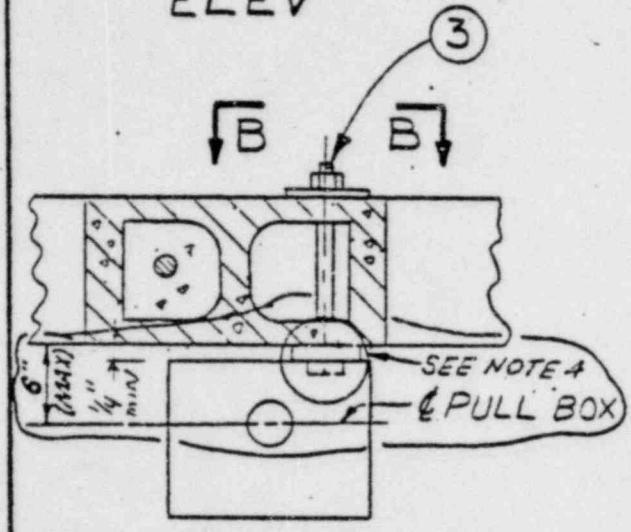
KNOXVILLE | [illegible] | 4 | 47A056-39



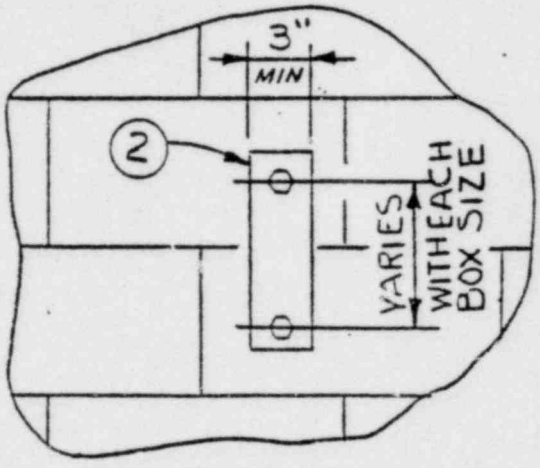
ELEV



SECT A-A
(ALTERNATE)



SECT "A-A" (ONE ANCHOR SHOWN)



SECT B-B

* THREADED ROD OPTIONAL

A 3"x3" MIN ℘ MAY BE USED FOR EACH BOLT.

NOTES:

1. FOR GEN. NOTES SEE 47A056-1
2. THE CONCRETE ANCHORS ARE COUNTERSUNK INTO THE CONCRETE IN SUCH A WAY THAT THE EXPANDING PART OF THE ANCHOR IS IN SOLID CONCRETE AND NOT IN THE CONCRETE BLOCK
3. CONDUIT PULL BOXES COME IN VARIOUS SIZES (I.E. 6"x8"x12", 12"x12"x12" AND 12"x12"x18"). LARGER BOXES IN WEIGHT WILL REQ. MORE ANCHORS, THE SIZES LISTED WERE SUPPORTED WITH (2) - 3/8" ℘ ANCHORS
4. P1000 UNISTRUT MAY BE USED AS A SPACER IF DESIRABLE

ITEM NO	NO. REQ'D	MATERIAL DESCRIPTION
1	AS REQ'D	BOLT ANCHOR ASS'Y - 3/8" DIA.
2	AS REQ'D	PLATE - W/ 7/16" HOLE
3	AS REQ'D	3/8" BOLT W/ NUTS & LOCKWASHERS *

SWITCHMASTER FILE

NOT TO SCALE

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
2	S1	12-23-75	P	F.B	WIN USA						
REVISED SEC. A-A, A-A ALT & ADDED NOTE 4											
1	S1			F.B							
ADDED NOTE 3, MIN AT SECT B-B											

DSGN W. G. MONROE
DRWN T. E. LANIZ
CHKD D. L. TREW
SUPV J. E. ARBOGAST

INSP
ENGINEER

SEISMIC CLASS I STRUCTURES

MECHANICAL SEISMIC SUPPORT CONDUIT PULLBOX

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J. P. Lowry	J. C. King	R. M. Pierce

KNOXVILLE	7-27-76	45	M	4	47A056-39

NOTES:

1. The seismic supports shown on this drawing series were designed using Sequoyah Nuclear Plant Design Criteria for Seismically Qualifying Round and Rectangular Duct, SQN-DC-V-13.8R1.

2. [illegible]

3. All welds shall be per Construction Specification G-29 using E70 SERIES electrodes. Visual inspection is required.

4. All material shall be ASTM A 36 unless otherwise noted.

5. Field may move supports a max. distance of 1'-0" in either longitudinal direction from given location.

6. Installation of bolt anchors shall be per Construction Specification G-32. A bolt anchor assembly consists of a Phillips Red Head SELF DRILLING BOLT ANCHOR, OR equal, an ASTM A 307 bolt, and a standard flat circular carbon steel washer.

7. All bolts shall be ASTM A 307, or equal, unless noted otherwise.

8. For quality assurance see Construction Specification N2G-877, Identification Of Structures, Systems, and Components covered by the Sequoyah Nuclear Plant Quality Assurance Program.

9. For bill of material, see 47BM050-1 and -2.

10. Certification of compliance by manufacturer is required for all materials.

11. On threaded parts, a minimum projection of 1-1/2 threads through the fastener is required.

12. Supports shall have a field coat of Carbo Weld 11 primer with a minimum thickness of 1.7 mils.

13. All rivets are to be SELF PLUGGING STEEL RIVETS, OR EQUAL, UNLESS OTHERWISE NOTED

14. All gauge dimensions and connections to be Standard AISC unless otherwise noted.

15. A bolt assembly consists of an ASTM A 307 hex head bolt, a standard flat circular carbon steel washer, and a hex locknut.

DELETED NOTE 2

COMPANION DWG 47A055-18

SEISMIC CLASS I STRUCTURES

MECHANICAL
HTG., VENT., & AC
DUCT SUPPORTS

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED

KNOXVILLE | [illegible] | EDWG 47A055-1A R2

NOTES:

1. All material shall be ASTM A 36 unless otherwise noted. Certification of compliance by manufacturer is required.
2. All welds shall be per Construction Specification G-29 using AWS E7018 electrodes. Visual inspection is required.
3. All bolts shall be ASTM A 307, or equal.
4. Installation of bolt anchors shall be per Construction Specification G-32.
5. All material and fabrication by construction project.
6. A Bolt Anchor Assembly: Shall consist of a Phillips Red Head bolt anchor or equal, ASTM A 307 bolt, and a standard circular washer.
7. The Auxiliary Building is a Class I structure and quality assurance is required for miscellaneous steel supports: SNP CP NO. P-11.
8. For material see 47BM050-1 and -2.
9. Supports shall have a field coat of carboweld 11 primer with a minimum thickness of 1.7 mils
10. For quality assurance see Construction Specification N2C-877, Identification of Structures, Systems, and Components covered by the Sequoyah Nuclear Plant Quality Assurance Program.

3 SI ADDED NOTE #10

SI ADDED NOTE 9

SI REVISED NOTE 7

FIELD CHANGE NO. M-22

AUXILIARY BUILDING UNITS 1 AND 2

MECHANICAL SEISMIC SUPPORT SPACE HEATER

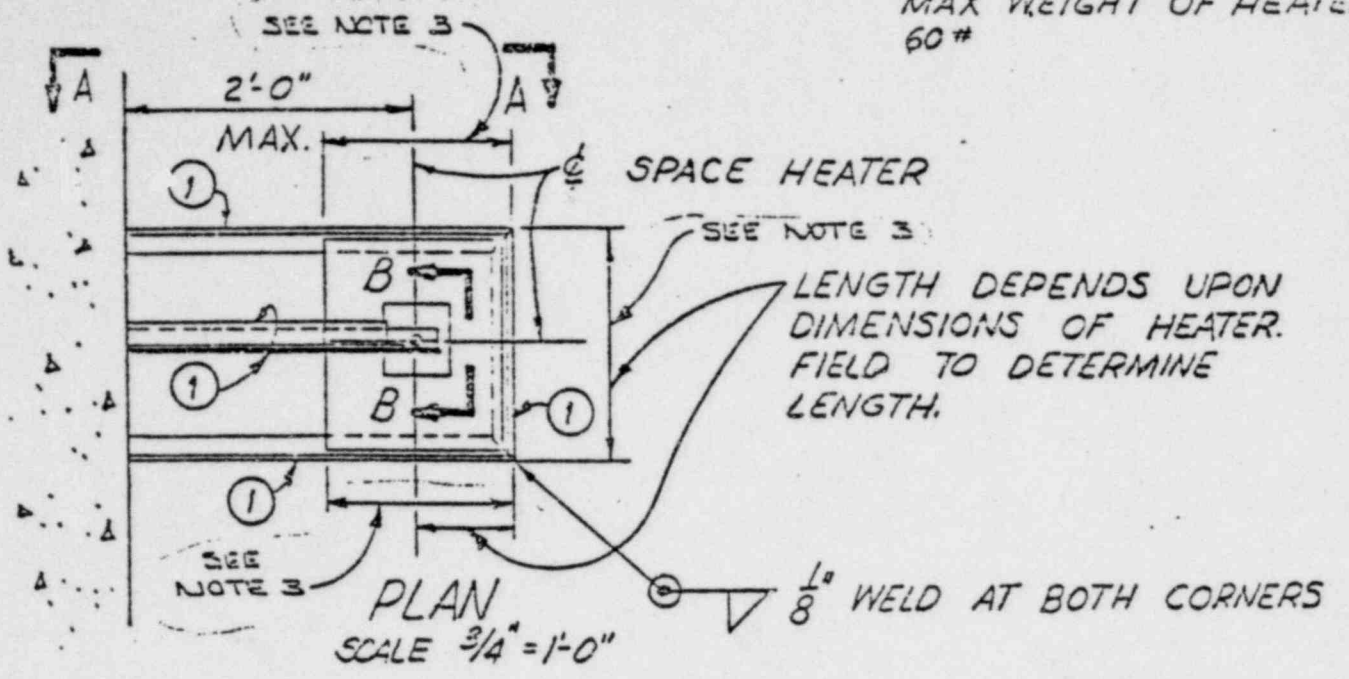
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED

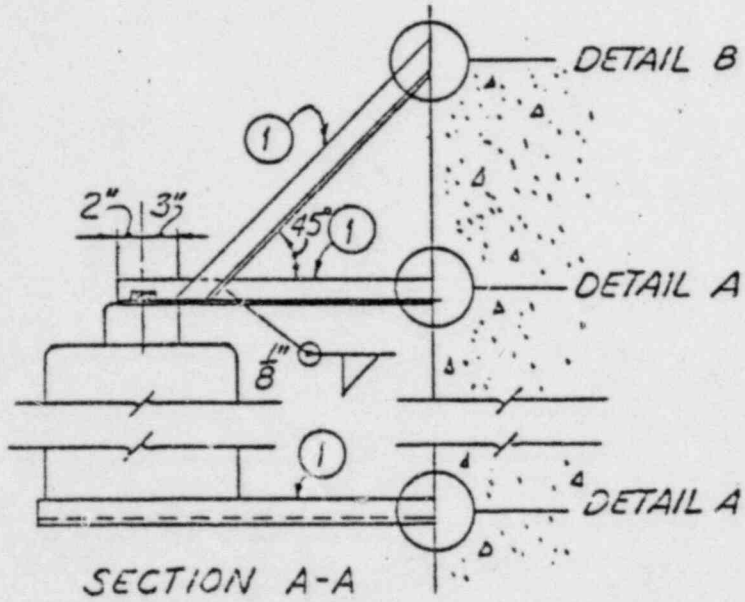
KNOXVILLE | 45 M 4 | 47A050-1 83

CIRCULAR WASHER, AND PHILLIPS RED HEAD BOLT ANCHOR OR EQUAL..

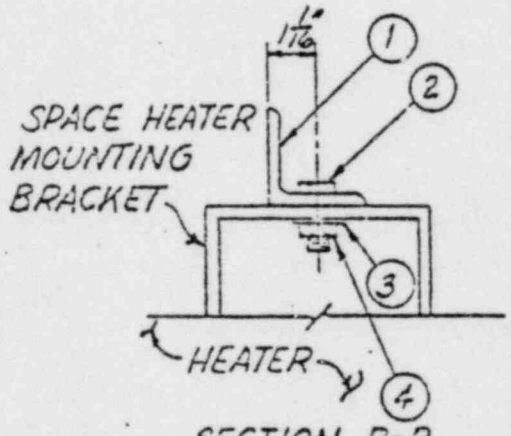
47A055-1, 2A, 2B & 2C
MAX WEIGHT OF HEATER
60 #



PLAN
SCALE 3/4" = 1'-0"



SECTION A-A



SECTION B-B
SCALE 3" = 1'-0"

ITEM NO.	NO. REQD	MATERIAL DESCRIPTION
1	AS REQD	ANGLE - 2"x 2" x 1/8" ASTM A36
2	1	1/2"ϕ BOLT x 0'-1" ASTM A307
3	1	STANDARD FLAT CIRCULAR WASHER FOR 1/2"ϕ BOLT
4	1	HEX NUT - 1/2" ASTM A307
5	AS REQD	PLATE - 6"x 6" x 3/8" - W/HOLES AS NOTED 1/2ϕ HOLES ASTM A36
6	AS REQD	3/8" BOLT ANCHOR ASSEMBLY *
7	AS REQD	3/8"ϕ x LENGTH AS REQD. A-36 ROD W/WASHERS AND HEX LOCKNUTS

SEISMIC CLASS I STRUCTURE

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

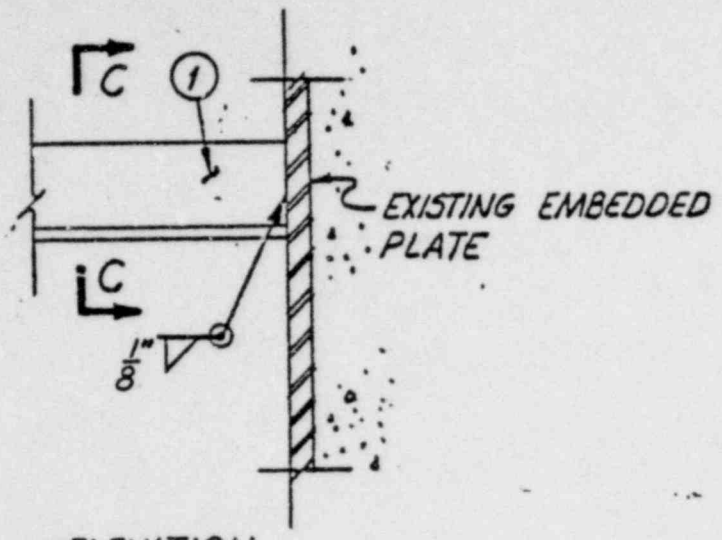
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED

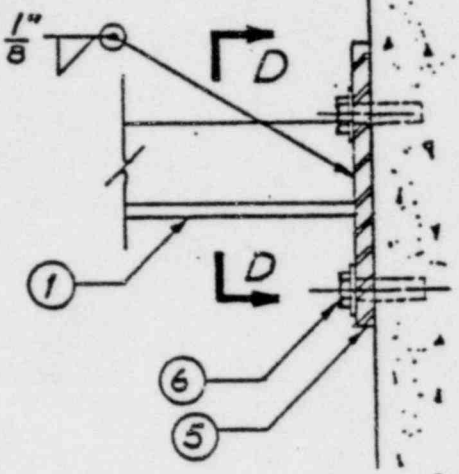
KNOXVILLE

47A055-2

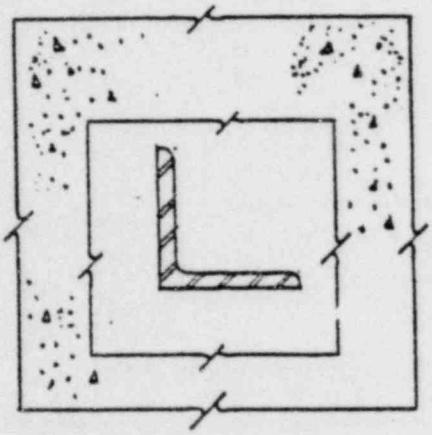
NOTE:
FOR NOTES
SEE 47A055-1



ELEVATION
SCALE 3" = 1'-0"

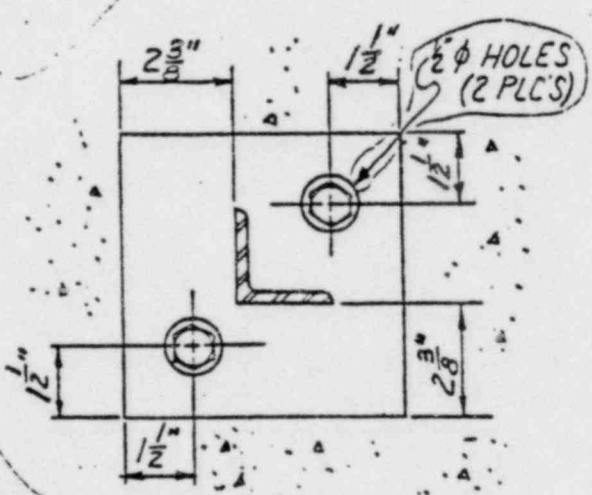


ELEVATION
SCALE 3" = 1'-0"



SECTION C-C
N.T.S.

TYPICAL WALL CONNECTION
ANGLE WELDED TO EMBEDDED
PLATE.



SECTION D-D
SCALE 3" = 1'-0"

TYPICAL WALL CONNECTION
ANGLE WELDED TO PLATE.
PLATE ATTACHED TO CONCRETE
WALL WITH BOLT ANCHORS.

DETAIL A

NOTE:
FOR NOTES SEE 47A055-1

1	57	12-8-71	MINOR REVISION

C. W. COMER
S. D. ANDERSON
D. L. TRAIN
W. H. BROWN
H. E. ARRINGTON
J. L. Perkey

COMPANION DWGS.
47A055-1, 2, 28, 20

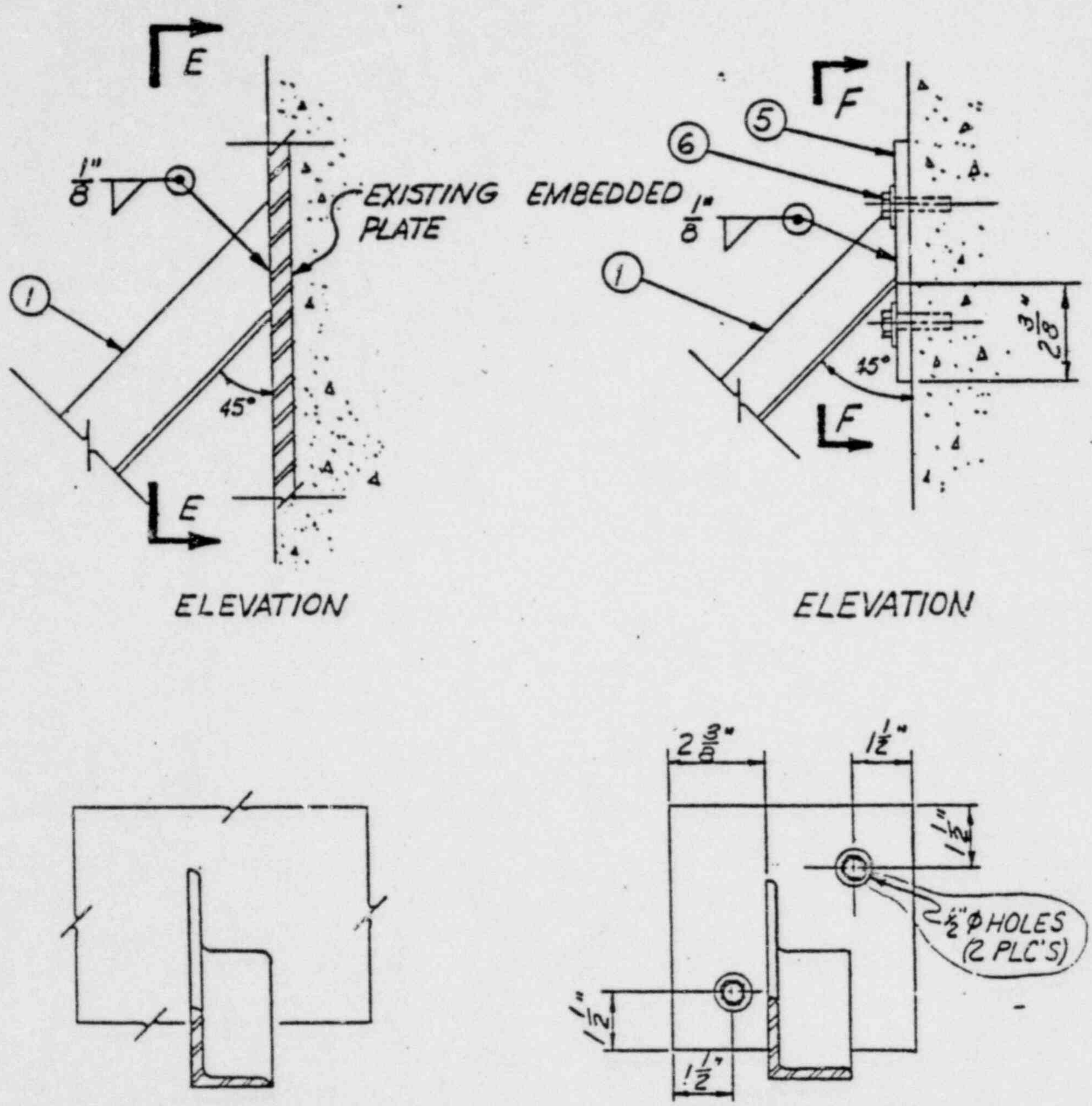
SEISMIC CLASS I STRUCTURE

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J. L. Perkey	R. C. Kay	R. M. Dilworth

KNOXVILLE | 4-17-74 | 5 | M | 4 | 47A055-2



SECTION E-E

TYPICAL WALL CONNECTION ANGLE WELDED TO EMBEDDED PLATE.

SECTION F-F

TYPICAL WALL CONNECTION ANGLE · WELDED TO PLATE PLATE ATTACHED TO CONCRETE WALL WITH BOLT ANCHORS.

DETAIL B
SCALE 3" = 1'-0" REMOVE

NOTE: FOR NOTES SEE 47A055-1

MINOR REVISION

COMPANION DWGS. 47A055-1, 2, 2A, 2C

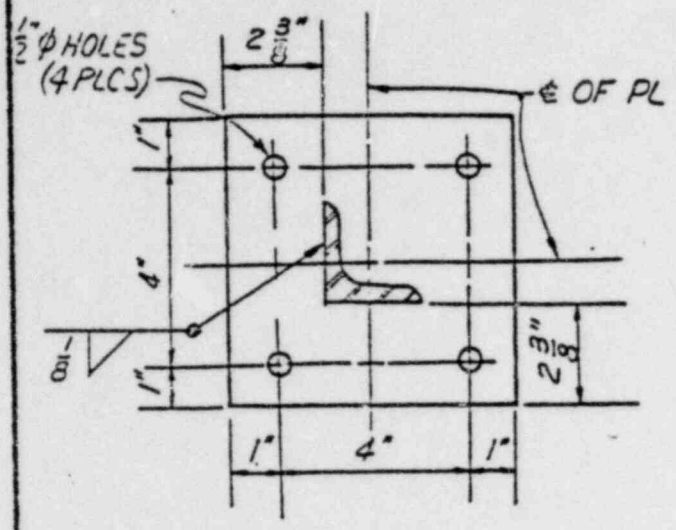
SEISMIC CLASS I STRUCTURE

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

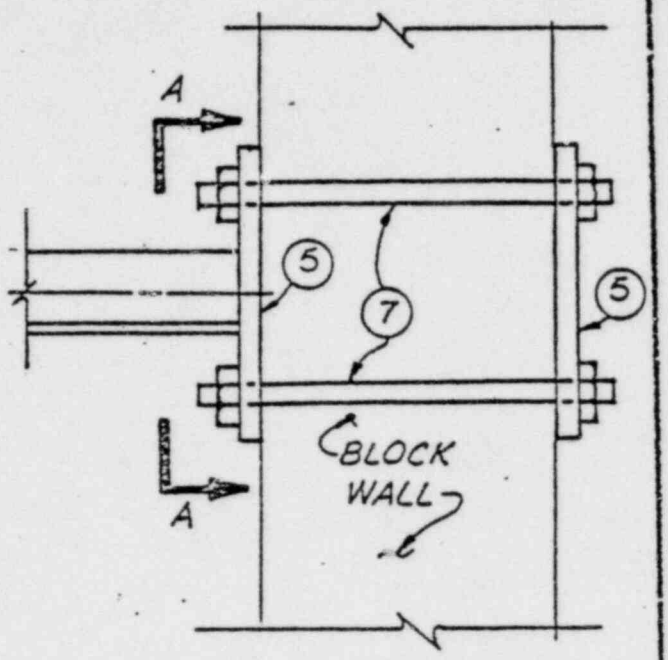
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED

KNOXVILLE 4-17-74 45M 4 47A055-2



A-A



SEISMIC BLOCK WALL PLATE DETAIL

NOTES:

1. FOR GEN NOTES SEE 47A055-1.
2. BLOCK WALL PLATE DETAIL IS TO BE USED ONLY ON SEISMIC BLOCK WALLS.
3. A MAX. OF ONE NOTCH MAY BE MADE IN THE VERT. LEG OF THE LOWER FRAME IN EACH OF THE LOCATIONS SHOWN. MAX. DIMENSIONS OF NOTCH: 1" DEEP x 2" LG.

COMPANION DWGS. 47A055-2, 2A, & 2B

REV NO	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	PECM	APPD	

DSGN L. M. CHALGON
DRWN M. CLAYPOOL
CHKD C. M. MASTERS
SUPV L. M. CHALGON
INSP
ENGINEER

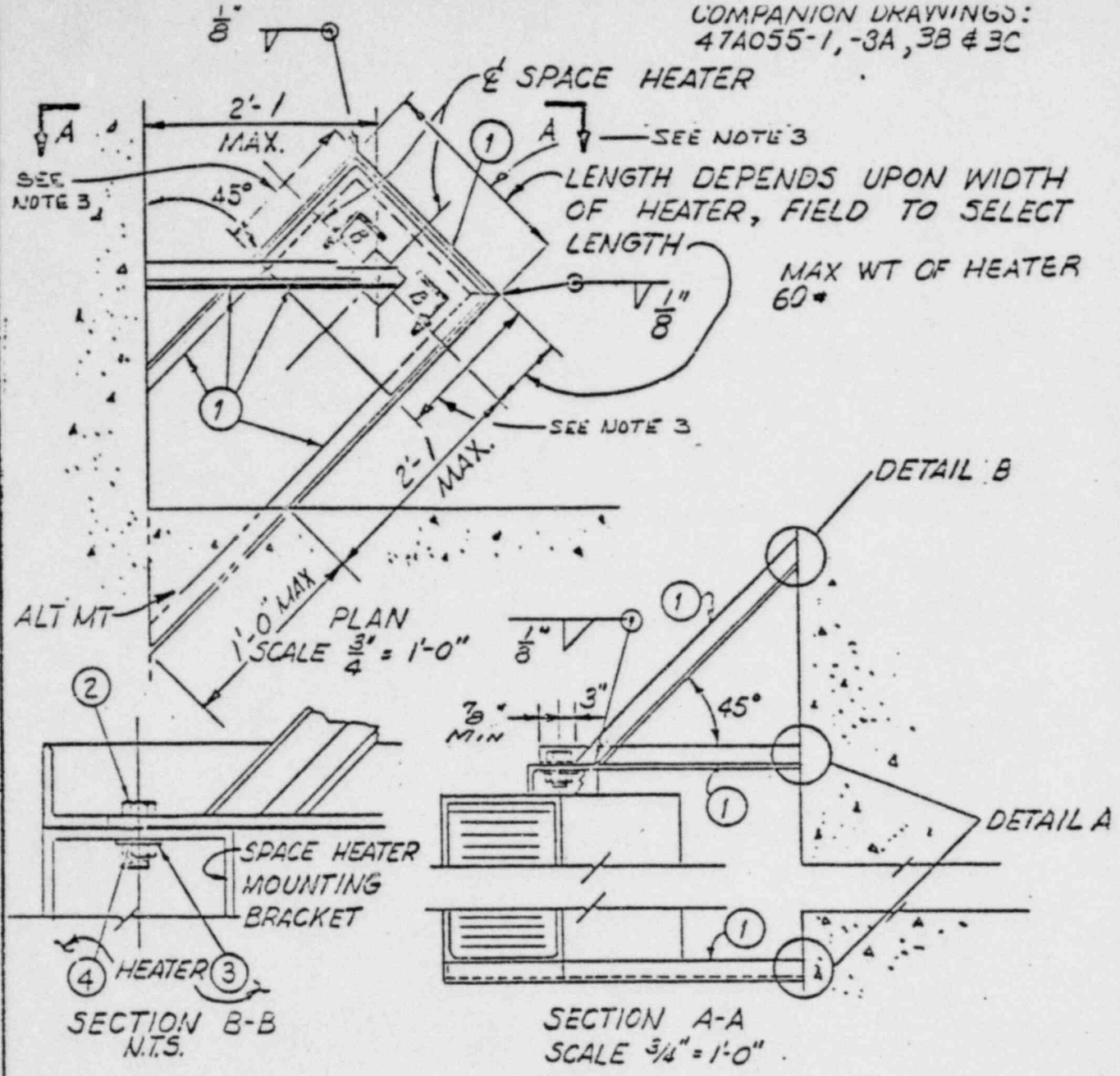
SEISMIC CLASS I STRUCTURES

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

KNOXVILLE | 45 | M | 47A055-2C

COMPANION DRAWINGS:
47A055-1, -3A, 3B & 3C



ITEM NO.	NO. REQD	MATERIAL DESCRIPTION
1	AS REQD	ANGLE - 2"x2"x 1/8" ASTM A36
2	1	1/2" ϕ BOLT x 0'-1" ASTM A307
3	1	STANDARD FLAT CIRCULAR WASHER FOR 1/2" ϕ BOLT
4	1	HEX NUT - 1/2" ASTM A307
5	AS REQD	PLATE - 6"x6"x 3/8" - W/HOLES AS NOTED 1/2 ϕ HOLES ASTM A36
6	AS REQD	3/8" BOLT ANCHOR ASSEMBLY *
7	AS REQD	3/8"ϕ x LENGTH AS REQD A-36 ROD W/WASHER & HEX LOCK NUTS

* BOLT ANCHOR ASSEMBLY INCLUDES A 307 BOLT, CIRCULAR WASHER, AND PHILLIPS RED HEAD BOLT ANCHOR OR EQUAL

NO.	DATE	REVISION	BY
2	5-20-77	REVISED PER SMR # 50-64	RT
3	1-20-78	REVISED AS PER SMR 50-93, ENSI	RT

ADDED NOTE 3

C.W. CRAIG
S.C. [illegible]

NOTE:
FOR NOTES SEE 47A055-1

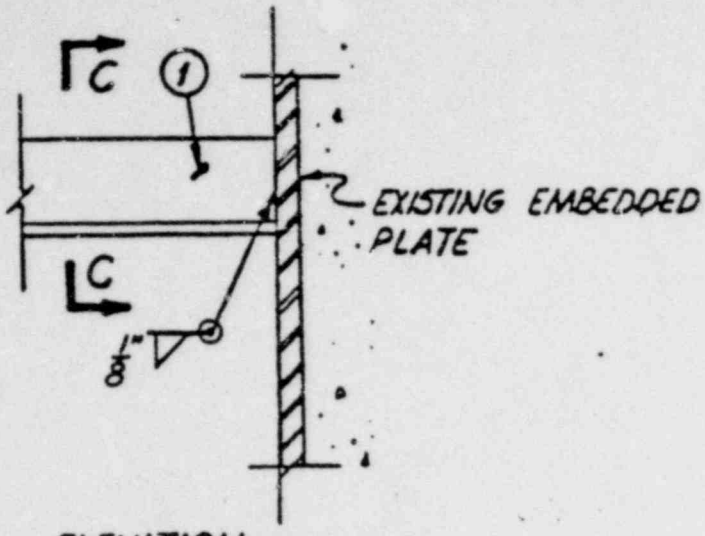
SEISMIC CLASS I STRUCTURE

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

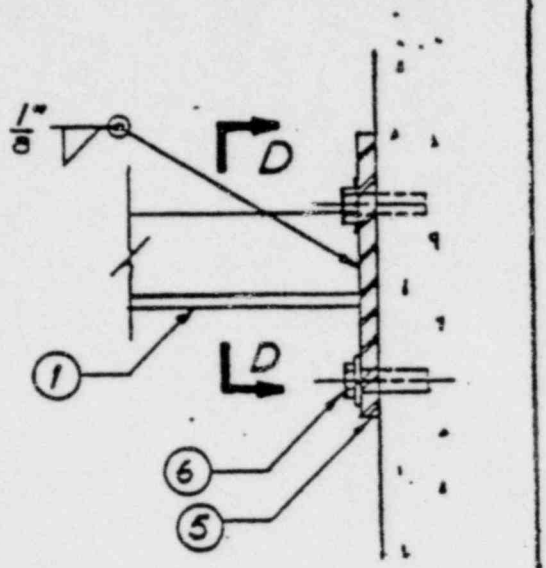
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED
KNOXVILLE | 4-17- | [illegible]

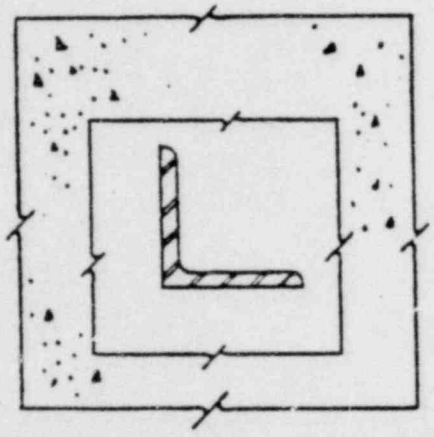
47A055-3



ELEVATION
SCALE 3" = 1'-0"

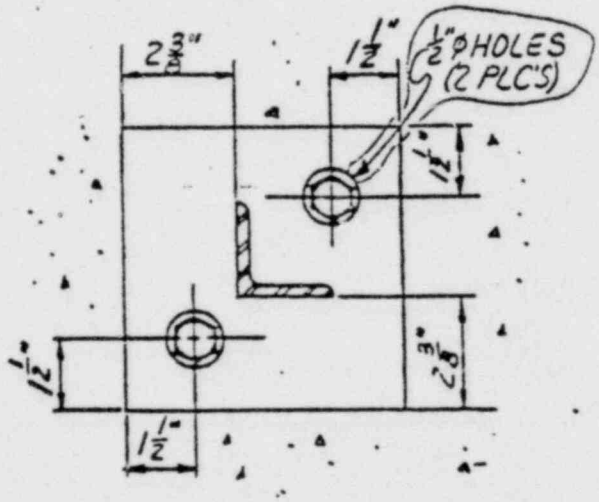


ELEVATION
SCALE 3" = 1'-0"



SECTION C-C
N.T.S.

TYPICAL WALL CONNECTION
ANGLE WELDED TO EMBEDDED
PLATE.



SECTION D-D
SCALE 3" = 1'-0"

TYPICAL WALL CONNECTION
ANGLE WELDED TO PLATE.
PLATE ATTACHED TO CONCRETE
WALL WITH BOLT ANCHORS.

DETAIL A

NOTE:
FOR NOTES SEE 47A055-1

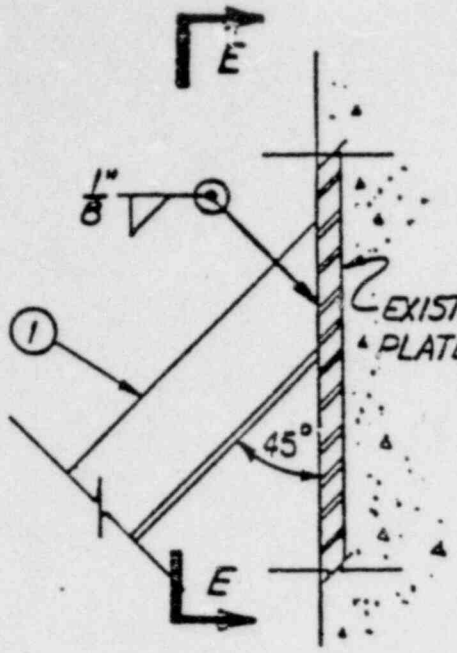
COMPANION DWGS.
47A055-1, 3, 3B, 3C

SEISMIC CLASS I STRUCTURE

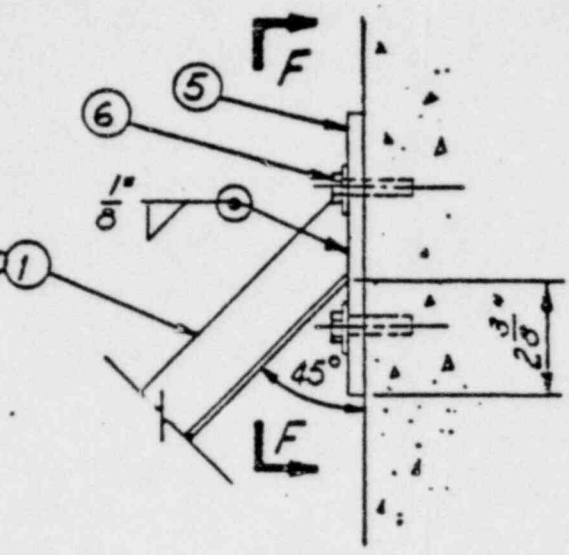
MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

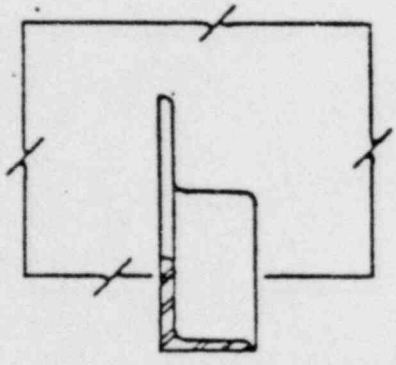
DRAWN	RECOMMENDED	APPROVED
	E.C. Ley	R.M. Parker
KNOXVILLE	4-17-74	47A055-3A



ELEVATION

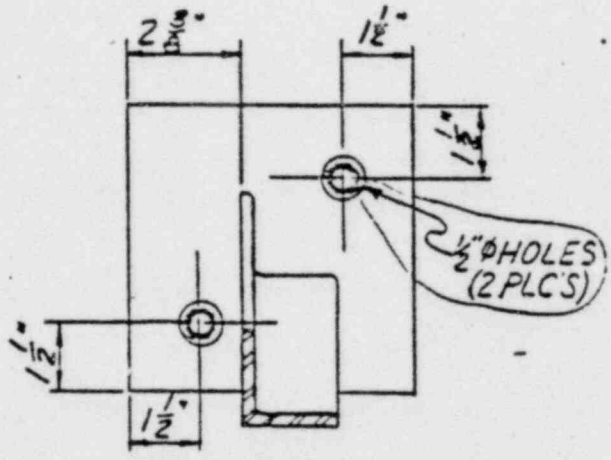


ELEVATION



SECTION E-E

TYPICAL WALL CONNECTION ANGLE WELDED TO EMBEDDED PLATE.



SECTION F-F

TYPICAL WALL CONNECTION ANGLE WELDED TO PLATE. PLATE ATTACHED TO CONCRETE WALL WITH BOLT ANCHORS.

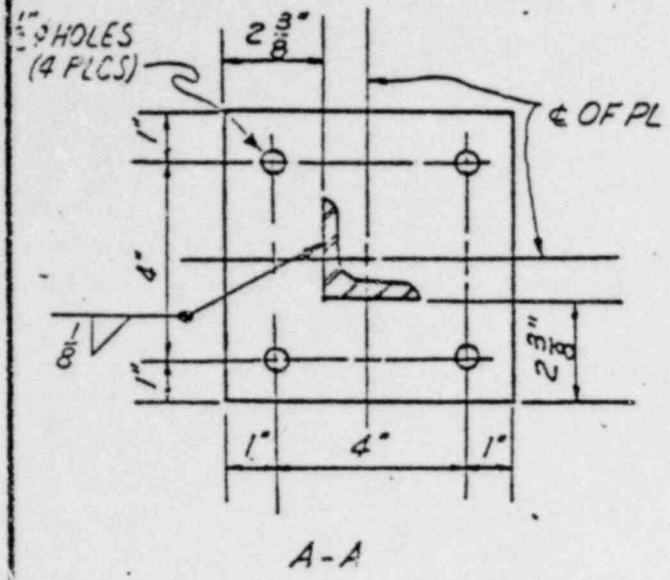
MF R0 R1

DETAIL B
SCALE 3" = 1'-0"

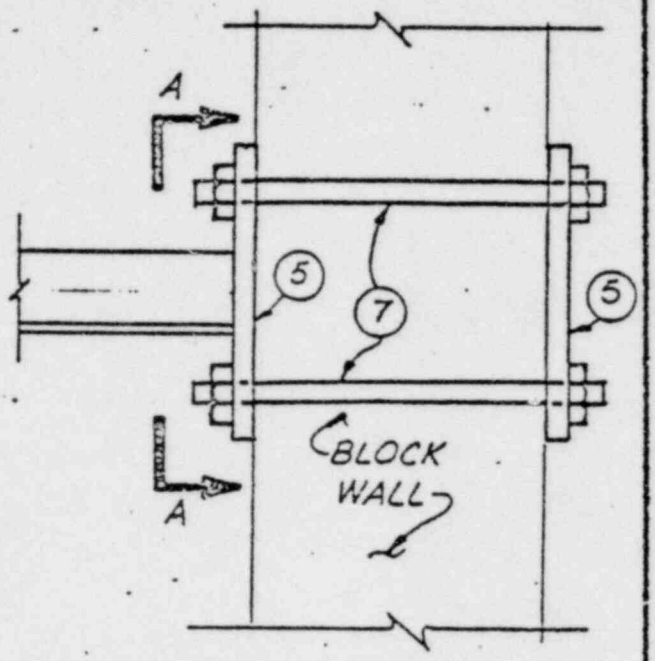
SEISMIC CLASS I STRUCTURE	
MECHANICAL SEISMIC SUPPORT SPACE HEATER	
SEQUOYAH NUCLEAR PLANT TENNESSEE VALLEY AUTHORITY	
SUBMITTED J. W. Lambert	RECOMMENDED K. C. Coy
APPROVED R. M. Dwell	
KNOXVILLE	4-17-74 45 M 4 47A055-3-A1

1	S/	MINOR REVISION
C. W. COMER	J. W. LAMBERTON	

COMPANION DWGS. 47A055-1, 3, 3A, 3C



A-A



SEISMIC BLOCK WALL PLATE DETAIL

NOTES:

1. FOR GEN NOTES SEE 47A055-1.
2. BLOCK WALL PLATE DETAIL IS TO BE USED ONLY ON SEISMIC BLOCK WALLS.
3. A MAX. OF ONE NOTCH MAY BE MADE IN THE VERT. LEG OF THE LOWER FRAME IN EACH OF THE LOCATIONS SHOWN. MAX. DIMENSIONS OF NOTCH: 1" DEEP × 2" LG.

COMPANION DWGS 47A055-3, 3A, 238

SEISMIC CLASS I STRUCTURES

MECHANICAL
SEISMIC SUPPORT
SPACE HEATER

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

NO.	ECN NO	DATE	DESIGN	DRAWN	CHKD	SUPV	QA	INSP	SUBM	RECM	APPD

DSGN L. W. GILLELAN
DRWN M. CLAYSON
CHKD
SUPV L. W. GILLELAN

INSP
ENGINEER

SUBMITTED | RECOMMENDED | APPROVED

KNOXVILLE | 47A055-56