LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

June 3, 1985

SNRC-1168

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Fire Protection
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Reference:
1) Letter from NRC (T. Martin) to LILCO (J. D. Leonard) forwarding Appendix A, Notice of Deviation and NRC Inspection Report 84-46.
2) Letter SNRC-1141, dated 1/29/85.
3) Letter SNRC-1122, dated 12/7/84.

Dear Mr. Denton:

The purpose of this letter is to formalize our understanding of the Staff's position on LILCO's resolution of certain fire protection issues outlined in Reference 1 and to provide clarifying information regarding certain of these issues as discussed in a telephone conversation between LILCO and members of your staff on 4/4/85. This information was requested to amplify LILCO's response to Reference 1 as contained in Reference 2, and is as follows:

(1) Inspection Report 84-46 Deviation A - Fire Detectors

LILCO is presently involved in a program involving the installation of additional fire detectors throughout various areas of the plant as described in Reference 2. In those areas, LILCO is pursuing a design that will be in compliance with NFPA Standards 72D and 72E. If, in the course of accomplishing this design, certain exceptions to these standards become warranted or necessary, justification for those exceptions will be submitted to the NRC. It should be noted that installation of Phase I detectors proceeded on schedule and is physically complete. Except for several detectors on the refueling deck, testing has also been completed for these Phase I detectors.

A006
1/10

(2) Inspection Report 84-46 Deviation B - Fire Doors
In SNRC-1141 LILCO proposed to justify the acceptability of fire doors where welded brackets have been utilized for mounting of magnetic switches, which are part of the plant security system. Discussions with the Staff confirmed their acceptance of those criteria with the clarification that, if a water spray in close proximity to the door is used as a criteria for providing suitable fire door resistance, it will be located such that it either discharges onto a side of the door or provides a "water curtain" protecting the door.

(3) Inspection Report 84-46 - Unresolved Item 84-46-15 - Structural Integrity of Cable Tray Penetration Seals
Your staff has stated that the approach utilized by LILCO (as described in Reference 2) is acceptable. As requested, a copy of the analysis used to verify the integrity of supports in areas not protected by automatic suppression is provided as Attachment 1. (Calculation No. 11600.02/SC-017-62M Rev. 0)

It is LILCO's understanding that several other responses contained in Reference 2, or discussed at the January 15, 1985 meeting have been reviewed and found acceptable by your staff. They are as follows:

1. Deviation C - Fire Pump House Separation
2. Deviation D - Damper between HVAC Equipment Room and Chiller Room
3. Deviation E - Carbon Dioxide Concentration
4. Deviation F - Fire Detectors in Computer Room
5. Deviation G - Damaged Fireproofing
6. Unresolved Item 84-46-06 - RCIC/HPCI Fire Suppression - Cable Routing
7. Unresolved Item 84-46-13 - Fire Hazards Analysis Report for Control Building Corridors and Manhole #1
8. Unresolved Item 84-46-14 - Single Header in Reactor Building
9. Unresolved Item 84-46-16 - Sizing of Fire Water Storage Capacity
10. Cable Tray Concentration - need for suppression

In addition, it should be noted that, as briefly discussed with Mr. R. Caruso on March 28, 1985, implementation of certain near term modifications is being delayed primarily due to problems with material lead times. These consist of the following:

1. Deviation B - Fire Doors - Repairs have been completed for forty of the fifty-nine FHAR fire doors. Due to difficulties in obtaining parts, however, an accurate completion date for these repairs is not available. Completion of most repairs is expected during the late summer of 1985. In an effort to obtain needed parts, LILCO has offered incentives/bonuses to vendors without success. LILCO has also investigated the availability of doors at other utilities via Nuclear Network (Notepad), again without success.

2. Deviation C - Separation of the Electric and Diesel Fire Pumps - Completion of this modification, which was originally scheduled to be completed by the end of April, 1985, has been delayed to June 21, 1985.

Until appropriate repairs/modifications are made, LILCO will continue the compensatory measures stipulated in the Reference 3 letter.

Should you have any questions, please contact this office.

Very truly yours,

J. D. Leonard, Jr.
Vice President - Nuclear Operations

RWG:ck

Attachment

cc: P. Eselgroth

SNRC-1168
Attachment 1

CALCULATION SUMMARY

STONE & WEBSTER ENGINEERING CORPORATION

JOB NO. / CALCULATION NO	REVISION	PAGE
11600.02 / SC-017-62M	0	1 OF 11

CLIENT / PROJECT
LILCO SNPS #1

QA CATEGORY (✓)
☒ I - NUCLEAR SAFETY RELATED
☐ II ☐ III ☐ OTHER

SUBJECT / TITLE
REVIEW CABLE TRAY SUPPORT ON TURBINE BLDG SIDE AT PENETRATION IN FIRE WALL BETWEEN TURB. BLDG & NORMAL SWITCH GEAR. FIRE HAZARAD ANALYSIS

* APPROVALS - SIGNATURE & DATE DEPT.			REV NO OR NEW CALC NO	SUPERSEDES * CALC NO OR REV NO	CONFIRMATION * REQUIRED (✓)	
PREPARER(S)/DATE(S)	REVIEWER(S)/DATE(S)	INDEPENDENT REVIEWER(S)/DATE(S)			YES	NO
V. CARRARA 1-12 85 H. MANIAR 1-12-85	H MANIAR 1-12 85 V. CARRARA 1-12 85		NEW			✓

OBJECTIVE OF CALCULATION
TO RESOLVE N.R.C.'s CONCERN ABOUT MELTING OF CABLE TRAYS & CABLE TRAY SUPPORTS IN THE EVENT OF FIRE AND IN TURN THESE PULLING FIRE STOP AND FIRE SEAL OUT OF PENETRATION AND THUS AFFECTING THE FIRE RESISTANCE OF THE FIRE WALL

CALCULATION METHOD/ASSUMPTIONS
HAND CALCULATIONS
EARTHQUAKE WILL NOT OCCUR AT THE TIME OF FIRE
CABLE TRAY SUPPORTS ARE REVIEWED FOR D.L. STRESSES ONLY
D.L. STRESSES COMPARED AGAINST THE YIELD STRESS AT THE ELEVATED TEMP OF 1100°F WHICH IS EQUAL TO 0.5FY PER USS STEEL DESIGN MANUAL PG. 12

SOURCES OF DATA / EQUATIONS
1. USS STEEL DESIGN MANUAL PUBLISHED BY UNITED STATES STEEL CORPORATION, JAN 1981.
2. SH1-159, SECTION 6.
3. UNISTRUT - GENERAL ENGINEERING CATALOG NO. 9
4. AISC STEEL DESIGN MANUAL - 7th EDITION.

CONCLUSIONS
CABLE TRAY SUPPORT WILL NOT FALL DOWN DUE TO DEAD LOAD ELEVATED TEMPERATURE OF 1000°F.

DISTRIBUTION *

GROUP	NAME & LOCATION	COPY SENT (✓)	GROUP	NAME & LOCATION	COPY SENT (✓)
RECORDS MGT FILES (OR FIRE FILE IF NONE)	SEO VAULT	✓			
STRUCTURAL					

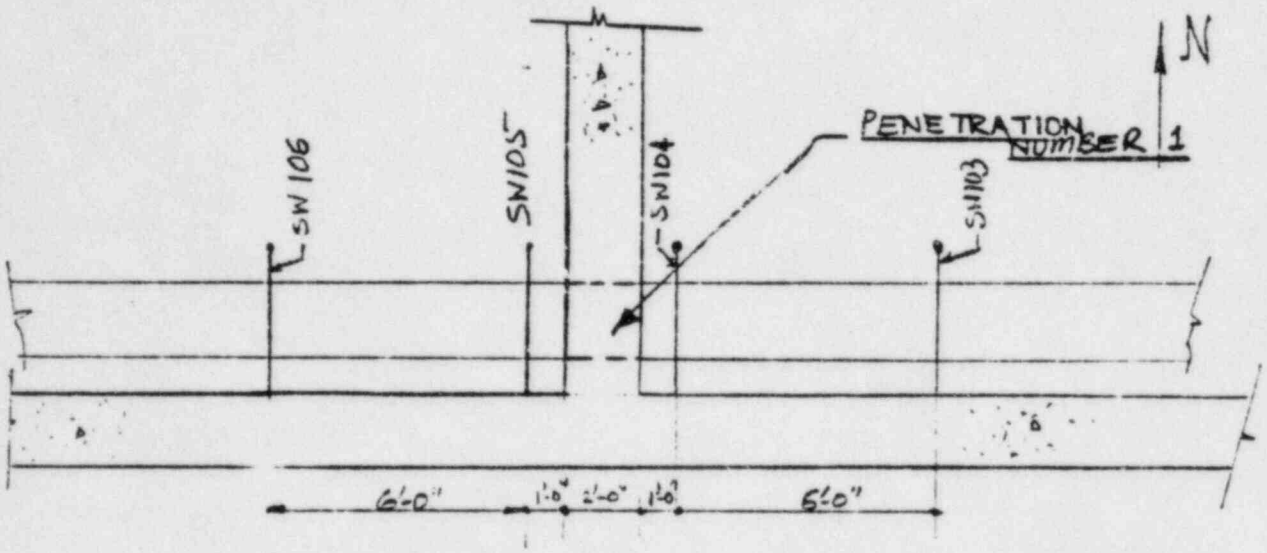
CALCULATION SHEET

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02/SC-017-62M	0	2

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
[illegible] 11-12-85	[illegible] 1/16/86	

SUBJECT/TITLE: FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS

QA CATEGORY/CODE CLASS: II/US2



CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02/SC-017-62M	0	3

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V.CARRARA 1/3/85	G. Park / 1-3-85	

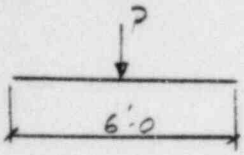
SUBJECT/TITLE: SCREENWELL (TRAY SUPTS SW104 & 105)

QA CATEGORY/CODE CLASS: I/NSR

MAX. STRESS FOR TRAY SUPPORTS @ EACH SIDE OF WALL PENETRATIONS (SW 104 & SW 105)

SW 105 WILL GOVERN SINCE IT IS HEAVIER LOADED WITH SAME CONFIGURATION AS SW 104 SEE APPENDIX 'A'

MAX. BENDING STRESS WILL OCCUR AT 3RD HORIZ. MEMB. (ASSUME ALL CND & TRAY LD. @ CENTER OF S.P.A.)



D.L of 1-4"ϕ CND = 17#/ 5.1 = 87#
24" TRAY (SEE CALC. 11600.27/E37.F9.1 PAGE 19M2) = 253.1#

P = TOTAL DL = 340#

$M_{OM} = \frac{340 \times 6 \times 12}{4} = 6120''$

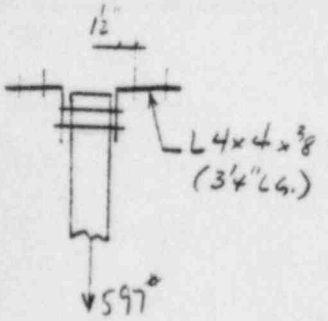
$f_b = \frac{6120}{.512} = 10700$ PSI MAX. < 0.5 x 36000 = 18000.

MAX. TENSION STRESS ON VERT. LEG.:

VERT. LD. ON LEG (SEE CALC. 11600.27/E37.F9.1 Pg. 19.8) = 597#

$f_T = \frac{597}{1.11} = 538$ PSI < 18000.0 PSI

CK. CONN. OF VERT. LEG:



TENSION/1/2" ϕ BOLT = 597/4 = 150#

$f_{T\,(BOLT)} = \frac{150\#}{.196\ in^2} = 765$ PSI

BEND. MOM. IN ⊄ = $\frac{597}{2} \times 1.5 = 450''$-#

$f_b = \frac{450 \times 6}{3.25 \times .375^2} = 5908$ PSI < 0.5 x 36000.0 = 18000. PSI

CALCULATION SHEET

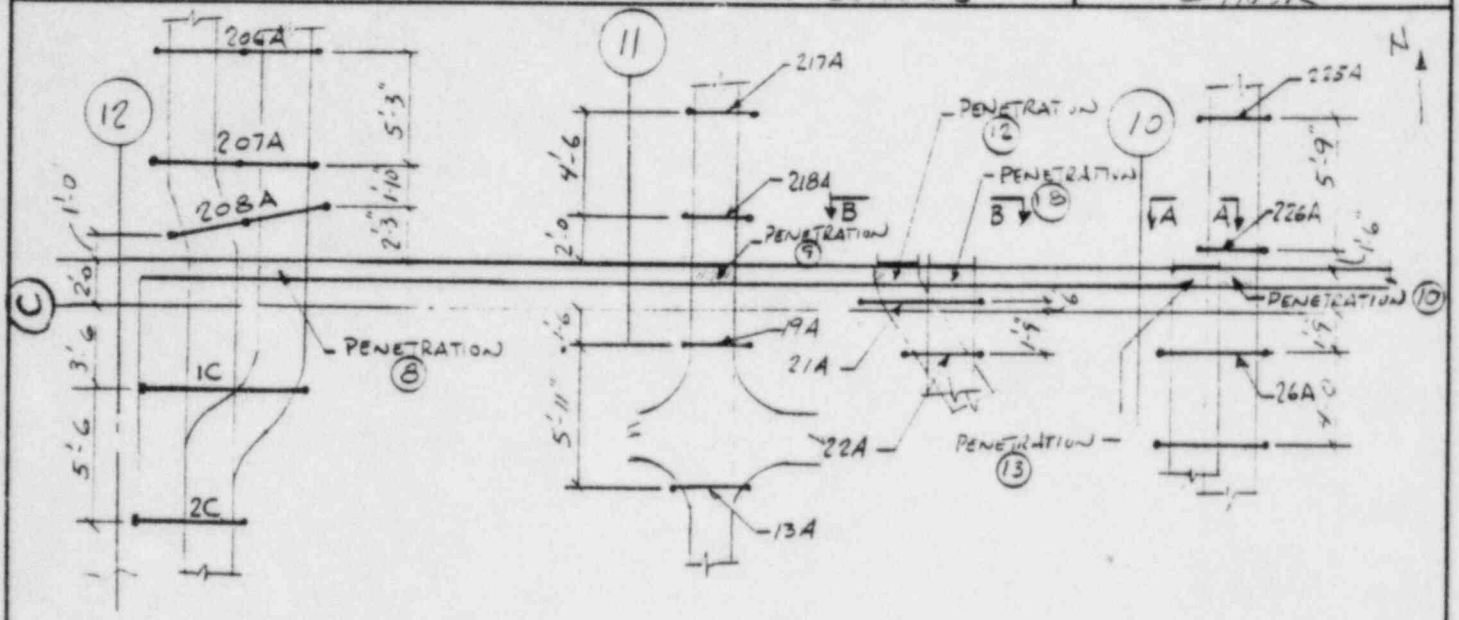
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600-62 / SC-017-62M	0	4

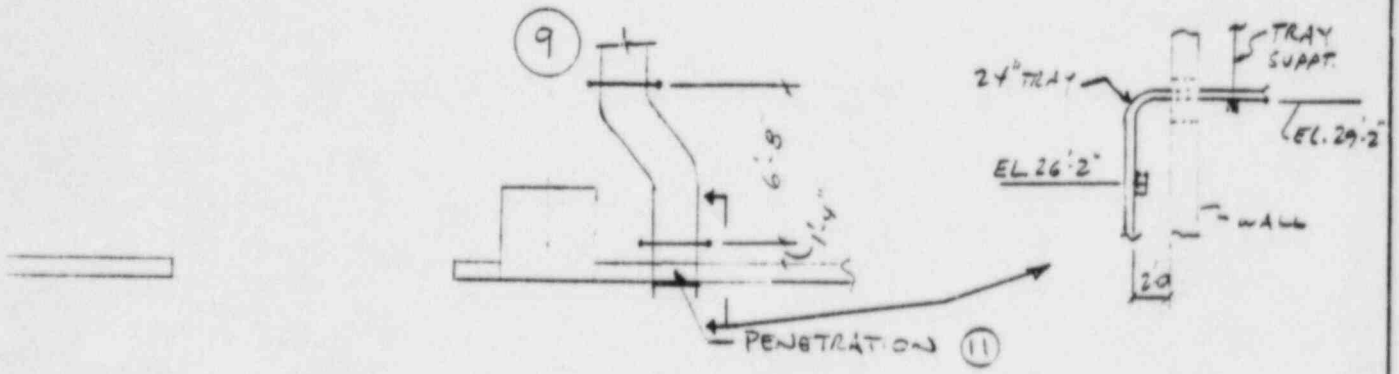
PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V. CAPLAN 1-12-85	1/12/85	NR

SUBJECT/TITLE: FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS

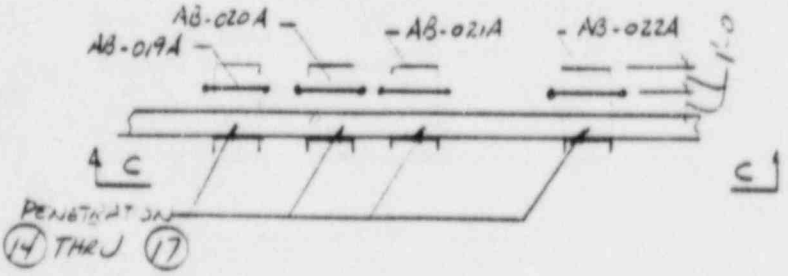
QA CATEGORY/CODE CLASS: II/NSR



PLAN (NORTH WEST CORNER OF NORM. SWGR)



PLAN (SOUTH EAST CORNER OF NORM. SWGR.



PLAN (NORTH WALL OF MOTOR GEN. ROOM)

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

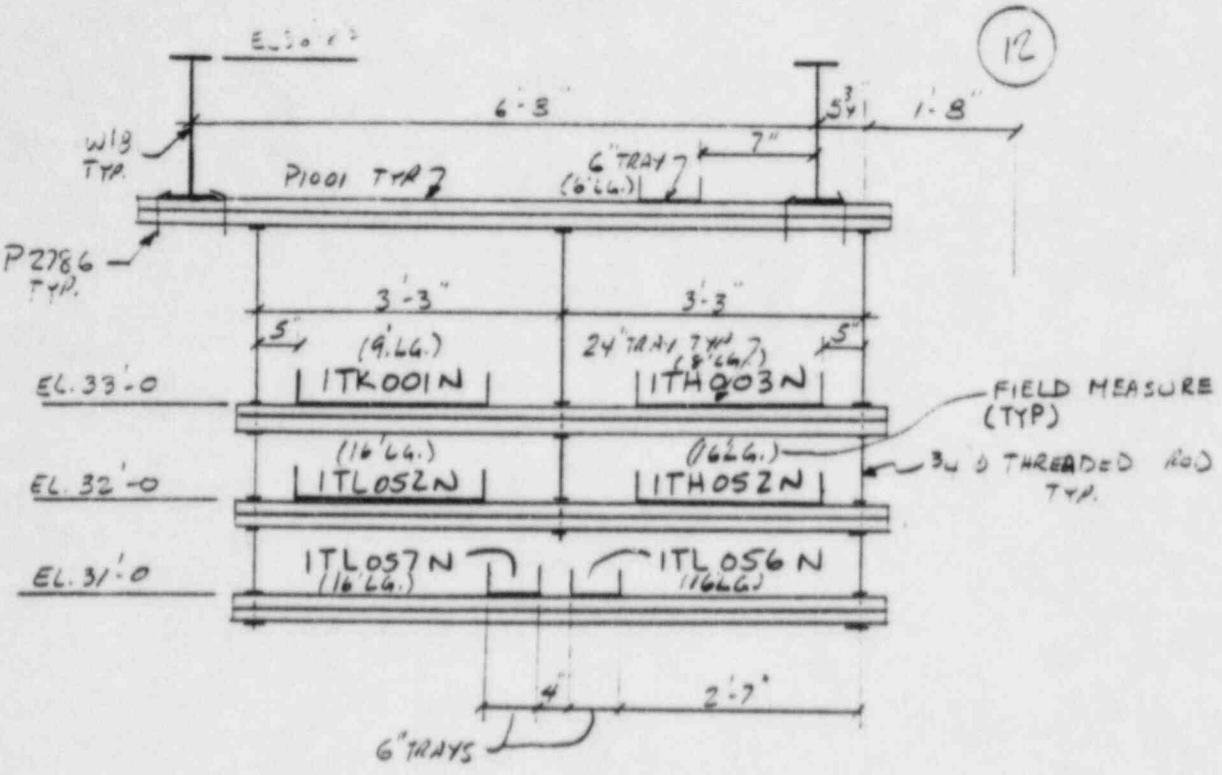
A5010.61

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.04/SC.017-62M	0	5

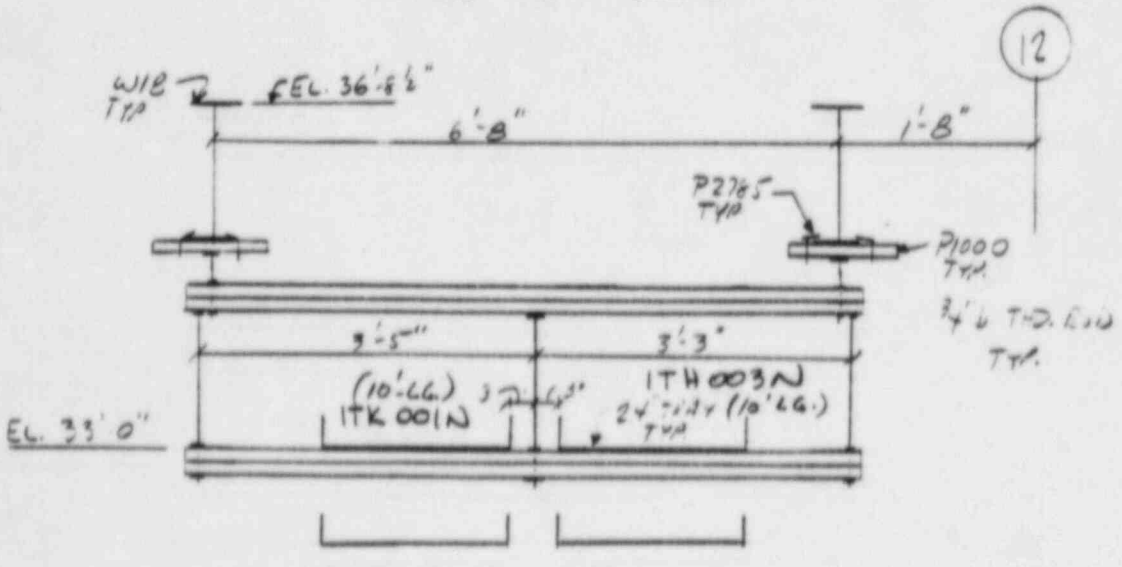
PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V. CAPPA 1-10-85	1/12/85	N/R

SUBJECT/TITLE (TURBINE BLDG.)
FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS

QA CATEGORY/CODE CLASS: II/NSR



207A (LOOKING SOUTH)
TURBINE BLDG.



208A (LOOKING SOUTH)
TURBINE BLDG.

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

A5010.61

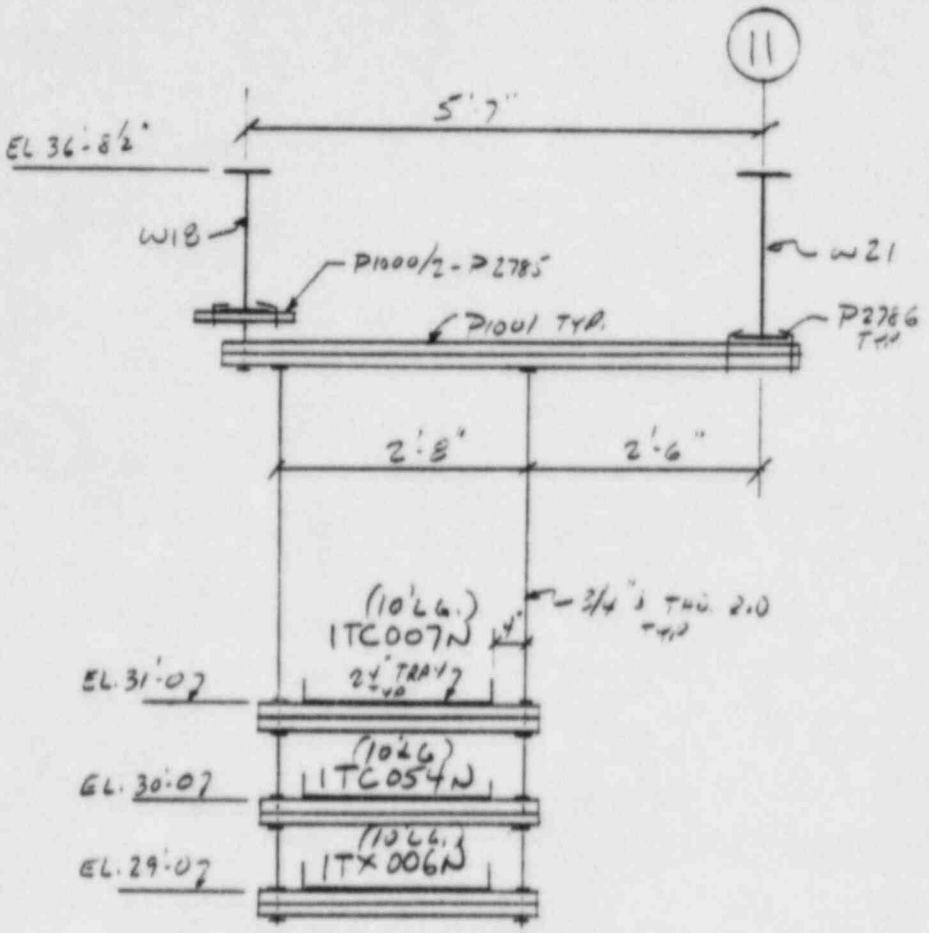
J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02 / SC-017-62H	0	6

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V. [illegible] 1-10-85	[illegible] 1/12/85	N.L

SUBJECT/TITLE (TURBINE BLDG.)

FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS

QA CATEGORY/CODE CLASS: II / NNR



218A (LOOKING SOUTH)

TURBINE BLDG.

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

A5010.61

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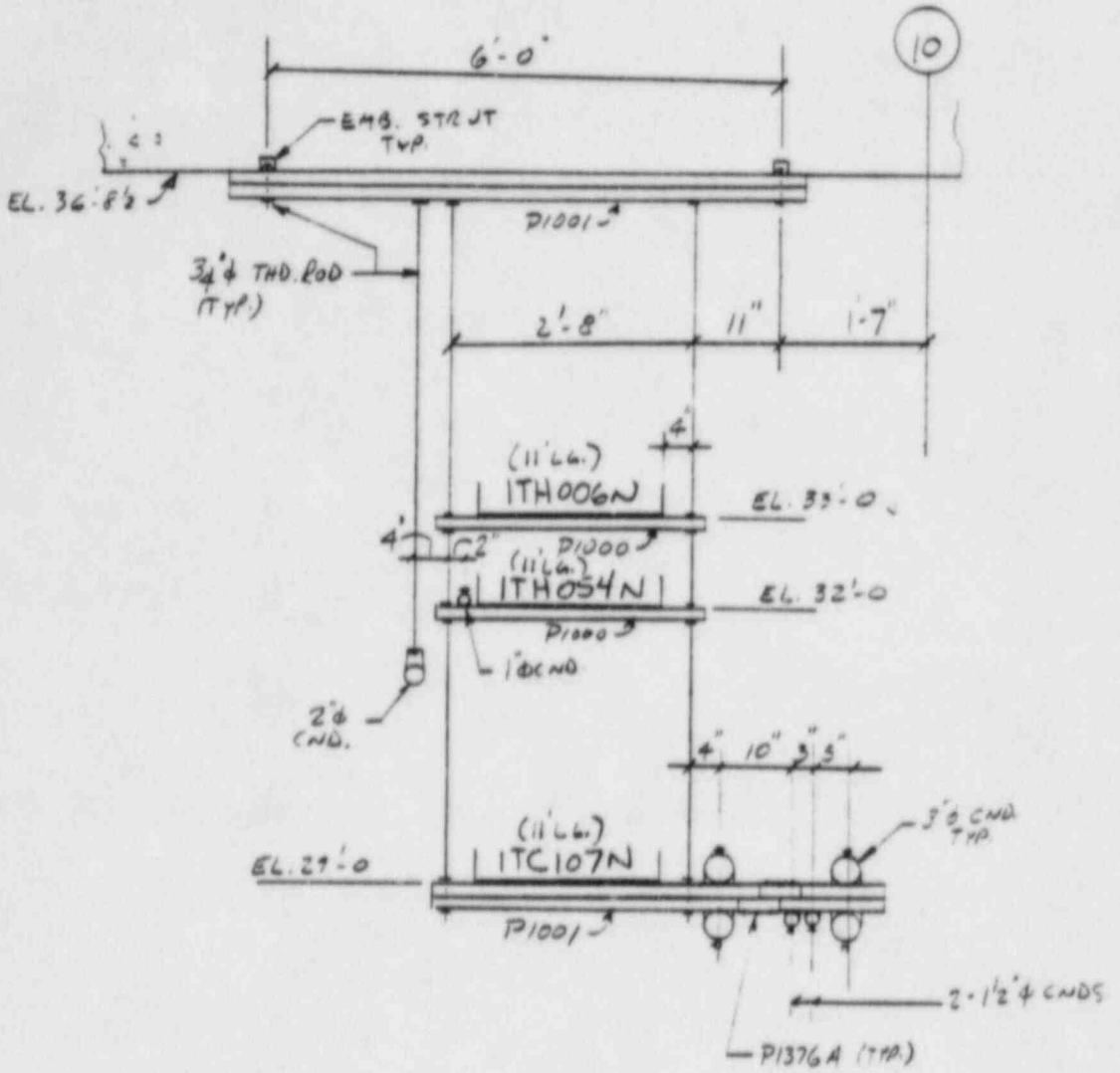
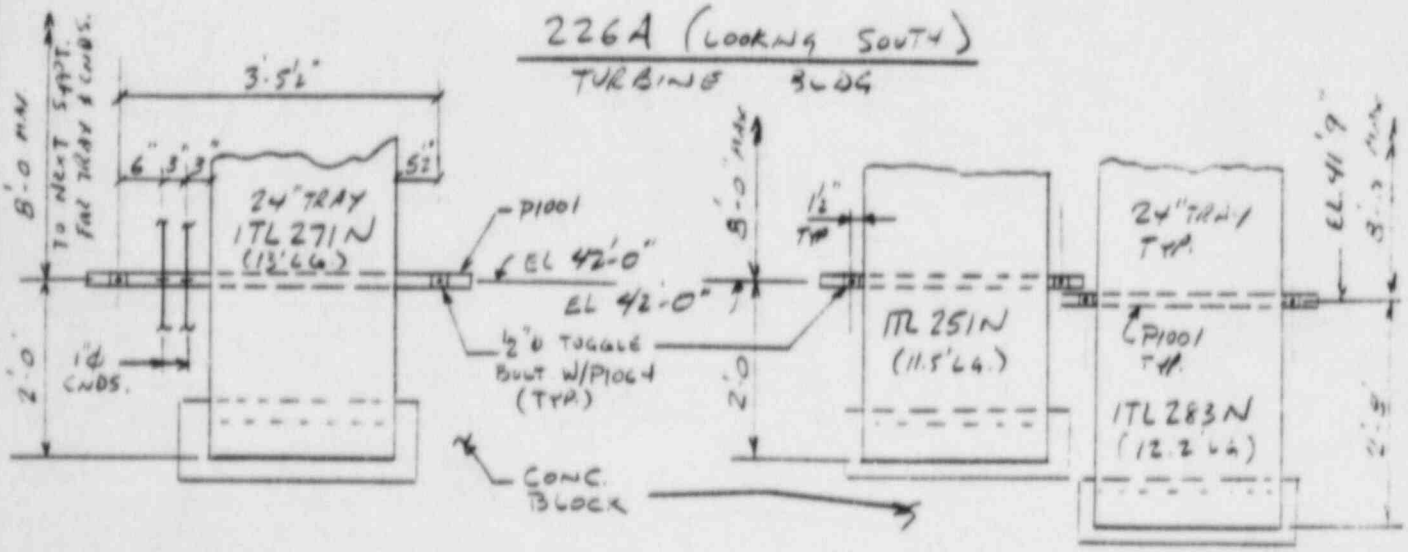
PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V.CAPRA 1-10-85	1/12/85	N/A

SUBJECT/TITLE	QA CATEGORY/CODE CLASS
FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS (TURBINE BLDG.)	II/NSR



226A (LOOKING SOUTH)
TURBINE BLDG



SECTION A-A
TURBINE BLDG.

SECTION B-B
TURBINE BLDG.

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02/SC.017.62H	0	5

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V CAPPA 1-10-85	H HAJJAR 1-11-85	NR

SUBJECT/TITLE (TURBINE BLDG.)
FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS

QA CATEGORY/CODE CLASS: II/NSC

CK. 226A

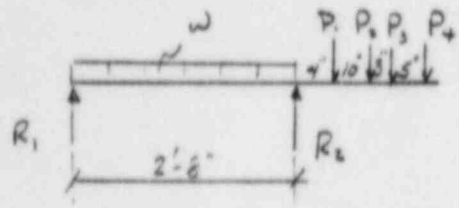
ALL TRAYS HAVE LENGTH: 11'-0/2 = 5.5' (ETG 10-2)

D.L. OF 24" TRAY = (40 #/' x 5.5' + 35) = 255#

ALL CNDS. HAVE LENGTH: 6.5'/2 = 3.25' (SH 1-159 SECTION 6)

D.L. OF 3" ϕ CND. = 11 #/' x 3.25' = 36#
" " 1½" ϕ " = 3.5 #/' x 3.25' = 12#
" " 1" ϕ " = 2.0 #/' x 3.25' = 7#
" " 2" ϕ " = 5.0 #/' x 3.25' = 17#

CK. HORIZ. MEMB. @ EL 29'-0":



w = 255#/32' + 3.8/12 = 8.3 #/'

P1 = 2 x 36 = 72#
P2 = 12# = P3
P4 = 2 x 36 + 3.8 x 2 = 80#

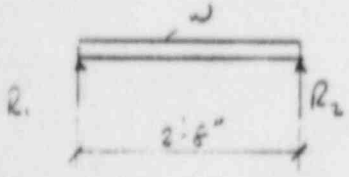
$$R_1 = \left[72^{\#} \times 4' + 12^{\#} \times 14' + 12^{\#} \times 17' + 80^{\#} \times 22' - \frac{8.3 \times 32^2}{2}\right] \div 32 = 57^{\#}$$

R_2 = 8.3 x 32 + 72 + 2 x 12 + 80 - 57 = 385#

MAX MOM. = 80 x 22 + 12 x 17 + 12 x 14 + 72 x 4 = 2420#'

$f_b = \frac{2420}{.572} = 4230$ psi

CK. HORIZ. MEMB. @ EL. 32'-0.



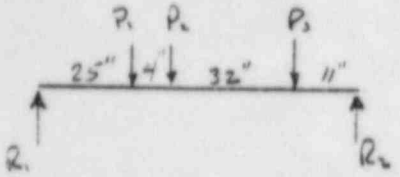
w = 255#/32 + 7#/32 + 3.8/2 = 8.5 #/'

$M_b = \frac{8.5 \times 32^2}{8} = 1088$ #-'

$f_b = \frac{1088}{.203} = 5360$ psi

$R_1 = 8.5 \times 32/2 = R_2 = 136^{\#}$

CK. HORIZ MEMB. @ CEILING:



$P_1 = 17^{\#}$

$P_2 = 57^{\#} + 136 \times 2 = 329^{\#}$

$P_3 = 385 + 136 \times 2 = 657^{\#}$

$$R_1 = \frac{17^{\#} \times 47'' + 329^{\#} \times 43'' + 657^{\#} \times 11''}{72''} + \frac{3.8^{\#} \times 6'}{2}$$

$= 320^{\#}$

$R_2 = 17 + 329 + 657 + 3.8 \times 6 - 320 = 706^{\#}$

$M_b = 706 \times 43 - 657 \times 32 = 9334^{\#-"}$, $f_b = \frac{9334}{.572} = 16318 < .5 \times F_y = 18000$

CK. ¾" ⌀ ROD: MAX. LOAD @ EMB. STRUT

TENSION/ROD = $706^{\#}$, $f_T = \frac{706}{.334} = 2114$ PSI $< .5 F_y$

CK. EMB. STRUT: ALLOWABLE TENSION = 6000#/FT.

$f_{esc} = 2 \times 1.625 \times 2 = 6.5''$

$.5 \times T_A = \frac{6.5}{12} \times 6000 \times .5 = 1625^{\#} > 760^{\#}$ OK

(SEE ATTACHED I.D.C. TO R WIESEL DATED 7-22-82)

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02/SC.017.62M	0	10

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
V CAPRARA 1-10-25	H MANIAR 1-12-25	NR

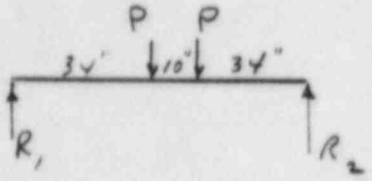
SUBJECT/TITLE: FIRE HAZARD ANALYSIS OF CABLE TRAY SUPPORTS (TURB BLDG.)

QA CATEGORY/CODE CLASS: 1/NSR

207A, 208A, 218A !

CK. 207A :

CK. HORIZ. MEMB. @ EL. 31'-0":



P = D.L. OF 6 TRAY = $(20\#/ft \times \frac{16}{2} + 12.7) = 173\#$ (ETG 10-2)

$R_1 = R_2 = \frac{2 \times 173}{2} + \frac{3.8 \times 6.5}{2} = 185\#$

$M_D = 185 \times 39 - 173 \times 5 - 12.4\#_{MEMB.} \times 22 = 6077$

$f_b = \frac{6077}{.572} = 10625 < .5 \times 36000$

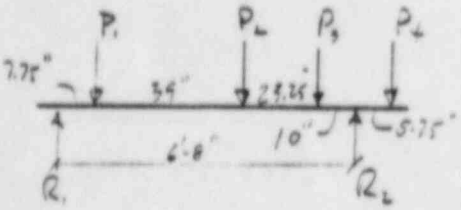
CK. HORIZ. MEMB. @ TOP :

DL. OF 24 TRAY (16' LG.) = $(40 \times \frac{16}{2} + 35) = 355\#$ (ETG 10-2)

" " " (9' LG.) = $(40 \times \frac{9}{2} + 35) = 215\#$

" " " (8' LG.) = $(40 \times \frac{8}{2} - 37) = 195\#$

" " 6" " (6' LG.) = $(20 \times \frac{6}{2} - 12.7) = 73\#$



$P_1 = 185 + (355 + 215)\frac{22}{39} + \frac{3.25 \times 2}{2} \times 3.8 = 520\#$

$P_2 = (215 + 195 + 2 \times 355)\frac{17}{39} + \frac{2 \times 6.5}{2} \times 3.8 = 513\#$

$P_3 = 73\#$

$P_4 = P_1 = 520\#$

$R_1 = \left[520\# \times 72.25" + 513\# \times 33.25" + 73\# \times 10" - 520 \times 5.75 + \frac{7^2 \times 3.8}{2}\right] \div 80 = 656\#$

$R_2 = 520 \times 2 + 513 + 73 + 7 \times 3.8 - 656 = 997\#$

$M_{b@R_1} = 656 \times 46.75 - 520 \times 39 - \frac{46.75^2}{12 \times 2} \times 3.8 = 10042\#"$

$f_b = 10042 / .572 = 17556 < .5 \times 36000 = 18000$

CK. P2786 : RECOMMENDED LOAD = $2 \times 1000 = 2000\# > 997\#$ OK (UNISTRUT CATALOG #9)

ALL OTHER TRAY SUPPORTS IN TURB BLDG OK

B. COM 12.2.50.

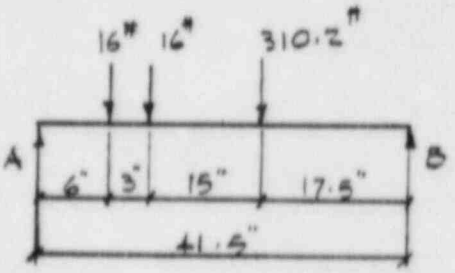
PENETRATION 13 TURBINE SIDE TRAY SUPPORT SECTION A-A'

24" TRAY LENGTH = $\frac{13.75}{2}$ = 6.88

D.L. OF 24" TRAY = (40 × 6.88 + 35) = 310.2# ← ETG 10.2

D L 1"ϕ CND = 2 × 8 = 16# ← SPEC. SH 1-157 SECTION 6

CHECK P1001



$R_A = \frac{310.2 \times 17.5 + 16 \times 32.5 + 16 \times 35.5}{41.5} + \frac{3.8 \times 41.5}{12 \times 2}$

= 163.6#

R_B = 16 + 16 + 310.2 + $\frac{3.8}{12}$ × 41.5 − 163.6

192#

$M = 192 \times 17.5 - \frac{3.8}{12} \times \frac{17.5^2}{2} = 3312$"#

$f_b = \frac{3312}{.572} = 5790 < .5 f_y$ OK

SHEAR OK BY INSPECTION

CHECK TOGGLE BOLTS

S = 192# ½"ϕ TOGGLE BOLT, SA = 250# > 192# OK ← SEE ATTACHMENT

PENETRATION 13, TRAY SUPPORT SHOWN IN SECTION AA' IS ACCEPTABLE

PENETRATION 12 & 18 TRAY SUPPORTS SECTION B-B' (TURBINE SIDE)

24" TRAY LENGTH = $\frac{11.5}{2}$ = 5.75'

D.L. OF TRAY = (40 × 5.75 + 35) = 265# ← ETG 10.2

TRAY SUPPORTS ARE ACCEPTABLE BY COMPARISON WITH TRAY SUPPORT IN SECTION 'A-A' AT PENETRATION 13 AS LOAD IS LIGHTER & SPAN IS SMALLER

A5010.61	J.O./W.O./CALCULATION NO. 3000.02-SC-017-624	REVISION	PAGE A1
PREPARER/DATE H. MAJAR 1-12-85	REVIEWER/CHECKER/DATE V. CAPPARA 1-12-85	INDEPENDENT REVIEWER/DATE	
SUBJECT/TITLE FIRE HAZARD ANALYSIS OF CABLE TRAYS		QA CATEGORY/CODE CLASS I	

ATTACHMENT A'

SENDER — RETAIN YELLOW COPY.
FORWARD WHITE AND PINK COPIES.

REPLIER — RETURN WHITE COPY
RETAIN PINK COPY FOR FILE.

P. A2

INTEROFFICE CORRESPONDENCE

TO	LOCATION	SUBJECT / REFERENCE / J.O. NO
P. Eisler		Allowables for Unistrut P3300 and powerstrut PT SON series
FROM: AYC WONG	LOCATION: 245/6	

MESSAGE:—

max allowable tension = 6000 #/FT = T_A

max allowable shear = 2500 #/FT = S_A

Interaction formula $\frac{T}{T_A} - \frac{S}{S_A} \leq 1.0$

The above allowables are based on manufacturer's data

7/22/82
DATE

Albert Y C Wong
SIGNATURE

X-2665
TELEPHONE

REPLY:

DATE

SIGNATURE

▲ 040 138

TABLE G-1

COMPARISON OF EXPANSION ANCHOR TENSION VALUES

Type of Anchor	Recommended Tension Values: Useful Load (New Construction) (lb) (1)	Recommended Tension Values: Useful Design Load-New Construction (lb) *	Mfg Tension Values: Ultimate Load (lb) (1, 2)	Mfg Tension Values: Design Value (lb)
1/4" Sleeve (H)	600/600	180	1,200	300
5/16" Sleeve (H)	725/725 (3)	215	1,329	332
#3/8" Sleeve (H)	800/800	240	1,666	416
#1/2" Sleeve (H)	1,500/1,500	450	2,431	607
1/4" Sleeve (P)	600/600	180	1,256	314
5/16" Sleeve (P)	725/725	215	1,460	365
#3/8" Sleeve (P)	800/800	240	2,328	582
#1/2" Sleeve (P)	1,500/1,500	450	3,540	885
3/8" "Pronto" (P)	1,000/500	300/150	2,237/ 1,707	559/425
1/4" Toggle (R)	Not Recommended		650	162
3/8" Toggle (R)	Not Recommended		1,000	250 — Allow. Tension / 100 # Shear

(H) Hilti (P) Phillips (R) Rawl

(1) Solid block/hollow block - where one value appears no differentiation made

(2) Adjusted for C-90 minimum block properties

(3) From Ref. 3 using ratio or 2.0 "low" useful/ultimate based on anchor pull failures

NA - Nonapplicable

* Recommended design values for DBE seismic loads may be obtained by increasing design values by 1.67

Recommended size and type anchor for most applications

TOGGLE BOLTS

STEVE GETZ OF ITT PHILLIPS IN PHONE CALL REFERS TO FEDERAL SPEC. FF-B-588 C WHICH GIVES PROOF LOADS FOR TOGGLE BOLTS TYPE I CLASS A (WINGS MADE OF SHEET METAL)

BOLT DIA	PROOF LOAD	FOR DIRECT TENSION
.138"	175	
.190	350	
.25	600	150# (= PROOF/4)
.3125	900	
.375	1100	
.5	1500	

→ THESE LOADS SHOULD BE DIVIDED BY 4 TO OBTAIN SAFE WORKING LOADS IN TENSION

(1971) PAUL MCHALE HAS BEEN ASKED BY NINE MILE 2 PROJECT ABOUT THE CAPACITY OF THESE TOGGLE BOLTS HE HAD ASSUMED THAT THEY WERE BEING INSTALLED IN CONCRETE BLOCK WALLS AND WOULD BE SUBJECT TO A VERTICAL SHEARING FORCE. THE CONCRETE BLOCK WOULD BE THE WEAKEST COMPONENT. YOU WILL NOTE THAT THE BOLTS ARE INSTALLED IN OVERSIZE HOLES (7/16" DIA. FOR 3/8" BOLT). HE ASSUMED ALLOW. BEARING OF .25 F'_c F'_c FOR BLOCK = 1000 psi

→ IF SHELL THICKNESS OF BLOCK IS 2"
FOR 1/4" DIA BOLT, $.25 \times 1000 \times \frac{1}{4}" \times 2" = 125\#$

THIS WOULD BE THE ALLOWABLE LOAD IN SHEAR

ASSUME BOLT SLIDES INTO BEARING

CALCULATION SHEET

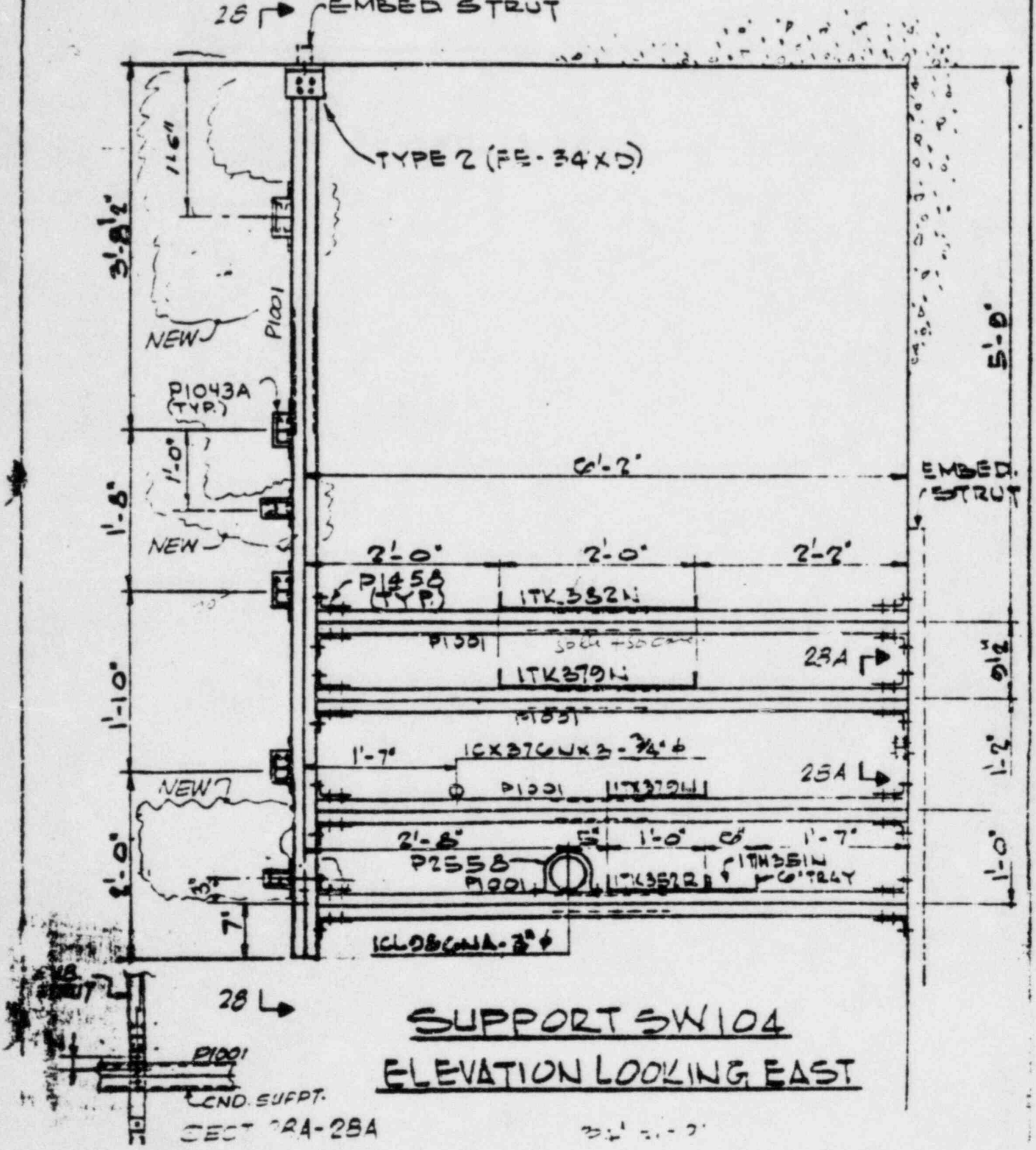
J.O. NO./CALCULATION NO.	REVISION	PAGE
11600.27 | E34F9.2	0	~~82~~ 4

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
Backilman 7-2-82	S. Greim 7-19-82	

SUBJECT/TITLE: SCREENWELL SECTOR SIV-2
SPECIAL CABLE TRAY SUPPORT SW104

QA CATEGORY/CODE CLASS: CAT. 1 / NSR

ATTACHMENT A P. A5



SUPPORT SW104

ELEVATION LOOKING EAST

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.27 / E34.F9.1	0	5 of 44

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
MBackilman 6/16/82	N. MENON 1/5/82	

SUBJECT/TITLE: DUTY-ENGINEER DESIGN SW-1 FE-342
CABLE TRAY SUPPORT SW105

QA CATEGORY/CODE CLASS: CAT. 1 / N.S.R.

ATTACHMENT 'A'