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RECIP.NAME RECIPIENT AFFILIATION
CRUTCHFIELD,D. Operating Reactors Branch 5

SUBJECT: Informs that end connections of turbine bldg structural member 25 will resist seismic member forces. No mods will be made for Open Issue 2, in response to SEP Topics III-6 & III-11, seismic design considerations.

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April 20, 1982

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: SEP Topics III-6 and III-11, "Seismic Design Considerations"
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

In response to the question concerning the adequacy of structural member 25 of the Turbine Building as addressed in our letter dated November 3, 1981 (open issue #2), we have determined that the end connections will resist the seismic member forces as shown by Attachment 1.

It was agreed during telephone conversations with staff members and Lawrence Livermore (LLNL) personnel that connection resistance would be checked based on the 1.1 overstress from the LLNL analysis.

Since the LLNL overstress is small and the connections are adequate, we still will not make any modifications for open issue #2.

Very truly yours,

John E. Maier

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1/1

ATTACHMENT 1

Gilbert Associates, Inc. Reading, Pennsylvania	SUBJECT RG&E · GINNA STATION TURBINE BLDG. BRACING EVALUATION	CISID 1:46.4-01	PAGE 1 OF 5 PAGES
CALCULATION	REV. 0 / 1 / 2 / 3		
	MICROFILMED		
	ORIGINATOR J.M. Adametz		
	DATE 03-04-82		

OBJECT: DETERMINE THE ABILITY OF THE CONNECTIONS FOR THE BRACING BETWEEN COLUMNS F-10 & F-11 AND APPROX. ELEV. 309' TO 328' TO SUPPORT THE BRACING LOADS DETERMINED BY L.L.N.L. (REF. MEETING MINUTES RG&E/GAI 02-26-82; IBN1-GR-13587, 03-02-82)

SOLUTION:

A) DETERMINE BRACING LOADS - YIELD CAPACITY OF GROSS AREA OF MEMBERS.

FROM GAI DRAWING D-502-062 REV. 4 DIAGONAL BRACING MEMBER MADE OF 2 - 3½" x 3" x ⅜" ANGLES. (NOTE: DRAWING ALSO SHOWS A 110^K TENSION LOAD FOR THIS BRACING)

$A_{gross} = 2 \times 2.3 = 4.6 \text{ in}^2$ $\quad F_y = 36 \text{ ksi}$

$\therefore$ Tension$_y$ $= 4.6 \times 36 = 165.6$ kips

FROM THE REFERENCED MEETING MINUTES THE BRACING MEMBERS WERE STRESSED OVER YIELD BY 1.10 FROM SEISMIC FORCES (.2g ground response)

SO THE ACTUAL BRACING LOAD $= 165.6 \times 1.1 = 182.2$ KIPS

B) CHECK THE BRACING CONNECTIONS FOR THE 182.2 KIP ACTUAL LOAD.

CONNECTION DETAILS SHOWN BELOW ARE FROM DRAWING NO. 15 CONTRACT NO. 66-190 OF "THE LEVISON STEEL CO"

Gilbert Associates, Inc.
Reading, Pennsylvania
CALCULATION

SUBJECT RG&E - GINNA STATION TURBINE BLDG. BRACING EVALUATION			CISID 1:46.4-02	PAGE 2 OF 5 PAGES
REV. 0	1	2	3	
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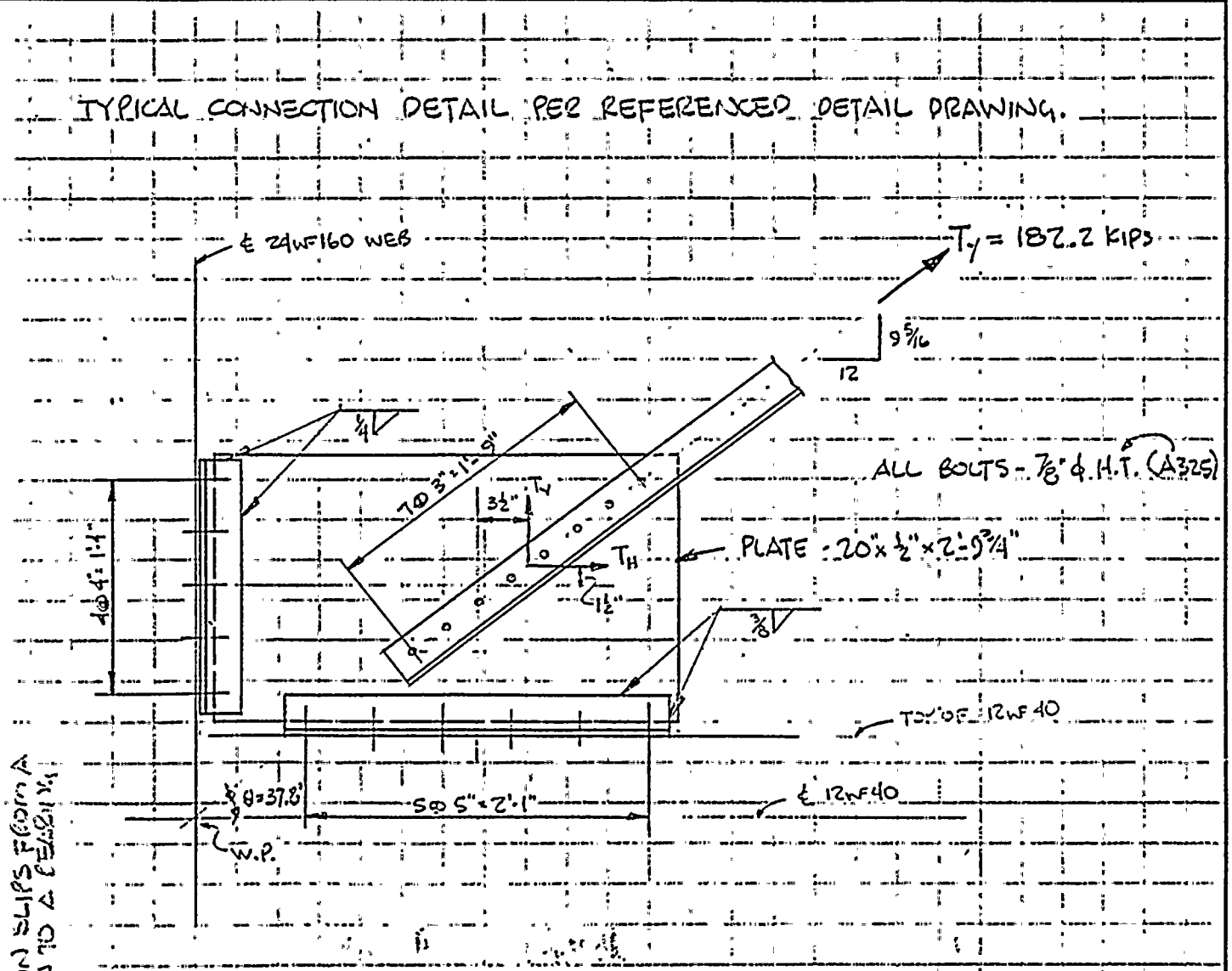
ORIGINATOR J M Adametz				
DATE 03-04-87				

TYPICAL CONNECTION DETAIL PER REFERENCED DETAIL DRAWING.



1) CHECK BRACING MEMBER TO GUSSET PLATE BOLTS

→ SAY BEARING TYPE CONNECTION - THREADS IN SHEAR PLANE

FROM AISC 8th EDITION $V_{ALLOW/BOLT}$ = 25.3 KIPS (FOR DOUBLE SHEAR)

SSE T_{ALLOW} = 8×25.3×1.6 = 323.8 KIPS > 187.2 KIPS (ok)

NOTE: ASSUME THAT CONNECTION SLIPS FROM A FRICTION TYPE CONNECTION TO A BEARING TYPE CONNECTION.

3) CHECK GUSSET PLATE TO STRUCTURE BOLTS

a) RESOLVE TENSILE LOAD INTO HORIZ. & VERT. COMPONENTS

$T_{y_{VERT}} = 182.2 \times \sin 37.8° = 112$ KIPS

$T_{y_{HORIZ}} = 182.2 \times \cos 37.8° = 144$ KIPS

b) SAY $T_{y_{VERT}}$ LOADS THE SIDE ANGLE & $T_{y_{HORIZ}}$ LOADS THE BOTTOM ANGLE. ASSUME ONLY SHEAR LOADS ON BOLTS.

$V/BOLT\ (SIDE) = 112/10 = 11.2$ KIPS

$V/BOLT\ (BOTTOM) = 144/12 = 12$ KIPS

FROM AISC 8th Ed. $V_{ALLOW/BOLT} = 12.6$ KIPS (BEARING, SINGLE SHEAR THREADS IN SHEAR PLANE)

SSE ALLOW SHEAR/BOLT $= 12.6 \times 1.6 = 20.2$ KIPS $> 11.2^K$ & 12 KIPS (OK)

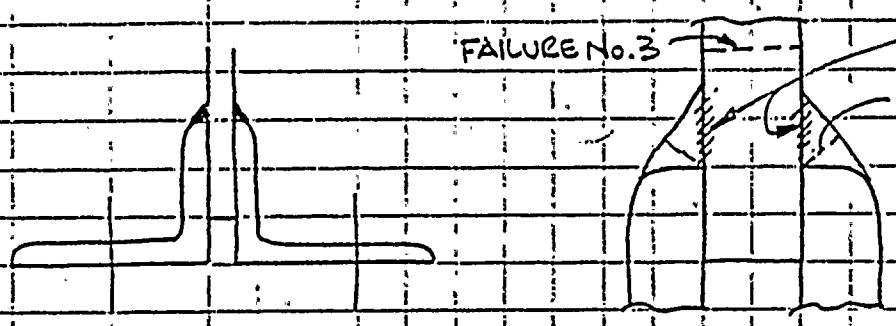
c) CHECK WELD OF GUSSET PLATE TO ANGLES

ASSUME - E60XX ELECTRODES

- ALLOW. WELD STRESS = 18 ksi (REF: AISC 7th Ed pg 5-21)

THERE ARE 3 POSSIBLE FAILURE MODES:

1) SHEAR ON THROAT AREA OF WELD
2) SHEAR BETWEEN WELD LEG & BASE METAL
3) SHEAR IN PLATE



SAY HORIZ. ANGLES RESIST HORIZONTAL LOAD

FORCE/IN OF WELD = 144K/32"x2 WELDS = 2.25 K/in

SSE ALLOW FORCE/IN OF WELD = .707x(3/8)x18ksi x1.6 = 7.63 KIPS/in ∴ WELD SHEAR CAPACITY OK

(REF. AISC 8th Ed pg 5-25) SSE ALLOW FORCE/IN OF BASE METAL = 3/8"x(.4x36)x1.6 = 8.64 K/in ∴ BASE METAL FORCE OK

FORCE/IN OF PLATE = 144/33.75 = 4.26 K/in

SSE ALLOW FORCE/IN PLATE = .5(.4x36)x1.6 = 11.5 K/in ∴ PLATE OK

SAY VERTICAL ANGLES RESIST VERTICAL LOAD

FORCE/IN OF WELD = 112/23x2 WELDS = 2.43 K/in

SSE ALLOW FORCE/IN OF WELD = .707(1/4")x18ksi x1.6 = 5.09 K/in ∴ WELD SHEAR CAPACITY OK

SSE ALLOW FORCE/IN OF BASE METAL = 1/4" x (.4x36) x1.6 = 5.76 K/in ∴ BASE METAL FORCE OK

FORCE/IN OF GUSSET PLATE = 112/17" = 6.59 K/in < 11.5 K/in ∴ PLATE OK

∴ ALL WELDED COMPONENTS ARE ACCEPTABLE

IT SHOULD BE NOTED THAT ELASTIC ALLOWABLE STRESSES HAVE BEEN USED TO DETERMINE THE ABILITY OF THE CONNECTION COMPONENTS TO SUPPORT YIELD LOADS OF THE BRACING MEMBERS.

CONCLUSION:

THE CONNECTIONS FOR THE BRACING IN THIS PANEL ARE ADEQUATE TO SUPPORT THE YIELD LOADS OF THE BRACING DETERMINED FROM L.L.N.L. ANALYSIS RESULTS.