PSE&G

Public Service Electric and Gas Company 80 Park Place Newark, N.J. 07101 Phone 201/430-7000

December 30, 1977

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washnington, D.C. 20555

Attention: Mr. George Lear, Chief
Operating Reactors Branch 3
Division of Operating Reactors

Gentlemen:

FRACTURE TOUGHNESS AND
POTENTIAL FOR LAMELLAR TEARING
OF SG AND RCP SUPPORT MATERIALS
NO. 1 UNIT
SALEM NUCLEAR GENERATING STATION
DOCKET NO. 50-272

In our letter of December 21, 1977 (attached) on the above subject, the attachments were inadvertantly omitted. Enclosed are forty (40) copies of the attachments and six (6) sets of blueprints.

F. P. Librizzi
General Manager -
Electric Production

ADDITIONAL INFORMATION

FRACTURE TOUGHNESS AND POTENTIAL FOR LAMELLAR TEARING OF STEAM GENERATOR AND REACTOR COOLANT PUMP SUPPORT MATERIALS

NO. 1 UNIT
SALEM NUCLEAR GENERATING STATION
DOCKET NO. 50-272

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1. Provide engineering drawings of the steam generator and reactor coolant pump supports sufficient to show the geometry of all principal elements. Provide a listing of materials of construction.

Response

The below listed drawings are attached.

Drawing No.		Title
208900-A-8823-3	-	No. 1 Unit, Steam Generator and Reactor Coolant Pump Supports, Location Plans
208903-A-8823-12	-	No. 1 and 2 Units, Steam Generator Supports
208904-A-8823-12	-	No. 1 and 2 Units, Steam Generator Supports
208905-A-8823-11	-	No. 1 and 2 Units, Reactor Coolant Pump Supports
208906-A-8823-12	-	No. 1 and 2 Units, Reactor Coolant Pump Supports
201320-AB-3557-2	-	No. 1 and 2 units, Reactor Coolant Pump Supports

The supports are constructed of ASTM A441 High Strength Low Alloy steel. Welding was done with the following rods:

AWS E70T-1 FCAW Electrodes
AWS E70T-2 FCAW Electrodes
AWS E7016, 17, 18 SMAW Electrodes
AWS F71-EL12 SAW Electrodes

2. Specify the detailed design loads used in the analysis and design of the supports. For each loading condition (normal, upset, emergency and faulted), provide the calculated maximum stress in each principal element of the support system and the corresponding allowable stresses.

Response

The detailed design loads and stresses and corresponding allowable stresses are provided in the nine tables attached.

3. Describe how all heavy section intersecting member weldments were designed to minimize restraint and lamellar tearing. Specify the actual section thicknesses in the structure and provide details of typical joint designs. State the maximum design stress used for the through-thickness direction of plates and elements of rolled shapes.

Response

Most intersecting primary members are connected flange to flange by butt welds or are connected to gusset plates by fillet welds. These types of connections are not susceptible to lamellar tearing. Those members connected by welded tee and corner joints subject to through-thickness design stresses are as follows:

Steam Generator Supports

(a) PL 18" x 4" x 2'-0", Section 10-10, Drawing No. 208904-A-8823-12 Maximum Through-Thickness Stress = 19.23 ksi

(b) Plate Girders and W36 x 280 supporting W14 x 202 columns, Plan B-B and Section 10-10, Drawing Nos. 208903-A-8823-12 and 208904-A-8823-12 respectively. Maximum Through-Thickness Stress = 19.23 ksi.

(c) PL 20" x 4'-4" x 1'-8", Detail F, Drawing No. 208903-A-8823-12. Maximum Through-Thickness Stress = 16.24 ksi.

(d) PL 20" x 3" x 3'-10", Section 7-7, Drawing No. 208903-A-8823-12. Maximum Through-Thickness Stress = 15.00 ksi.

Reactor Coolant Pump Supports

(a) PL 13" x 5" x 1'-8", Detail E and Section 5-5, Drawing No. 208905-A-8823-11. Maximum Through-Thickness Stress = 18.23 ksi.

(b) Bar 6" x 2", Section 6-6, Drawing No. 208906-A-8823-12. Maximum Through-Thickness Stress = 26.11 ksi.

(c) PL 18" x 4" x 4'-10", Section 7-7, Drawing No. 208906-A-8823-12. Maximum Through-Thickness Stress = 11.11 ksi.

(d) PL 22" x 3" x 3'-6", Section 3-3, Drawing No. 208905-A-8823-11. Maximum Through-Thickness Stress = 11.78 ksi.

There is no potential for fatigue crack growth in these members since these through-thickness tensile stresses are based on emergency and faulted conditions.

4. Specify the minimum operating temperature for the supports and describe the extent to which material temperatures have been measured at various points on the supports during the operation of the plant.

Response

Material temperatures have not been measured on the supports. The operating temperature for the supports would be at least the ambient temperature within the containment. The average operating temperature in the containment is approximately 100°F with a minimum of 70°F. The fracture toughness of the supports assures that they will not exhibit brittle behavior at these temperatures.

5. Specify all the materials used in the supports and the extent to which mill certificate data are available. Describe any supplemental requirements such as melting practice, toughness tests and through-thickness tests specified. Provide the results of all tests that may better define the properties of the materials used.

Response

Mill certificate data is available for all materials used in the supports. All primary structural members are silicon killed and normalized ASTM A441 steel subject to a supplementary requirement for Charpy V-Notch testing (20 ft.-lb. minimum at 20°F). This toughness requirement was met with ample margin.

6. Describe the welding procedures and any special welding process requirements that were specified to minimize residual stress, weld and heat affected zone cracking and lamellar tearing of the base metal.

Response

All shop welding was done in accordance with AWS D2.0, "Specification for Welded Highway and Railway Bridges." Detailed joint procedure specifications were submitted by the fabricator for review and approval by PSE&G engineering personnel. The following preheat requirements were specified to minimize residual stress:

(a) Material less than 3/4" thick shall be preheated to 100°F if the ambient temperature falls below 40°F.

(b) Material 3/4" to 1-1/2" thick shall be preheated to 150°F prior to welding.

(c) Material 1-1/2" to 2-1/2" thick shall be preheated to 225°F before welding.

(d) Material over 2-1/2" thick shall be preheated to 300°F before welding.

7. Describe all inspections and non-destructive tests that were performed on the supports during their fabrication and installation, as well as any additional inspections that were performed during the life of the facility.

Response

All welds were subject to visual inspection in accordance with AWS requirements. All full penetration shop welds were subject to magnetic particle inspection at four (4) depths supplemented, where practical, by ultrasonic inspection of the finished weld. After installation, welds on the supports were subject to another magnetic particle inspection. This inspection revealed only minor surface defects on some welds, none critical to the structural integrity of the supports. Nonetheless, these welds were repaired.

SALEM NUCLEAR GENERATING STATION
UNITS NO. 1 & 2

STEAM GENERATOR AND REACTOR COOLANT PUMP SUPPORTS

LOADING COMBINATIONS AND ALLOWABLE STRESS LIMITS

LOADING COMBINATIONS	SUPPORTS - ALLOWABLE STRESS LIMIT
1. Normal Loads	Working stresses per AISC code.
2. Normal loads + operating base earthquake (upset condition)	1-1/3 working stresses AISC code.
3. Normal loads + pipe rupture loads (emergency condition)	90% of yield stress of material.
4. Normal loads + design base earthquake (faulted condition)	90% of yield stress of material.
5. Normal loads + design base earthquake + pipe rupture loads (faulted condition)	Yield stress of material.

SALEM GENERATING STATION

STEAM GENERATOR SUPPORTS

	NOMENCLATURE: f_b = BENDING STRESS F_b = BENDING STRESS f_p = BEARING STRESS f_a = COMPRESSIVE STRESS F_p = BEARING F_a = COMP. STRESS f_T = TENSILE STRESS F_T = TENSILE STRESS f_v = SHEAR STRESS F_v = SHEAR STRESS KIP = 1000 LBS K.S.I = KIPS/IN²	LOADING COMB.:1 NORMAL LOADS FLOODED CONDITION LOADS IN KIPS		LOADING COMB.:2 UPSET CONDITION OPERATING BASE EARTHQUAKE + NORMAL LOADS KIPS		LOADING COMB.:3 [EMERGENCY CONDITION] NORMAL LOADS + PIPE RUPTURE LOADS LOADS IN KIPS						LOADING COMB:4 FAULTED CONDITION NORMAL LOADS + DESIGN BASE EARTHQUAKE. LOADS IN KIPS	
		NORMAL LOAD FLOODED = 1,235.0 K.		NORMAL + SEISMIC VERTICAL = 1,322.0 K SEISMIC HORIZ. = 50.0 K LOAD ON BELLY BEND = 204.0 K		R.C. PUMP SUCTION PIPE RUPTURE DESIGN LOADS VERTICAL UP = −2,370.0 K HORIZONTAL = 1970.0 K VERTICAL DOWN = 1235.0 K NORMAL LOADS		HOT LEG PIPE RUPTURE DESIGN LOADS HORIZONTAL = 3,140.0 K NORMAL LOADS VERTICAL DOWN = 1,235.0 K		STEAM PIPE RUPTURE LOAD HORIZ. ON BELLY BEND = 3,730.0 K SUPPORT NORMAL LOAD = 2798.0 K +PIPE RUPTURE - VERTICAL		NORMAL + SEISMIC VERTICAL LOAD = 1420.K HORIZONTAL LOAD = 92.0 K LOAD ON BELLY BEND = 360.0 K	
	MEMBER IDENTIFICATION	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.
1	POST 14WF202 UNDER S.G PADS	f_a = 5.198	F_a = 24.5	f_a = 5.565	F_a = 32.585	f_t = 17.845 f_a = 6.677 f_t BOLTS = 125.29	F_T = 37.8 F_a = 36.75 F_{TB} = 148.95	f_a = 5.198	F_a = 36.75	f_a = 11.785	F_a = 36.75	f_a = 5.977	F_a = 36.75
2	BEAMS UNDER THE POST 14WF202: a. 36WF280	f_b = 9.9	F_b = 28.0	f_b = 10.6	F_b = 37.24	f_b = 23.278 f_v = 21.450	F_b = 37.8	f_b = 9.9	F_b = 37.8	f_b = 22.4	F_b = 37.8	f_b = 7.932	F_b = 37.8
	b. PLATE GIRDER	f_b = 12.87	F_b = 28.0	f_b = 13.7	F_b = 37.24	f_b = 10.780 f_v = 15.100	F_v = 23.625	f_b = 12.87	F_b = 37.8	f_b = 29.20	F_b = 37.8	f_b = 14.796	F_b = 37.8
3	BEAMS FRAMING INTO 14WF320 EL. 94'-1" a. 36WF280	f_b = 11.27	F_b = 28.0	f_b = 12.06	F_b = 37.24	f_b = 24.0 f_v = 14.66 f_a = 12.135	F_b = 37.8 F_v = 23.625 F_a = 37.8	f_b = 11.27	F_b = 37.8	f_b = 24.8	F_b = 37.8	f_b = 12.954	F_b = 37.8
	b. PLATE GIRDER	f_b = 7.73	F_b = 28.0	f_b = 8.275	F_b = 37.24	f_b = 27.879 f_v = 16.200 f_a = 10.280	F_b = 37.8 F_v = 23.625 F_a = 37.8	f_b = 7.73	F_b = 37.8	f_b = 12.435	F_b = 37.8	f_b = 8.88	F_b = 37.8
4	COLUMNS 14WF320	f_a = 0 f_T = 0	—	—	—	f_a = 9.25 OR f_T = 14.65	F_a = 34.32 F_T = 37.80	—	—	—	—	—	—
	COLUMNS 14WF426	f_a = 3.06 f_T = 0	F_a = 23.7	f_a = 3.312	F_a = 31.6	f_a = 13.9 OR f_T = 19.65	F_a = 34.860 F_T = 37.80	f_a = 3.06	F_a = 35.55	f_a = 8.56	F_a = 35.55	f_a = 3.557	F_a = 35.64
5	8½"φ PINS f_p = BEARING STRESS BEARING ON 4" ℞S	f_p = 5.63 f_b = 11.835 f_v = 3.375 f_p = 5.63	F_p = 87.3 F_b = 58.2 F_v = 38.8 F_p = 37.8	f_p = 6.0 f_b = 16.67 f_v = 3.6 f_p = 6.0	F_p = 87.3 F_b = 77.4 F_v = 51.604 F_p = 37.8	f_p = 30.4 f_b = 79.5 f_v = 18.8 f_p = 30.4	F_p = 87.3 F_b = 87.3 F_v = 54.56 F_p = 37.8	f_p = 5.63 f_b = 11.835 f_v = 3.375 f_p = 5.63	F_p = 87.3 F_b = 87.5 F_v = 54.55 F_p = 37.8	f_p = 12.76 f_b = 26.82 f_v = 7.650 f_p = 12.76	F_p = 87.3 F_b = 87.3 F_v = 54.55 F_p = 37.8	f_p = 6.444 f_b = 18.0 f_v = 3.866 f_p = 6.44	F_p = 87.3 F_b = 87.3 F_v = 54.55 F_p = 37.8
6	27WF177 - TIES	—	—	f_t = 0.478	F_T = 33.51	—	—	f_T = 20.15	F_T = 37.8	—	—	f_T = 0.514	F_T = 37.8
	2¾"φ A490 BOLTS	—	—	f_t = 1.052	F_T = 71.8	—	—	f_T = 79.77	F_T = 103.5	—	—	f_T = 1.129	F_T = 103.5

SALEM GENERATING STATION

STEAM GENERATOR SUPPORTS - SALEM GENERATING STATION

NOMENCLATURE:
- f_b = BENDING STRESS
- F_b = BENDING STRESS
- f_a = COMPRESSIVE STRESS
- F_a = COMP. STRESS
- f_T = TENSILE STRESS
- F_T = TENSILE STRESS
- f_v = SHEAR STRESS
- F_v = SHEAR STRESS
- KIP = 1000 LBS

No.	MEMBER IDENTIFICATION	LOADING COMB.:1 NORMAL LOADS FLOODED CONDITION LOADS IN KIPS — NORMAL LOAD FLOODED = 1,235.0 K.		LOADING COMB.:2 UPSET CONDITION OPERATING BASE EARTHQUAKE + NORMAL LOADS KIPS — NORMAL + SEISMIC VERTICAL = 1,322.0 K; SEISMIC HORIZ. = 50.0 K; LOAD ON BELLY BEND = 204.0 K		LOADING COMB.:3 [EMERGENCY CONDITION] NORMAL LOADS + PIPE RUPTURE LOADS, LOADS IN KIPS — R.C. PUMP SUCTION PIPE RUPTURE DESIGN LOADS: VERTICAL UP = -2,370.0 K; HORIZONTAL = 1970.0 K; VERTICAL DOWN = 1235.0 K NORMAL LOADS		HOT LEG PIPE RUPTURE DESIGN LOADS: HORIZONTAL = 3,140.0 K; NORMAL LOADS VERTICAL DOWN = 1,235.0 K		STEAM PIPE RUPTURE LOAD: HORIZ. ON BELLY BEND = 3,730.0 K; SUPPORT PIPE REPTURE + NORMAL LOAD VERTICAL DOWN = 2798.0 Ki		LOADING COMB.:4 FAULTED CONDITION NORMAL LOADS + DESIGN BASE EARTHQUAKE LOADS IN KIPS — NORMAL + SEISMIC VERTICAL LOAD = 1420.K; HORIZONTAL LOAD = 92.0 K; LOAD ON BELLY BEND = 360.0	
		CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.
7	HORIZONTAL PLATE GIRDERS AT EL. 100'-8¼" FLGS ℞ 17"x2½" WEB ℞ 26"x2"	—	—	—	—	f_b = 17.26 f_v = 16.38	F_b = 37.8 F_v = 23.625	f_b = 35.47 f_v = 22.00	F_b = 37.8 F_v = 23.65	—	—	—	—
8	3"- SHEAR PLATES EL. 100'-8¼" (BEARING)	—	—	—	—	f_p = 14.388	F_p = 37.8	f_p = 29.00	F_p = 37.8	—	—	—	—
9	DIAGONAL BRACING MEMBERS 14WF127	—	—	—	—	f_a = 20.800 OR f_t = 19.50	F_a = 34.320 OR F_T = 37.8	—	—	—	—	—	—
10	SHEAR BLOCK BEAM 14WF158	—	—	—	—	f_p = 27.7 f_a = 27.15	F_p = 37.8 F_a = 36.0	—	—	—	—	—	—
11	EMBEDDED STEEL a. 6" φ ANCHOR BOLT	—		—	—	f_T = 37.44	F_T = 38.7	—	—	—	—	—	—
	b. 4" ℞ S AT PIN-HOLE	f_p = 5.63	F_p = 37.8	F_p = 6.0	F_p = 37.8	f_T = 32.98	F_T = 37.8	f_p = 5.63	F_p = 37.8	f_p = 12.76	F_p = 37.8	f_p = 6.44	F_p = 3
12	BELLY BEND AT EL. 130'-0 a. ℞ 2½"x 2'-6"	—	—	f_t = 1.76	F_T = 28.74	—	—	—	—	f_T = 32.171	F_T = 32.4	f_T = 3.105	F_T = 37.8
	b. ℞ 2¼"x 5'-4"	—	—	f_b = 0.099	F_p = 32.400	—	—	—	—	f_p = 1.82	F_p = 32.4	f_p = 0.175	F_p = 32.4
	c. LOAD ON SNUBBER	—	—	P = 51.0	P = 1000.0	—	—	—	—	P = 932.5	P = 1000 k	P = 90.0	P = 1000

SALEM GENERATING STATION

STEAM GENERATOR SUPPORT

f_b = BENDING STRESS, F_b =
f_a = COMP. STRESS, F_a
f_p = BEARING STRESS, F_p
f_T =, F_T = TENSILE STRESS
f_v = SHEAR STRESS, F_v
KIPS = 1000 LBS
f_{TB} = BOLT TENSILE STRESS

LOADING COMBINATION: 5 [FAULTED CONDITION]

NORMAL LOADS + PIPE RUPTURE LOADS + DESIGN BASE EARTHQUAKE. LOADS IN KIPS

	MEMBER IDENTIFICATION	R.C. PUMP SUCTION PIPE RUPTURE DESIGN LOADS PIPE BREAK + SEISMIC = −2,555.0 K UP; NORMAL = 1,235.0 K DN; HORIZ. LOAD = 2062. K		HOT LEG PIPE RUPTURE. DESIGN LOADS HORIZ. = 3,232.0 K; VERTICAL = 1,420.0 K DOWN		STEAM PIPE RUPTURE LOAD. DESIGN LOADS HORIZ. ON BELLY BEND = 4,090. K; VERTICAL = 2,983.0 K DOWN	
		CALCULATED STRESSES K.S.I	ALLOWABLE STRESSES K.S.I	CALCULATED STRESSES K.S.I	ALLOWABLE STRESSES K.S.I.	CALCULATED STRESSES K.S.I.	ALLOWABLE STRESSES K.S.I
1	POST 14WF202 UNDER S.G PADS	$f_T = 19.23$ $f_a = 7.198$	$F_T = 42.0$ $F_a = 40.425$	$f_a = 5.977$	$F_a = 40.42$	$f_a = 12.56$	$F_a = 40.425$
	$1\frac{1}{2}$" Φ VASCOMAX BOLTS	$f_{TB} = 135.0$	$F_{TB} = 165.3$	—	—	—	—
2	BEAMS UNDER THE 14WF202 POST a. 36WF280	$f_b = 25.09$ $f_v = 23.12$	$F_b = 42.0$ $F_v = 26.25$	$f_b = 7.932$	$F_b = 42.0$	$f_b = 23.945$ $f_v = 19.69$	$F_b = 42.0$ $F_v = 26.25$
	b. PLATE GIRDER	$f_b = 11.62$ $f_v = 16.278$	$F_b = 42.0$ $F_v = 26.25$	$f_b = 14.796$	$F_b = 42.0$	$f_b = 33.188$ $f_v = 20.04$	$F_b = 42.0$ $F_V = 26.25$
3	BEAMS FRAMING INTO 14WF320. EL 94'-1" a. 36WF280	$f_b = 25.87$ $f_v = 15.803$ $f_a = 13.457$	$F_b = 42.0$ $F_v = 26.25$ $F_a = 37.85$	$f_b = 12.954$	$F_b = 42.0$	$f_b = 26.44$ $f_v = 19.26$	$F_b = 42.0$ $F_v = 26.25$
	b = PLATE GIRDER	$f_b = 30.05$ $f_v = 17.46$ $f_a = 11.40$	$F_b = 42.0$ $F_v = 26.25$ $F_a = 37.85$	$f_b = 8.88$	$F_b = 42.0$	$f_b = 13.257$ $f_v = 10.12$	$F_b = 42.0$ $F_v = 26.25$
4	COLUMN 14WF320	$f_a = 10.25$ $f_T = 16.24$	$F_a = 38.81$ $F_T = 42.0$	—	—	—	—
	COLUMN 14WF426	$f_a = 15.41$ $f_T = 21.192$	$F_a = 39.67$ $F_T = 42.0$	$f_b = 3.557$	$F_b = 42.0$	$f_a = 9.147$	$F_a = 39.67$
5	$8\frac{1}{2}$" Φ PINS	$f_p = 33.71$ $f_b = 88.17$ $f_v = 20.85$	$F_p = 97.0$ $F_b = 97.00$ $F_v = 60.25$	$f_p = 6.44$ $f_b = 18.0$ $f_v = 3.866$	$F_p = 97.0$ $F_b = 97.0$ $F_v = 60.25$	$f_p = 13.603$ $f_p = 28.593$ $f_v = 8.155$	$F_p = 97.0$ $F_b = 97.0$ $F_V = 60.25$
	BEARING ON 4" PLS	$f_T = 36.04$ $f_p = 33.71$	$F_T = 42.0$ $F_p = 42.0$	$f_p = 6.44$	$F_p = 42.0$	$f_p = 13.603$	
6	27WF177-TIES	—	—	$f_T = 20.75$	$F_T = 42.0$	—	—
	$2\frac{3}{4}$" Φ A-490 BOLTS	—	—	$f_T = 82.16$	$F_T = 115.0$	—	—
7	HORIZONTAL PLATE GIRDERS AT EL 100'-8¼" FLG PL 17"x2½" WEB PL 26"x2"	$f_b = 17.79$ $f_v = 16.88$	$F_b = 42.0$ $F_v = 26.25$	$f_b = 36.53$ $f_v = 22.6$	$F_b = 42.0$ $F_v = 26.25$	—	—
8	3" SHEAR PLATES EL. 100'-8¼"	$f_p = 14.83$	$F_p = 42.0$	$f_p = 29.87$	$F_p = 42.0$	—	—
9	DIAGONAL BRACING MEMBERS 14WF127	$f_a = 21.44$ OR $f_T = 20.05$	$F_a = 38.209$ $F_T = 42.0$	—	—	—	—
10	SHEAR BLOCK BEAM 14WF158	$f_p = 23.4$ $f_a = 27.99$	$F_p = 42.0$ $F_a = 40.08$	—	—	—	—
11	EMBEDDED STEEL a. 6" Φ ANCHOR BOLT	$f_T = 41.52$	$F_T = 43.0$	—	—	—	—
	b. 4" PLS AT PIN HOLE	$f_T = 36.57$	$F_T = 42.0$	$f_p = 6.44$	$F_p = 42.0$	$f_p = 13.60$	$F_p = 42.0$
12	BELLY BEND AT EL. 130'-0" a. PL 2½"x2'-6"	—	—	$f_T = 3.105$	$F_T = 36.0$	$f_T = 35.5$	$F_T = 36.0$
	b. PL 2¼"x5'-4"	—	—	$f_p = 0.177$	$F_p = 36.0$	$f_p = 1.997$	$F_p = 36.0$
	c. LOAD ON SNUBBER	—	—	P = 90.0 K	P = 1000 K	P = 1022 K	P = 1000 K

SALEM GENERATING STATION

REACTOR COOLANT PUMP SUPPORTS

NOMENCLATURE:

- f_b = } BENDING STRESS; F_b = }
- f_a = } COMPRESSIVE STRESS; F_a = }
- F_v = SHEAR STRESS
- f_T = } TENSILE STRESS; F_T = }
- f_v = SHEAR STRESS
- f_p = } BEARING STRESS; F_p = }
- K = 1000 LBS

		LOADING COMB: 1		LOADING COMB: 2		LOADING COMB: 3 [EMERGENCY CONDITION]						LOADING COMB: 4	
		NORMAL LOADS FLOODED CONDITION LOADS IN KIPS		NORMAL LOADS + OPERATING BASE EARTHQUAKE. LOADS IN KIPS		NORMAL LOADS + PIPE RUPTURE LOADS. LOADS IN KIPS						[FAULTED CONDITION] NORMAL LOADS + DESIGN BASE EARTHQUAKE. LOADS IN KIPS	
		NORMAL LOAD FLOODED = 224.0 K		NORMAL + SEISMIC VERTICAL = 238.0K HORIZONTAL = 30.0K		R.C. PUMP SUCTION PIPE RUPTURE - DESIGN LOADS				R.C. PUMP DISCHARGE PIPE RUPTURE - DESIGN LOADS		NORMAL LOAD + SEISMIC LOAD = 262.0 K HORIZONTAL SEISMIC = 56.0 K	
						NORMAL = 172.0K HORIZONTAL BREAK = 2000K. MOMENT = 11,600'K		NORMAL = 172K PIPE RUPTURE LOAD VERTICAL UP = -3,130.0K		NORMAL = 172K PIPE BREAK HORIZONTAL = 1410.0K MOMENT = 5,640.0'K			
	MEMBER IDENTIFICATION	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I
1	BEAMS UNDER R.C. PUMP PADS. SHOWN IN SECTION 4-4. DWG. 208906A8823	$f_b = 0.82$ $f_v = 0.3$	$F_b = 28.0$ $F_v = 16.8$	$f_b = 0.87$ $f_v = 0.318$	$F_b = 37.24$ $F_v = 22.34$	$f_b = 24.59$ $f_v = 12.03$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 10.78$ $f_v = 3.95$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 6.4$ $f_v = 4.7$	$F_b = 37.8$ $F_v = 23.625$	$f_b = .96$ $f_v = .35$	$F_b = 37.8$ $F_v = 23.625$
	R.C. PUMP HOLD DOWN BOLT - 4" ϕ VASCOMAX 300 CVM	—		—	—	$f_T = 227.0$	$F_T = 228.0$ (.95 Fy)	$f_T = 88.8$	$F_T = 228.0$	$f_T = 22.88$	$F_T = 228.0$	—	—
2	VERTICAL PLATE GIRDER. SHOWN IN SECTION 15-15 DWG. 208906 A8823	$f_b = 0.7$ $f_v = 0.6$	$F_b = 28.0$ $F_v = 16.8$	$f_b = 0.74$ $f_v = 0.63$	$F_b = 37.24$ $F_v = 22.34$	$f_b = 12.20$ $f_v = 16.0$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 9.46$ $f_v = 8.3$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 8.28$ $f_v = 7.3$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 0.818$ $f_v = 0.701$	$F_b = 37.8$ $F_v = 23.625$
	HORIZONTAL PLATE GIRDER. SHOWN IN SECTION 15-15 DWG. 208906 A 8823 DWG. 208905 A 8823	—	—	$f_b = 0.48$ $f_v = 0.18$	$F_b = 37.24$ $F_v = 22.34$	$f_b = 32.2$ $f_v = 12.56$	$F_b = 37.8$ $F_v = 23.625$	—	—	$f_b = 22.79$ $f_v = 8.85$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 0.895$ $f_v = 0.335$	$F_b = 37.8$ $F_v = 23.6$[illegible]
3	VERTICAL GIRDER. SHOWN IN. SECTION 7-7. DWG. 208906A8823 DWG. 208905 A 8823	$f_b = 0.425$ $f_v = 0.688$	$F_b = 28.0$ $F_v = 16.8$	$f_b = 0.45$ $f_v = 0.731$	$F_b = 37.24$ $F_v = 22.34$	$f_b = 16.3$ $f_v = 14.65$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 6.13$ $f_v = 5.47$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 2.76$ $f_v = 2.4$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 0.49$ $f_v = 0.80$	$F_b = 37.8$ $F_v = 23.625$
	HORIZONTAL GIRDER WHICH IS TIED TO CONCRETE WALL. SHOWN IN SECTION 7-7.	—	—	$f_b = 0.3945$ $f_v = 0.155$	$F_b = 37.24$ $F_v = 22.34$	$f_b = 26.3$ $f_v = 10.29$	$F_b = 37.8$ $F_v = 23.625$	—	—	$f_b = 9.10$ $f_v = 1.00$	$F_b = 37.8$ $F_v = 23.625$	$f_b = 0.78$ $f_v = 0.29$	$F_b = 37.8$ $F_v = 23.625$
	TIE BOLTS - 2½" ϕ A-325 (CONCRETE)	—	—	$f_T = 0.75$	$f_T = 53.4$	$f_t = 50.0$	$F_T = 60.0$	—	—	$f_T = 35.25$	$F_T = 60.0$	$f_t = 1.4$	$F_T = 60.0$

SALEM GENERATING STATION

REACTOR COOLANT PUMP SUPPORTS

NOMENCLATURE:

- f_b = } BENDING STRESS
- F_b = }
- f_a = } COMPRESSIVE STRESS
- F_a = }
- F_v = SHEAR STRESS
- f_T = } TENSILE STRESS
- F_T = }
- f_v = SHEAR STRESS
- f_p = } BEARING STRESS
- F_p = }
- K = 1000 LBS

	MEMBER IDENTIFICATION	LOADING COMB: 1 NORMAL LOADS FLOODED CONDITION LOADS IN KIPS		LOADING COMB: 2 NORMAL LOADS + OPERATING BASE EARTHQUAKE. LOADS IN KIPS		LOADING COMB: 3 [EMERGENCY CONDITION] NORMAL LOADS + PIPE RUPTURE LOADS LOADS IN KIPS						LOADING. COMB: 4 [FAULTED CONDITION] NORMAL LOADS + DESIGN BASE EARTHQUAKE. LOADS IN KIPS	
		NORMAL LOAD FLOODED = 224.0 K		NORMAL + SEISMIC VERTICAL = 238.0K HORIZONTAL = 30.0K		R. C. PUMP SUCTION PIPE RUPTURE - DESIGN LOADS				R.C. PUMP DISCHARGE PIPE RUPTURE - DESIGN LOADS		NORMAL LOAD + SEISMIC LOAD = 262.0 K HORIZONTAL SEISMIC = 56.0 K	
						NORMAL = 172.0K HORIZONTAL BREAK = 2000K MOMENT = 11,600'K		NORMAL = 172K PIPE RUPTURE LOAD VERTICAL UP = -3,130.0K		NORMAL = 172K PIPE BREAK HORIZONTAL = 1410.0K MOMENT = 5,640.0'K			
		CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I
4	VERTICAL GIRDER SHOWN IN SECT. 16-16 DWG. 208906A8823	f_b = 0.398 f_v = 0.411	F_b = 28.0 F_v = 16.8	f_b = 0.423 f_v = 0.436	F_b = 37.24 F_v = 22.34	f_b = 12.17 f_v = 11.12	F_b = 37.8 F_v = 23.62	f_b = 5.19 f_v = 5.37	F_b = 37.8 F_v = 23.625	f_b = 3.09 f_v = 3.2	F_b = 37.8 F_v = 23.625	f_b = 0.465 f_v = 0.48	F_b = 37.8 F_v = 23.625
	HORIZONTAL GIRDER SHOWN ON SECT. 16-16. DWG 208906-A-8823	—	—	f_b = 0.40 f_v = 0.18	F_b = 37.24 F_v = 22.34	f_b = 26.73 f_v = 12.5	F_b = 37.8 F_b = 23.625	—	—	f_b = 10.69 f_v = 1.04	F_b = 37.8 F_v = 23.625	f_b = 0.75 f_v = 0.336	F_b = 37.8 F_v = 23.625
5	VERTICAL GIRDER. SHOWN IN SECT. 6-6. DWG 208906-A 8823	f_b = 0.772 f_v = 0.688	F_b = 28.0 F_v = 16.8	f_b = 0.820 f_v = 0.710	F_b = 37.24 F_v = 22.34	f_b = 31.0 f_v = 16.07	F_b = 37.8 F_v = 23.625	f_b = 9.04 f_v = 7.83	F_b = 37.8 F_v = 23.625	f_b = 4.97 f_v = 4.1	F_b = 37.8 F_v = 23.625	f_b = 0.902 f_v = 0.804	F_b = 37.8 F_v = 23.625
	HORIZONTAL GIRDER SHOWN IN SECT. 6-6. TIED TO 24WF160	—	—	f_b = 0.252 f_v = 0.157	F_b = 37.24 F_v = 22.34	f_b = 16.8 f_v = 10.5	F_b = 37.8 f_v = 23.625	—	—	f_b = 11.8 f_v - 7.4	F_b = 37.8 F_v = 23.625	f_b = 0.47 f_v = 0.29	F_b = 37.8 F_v = 23.625
6	24WF 160 TIES TO CONCRETE WALL	—	—	f_T = 0.381	F_T = 33.5	f_T - 25.4	F_T = 37.8	—	—	f_T = 17.9	F_T = 37.8	f_T = 0.71	F_T = 37.[illegible]
	2½"Φ-A 490 BOLTS WITH 24WF TIES	—	—	f_T = 1.125	F_T - 69.0	f_T = 75.0	F_T = 103.5	—	—	f_T = 52.87	F_T = 103.5	f_T = 2.1	F_T = 103.5
7	6" DIA. (CAMVAC-200) PINS.	f_p = 1.66 f_b = 4.9 f_v = 1.18	F_p = 148.95 F_b = 99.0 F_v = 66.0	f_p = 1.76 f_b = 5.2 f_v = 1.25	F_p = 148.95 F_b = 132.0 F_v - 88.0	f_p = 35.7 f_b = 105.6 f_v = 25.5	F_p = 148.95 F_b = 148.95 F_v = 93.0	f_p = 22.2 f_b = 65.9 f_v = 15.9	F_p = 148.95 F_b = 148.95 F_v = 93.0	f_p = 11.10 f_b = 32.95 f_v = 7.95	F_p = 148.95 F_b = 148.95 F_v = 93.0	f_p = 1.94 f_b = 5.73 f_v = 1.38	F_p = 148.95 F_b = 148.95 F_v = 93.0
	3" PLS FOR 6"Φ PINS	f_p = 1.66	F_p = 37.8	f_p = 1.76	F_p = 37.8	f_p = 35.7	F_p = 37.8	f_p = 22.2	F_p = 37.8	f_p = 11.10	F_p = 37.8	f_p = 1.94	F_p = 37.8

SALEM GENERATING STATION

REACTOR COOLANT PUMP SUPPORTS

	NOMENCLATURE:	LOADING COMB: 1		LOADING COMB: 2		LOADING COMB: 3 [EMERGENCY CONDITION]						LOADING. COMB: 4	
	f_b = } BENDING STRESS; F_b = } f_a = } COMPRESSIVE STRESS; F_a = } F_v = SHEAR STRESS f_T = } TENSILE STRESS; F_T = } f_v = SHEAR STRESS f_p = } BEARING STRESS; F_p = } K = 1000 LBS	NORMAL LOADS FLOODED CONDITION LOADS IN KIPS		NORMAL LOADS + OPERATING BASE EARTHQUAKE. LOADS IN KIPS		NORMAL LOADS + PIPE RUPTURE LOADS LOADS IN KIPS						[FAULTED CONDITION] NORMAL LOADS + DESIGN BASE EARTH QUAKE. LOADS IN KIPS	
		NORMAL LOAD FLOODED = 224.0 k		NORMAL + SEISMIC VERTICAL = 238.0 k HORIZONTAL = 30.0 k		R. C. PUMP SUCTION PIPE RUPTURE - DESIGN LOADS NORMAL = 172.0 k HORIZONTAL BREAK = 2000 k. MOMENT = 11,600 'k		NORMAL = 172 K PIPE RUPTURE LOAD VERTICAL UP = 3,130.0 K		R.C. PUMP DISCHARGE PIPE RUPTURE - DESIGN LOADS NORMAL = 172. k PIPE BREAK HORIZONTAL = 1410.0 k MOMENT = 5,640.0 'k		NORMAL LOAD + SEISMIC LOAD = 262.0 k HORIZONTAL SEISMIC = 56.0 k	
	MEMBER IDENTIFICATION	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.
8	14 WF 202 COLUMNS	$f_a = 1.29$	$F_a = 22.97$	$f_a = 1.37$	$F_a = 30.55$	$f_a = 28.$ KSI OR $f_T = 23.4$	$F_a = 35.13$ $F_T = 37.8$	$f_T = 17.0$	$F_T = 37.8$	f_a = 8.0 OR f_T = 8.0	$F_a = 35.13$ $F_T = 37.8$	$f_a = 1.5$	$F_a = 35.13$
9	SHEAR BEAM 14WF202	—	—	$f_p = 0.9$ $f_a = 0.9$	$F_p = 37.8$ $F_a = 30.55$	$f_p = 4.5$ $F_a = 4.5$	$F_p = 37.8$ $F_a = 34.45$	—	—	—	—	$f_p = 1.68$ $f_a = 1.68$	$F_p = 37.8$ $F_a = 34.45$
10	DIAGONAL 14WF87	—	—	$f_a = 1.65$ OR $f_T = 1.65$	$F_a = 29.77$ $F_T = 33.5$	$f_a = 10.4$ OR $f_T = 10.4$	$F_a = 16.65$ OR $F_T = 37.8$	—	—	—	—	$f_a = 3.08$ OR $f_t = 3.08$	$F_a = 33.57$ $F_T = 37.8$
11	EMBEDDED STEEL. 3"- THICK PLATES FOR LOWER PINS.	$f_p = 1.66$	$F_p = 37.8$	$f_p = 1.763$	$F_p = 37.8$	$f_p = 37.3$	$F_p = 37.8$	$f_p = 22.2$	$F_p = 37.8$	$f_p = 11.1$	$F_p = 37.8$	$f_p = 1.94$	$F_p = 37.8$
12	5"-THICK PLATES AT EL. 92'-0. FOR UPPER 6"φ PINS.	—	—	—	—	$f_T = 18.33$ $f_b = 27.0$	$F_T = 36.0$ $F_b = 36.0$	$f_T = 13.00$ $f_b = 19.6$	$F_T = 36.0$ $F_b = 36.0$	$f_T = 6.5$ $f_b = 9.8$	$F_T = 36.0$ $F_b = 36.0$	—	—

SALEM GENERATING STATION

REACTOR COOLANT PUMP SUPPORTS

NOMENCLATURE:

- f_b = BENDING STRESS
- F_b = BENDING STRESS
- f_a = COMPRESSIVE STRESS
- F_a = COMPRESSIVE STRESS
- f_T = TENSILE STRESS
- F_T = TENSILE STRESS
- f_p = BEARING STRESS
- F_p = BEARING STRESS
- f_v = SHEAR STRESS
- F_v = SHEAR STRESS
- K = 1000 LBS

LOADING COMB: 5 [FAULTED CONDITION]

NORMAL LOADS + PIPE RUPTURE LOADS + DESIGN BASE EARTHQUAKE LOADS

LOADS IN KIPS

	MEMBER IDENTIFICATION	R.C. PUMP SUCTION PIPE RUPTURE + NORMAL + SEISMIC LOADS } DESIGN LOADS				R.C. PUMP DISCHARGE PIPE RUPTURE + NORMAL + SEISMIC LOADS.	
		SEISMIC + NORMAL LOAD = 262 k HORIZONTAL PIPE BREAK + SEISMIC = 2056.0 k MOMENT = 11,600'k		SEISMIC + NORMAL = 262.0 k SEISMIC HORZONTAL = 56.0 k PIPE RUPTURE VERTICAL UP = 3130.0 k		SEISMIC + NORMAL = 262.0 k PIPE BREAK HORZONTAL = 1456.0 k MOMENT = 5,640.0'k	
		CALCULATED STRESS IN K.S.I.	ALLOWABLE STRESS IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES. IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.
1	BEAMS UNDER R.C. PUMP PADS. SHOWN IN SECTION 4-4. DWG. 208906-A-8823	f_b = 24.92 f_v = 12.15	F_b = 42.0 F_v = 26.25	f_b = 11.11 f_v = 4.07	F_b = 42.0 F_v = 26.25	f_b = 6.73 f_v = 4.82	F_b = 42.0 F_v = 26.25
	R.C. PUMP HOLD DOWN BOLT - 4"φ VASCOMAX 300 CVM	f_T = 227.0	F_T = 239.9	f_T = 88.8	F_T = 239.0	f_T = 22.88	F_T = 239.9
2	VERTICAL PLATE GIRDER SHOWN IN SECTION 15-15. DWG 208906 A 8823	f_b = 12.48 f_v = 16.24	F_b = 42.0 F_v = 26.25	f_b = 9.74 f_v = 8.54	F_b = 42.0 F_v = 26.25	f_b = 8.56 f_v = 7.54	F_b = 42.0 F_v = 26.25
	HORIZONTAL PLATE GIRDER. SHOWN IN SECTION 15-15. DWG 208906-A-8823 DWG 208905 A 8823	f_b = 33.095 f_v = 12.895	F_b = 42.0 F_v = 26.25	—	—	f_b = 23.675 f_v = 9.185	F_b = 42.0 F_v = 26.25
3	VERTICAL GIRDER. SHOWN IN SECTION 7-7. DWG 208905-A-8823. DWG 208906 A 8823	f_b = 16.47 f_v = 14.92	F_b = 42.0 F_v = 26.25	f_b = 6.3 f_v = 5.74	F_b = 42.0 F_v = 26.25	f_b = 2.93 f_v = 2.67	F_b = 42.0 F_v = 26.25
	HORIZONTAL GIRDER WHICH IS TIED TO CONCRETE WALL. SHOWN IN SECTION 7-7. DWG 208906 A 8823	f_b = 27.3 f_v = 10.58	F_b = 42.0 F_v = 26.25	—	—	f_b = 9.83 f_v = 1.29	F_b = 42.0 F_v = 26.25
	TIE BOLTS - 2½"φ A-325. (CONCRETE)	f_T = 51.4	F_T = 67.0	—	—	f_T = 36.65	F_T = 67.0
4	VERTICAL GIRDER. SHOWN IN SECT. 16-16. DWG 208906-A-8823	f_b = 12.33 f_v = 11.29	F_b = 42.0 F_v = 26.25	f_b = 5.35 f_v = 5.45	F_b = 42.0 F_v = 23.625	f_b = 3.25 f_v = 3.37	F_b = 42.0 F_v = 23.625
	HORIZONTAL GIRDER SHOWN IN SECTION 16-16	f_b = 27.48 f_v = 12.836	F_b = 42.0 F_v = 26.25	—	—	f_b = 11.44 f_v = 1.376	F_b = 42.0 F_v = 26.25
5	VERTICAL GIRDER. SHOWN IN SECT. 6-6 DWG. 208906 A 8823	f_b = 31.31 f_v = 16.34	F_b = 42.0 F_v = 26.25	f_b = 9.35 f_v = 8.10	F_b = 42.0 F_v = 26.25	f_b = 5.28 f_v = 4.46	F_b = 42.0 F_v = 26.25
	HORIZONTAL GIRDER. SHOWN IN SECT. 6-6. TIED TO 24WF160.	f_b = 17.27 f_v = 10.79	F_b = 42.0 F_v = 26.25	—	—	f_b = 12.27 f_v = 7.69	F_b = 42.0 F_v = 26.25
6	24WF160 TIES TO CONCRETE WALL.	f_T = 26.111	F_T = 42.0	f_T = 0.711	F_T = 42.0	f_T = 18.611	F_T = 42.0
	2½"φ A-490 BOLTS WITH 24WF TIES.	f_T = 77.1	F_T = 115.0	f_T = 2.1	F_T = 115.0	f_T = 54.97	F_T = 115.0

SALEM GENERATING STATION

REACTOR COOLANT PUMP SUPPORTS

NOMENCLATURE:

- f_b = BENDING STRESS
- F_b = BENDING STRESS
- f_a = COMPRESSIVE STRESS
- F_a = COMPRESSIVE STRESS
- f_T = TENSILE STRESS
- F_T = TENSILE STRESS
- f_p = BEARING STRESS
- F_p = BEARING STRESS
- f_v = SHEAR STRESS
- F_v = SHEAR STRESS
- K = 1000 LBS

LOADING COMB. 5 [FAULTED CONDITION] (CONTINUED)
NORMAL LOADS + PIPE RUPTURE LOADS + DESIGN BASE EARTHQUAKE LOADS;
LOADS IN KIPS

MEMBER IDENTIFICATION	R.C. PUMP SUCTION PIPE RUPTURE + NORMAL + SEISMIC LOADS } DESIGN LOADS				R.C. PUMP DISCHARGE PIPE RUPTURE + NORMAL + SEISMIC LOADS.	
	SEISMIC + NORMAL LOAD = 262.^{k} HORIZONTAL PIPE BREAK + SEISMIC = 2056.0^k MOMENT = 11,600$^{'k}$		SEISMIC + NORMAL = 262.0^k SEISMIC HORIZONTAL = 56.0^k PIPE RUPTURE VERTICAL UP = 3130.0^k		SEISMIC + NORMAL = 262.0 K PIPE BREAK HORIZONTAL = 1450.0^k, MOMENT = 5640.0$^{'k}$	
	CALCULATED STRESS IN K.S.I.	ALLOWABLE STRESS IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.	CALCULATED STRESSES IN K.S.I.	ALLOWABLE STRESSES IN K.S.I.
7 6"-DIA. (CAM VAC-200) PINS.	f_p = 36.36 f_b = 107.56 f_v = 25.97	F_p = 165.5 F_b = 165.5 F_v = 103.5	f_p = 22.865 f_b = 67.86 f_v = 16.373	F_p = 165.5 F_b = 165.5 F_v = 103.5	f_p = 11.765 f_b = 34.91 f_v = 8.423	F_p = 165.5 F_b = 165.5 F_v = 103.5
3"- PLS FOR 6" φ PINS.	f_p = 36.76	F_p = 42.0	f_p = 22.865	F_p = 42.0	f_p = 11.765	F_p = 42.0
8 14 WF 202 COLUMNS	f_a = 28.51 OR f_T = 23.91	F_a = 39.11 F_T = 42.0	f_T = 17.0	F_T = 42.0	f_a = 8.51 OR f_T = 8.51	F_a = 39.11 F_T = 42.0
9 SHEAR BEAM 14WF 202	f_p = 5.07 f_a = 5.07	F_p = 18.65 F_a = 42.0	—	—	—	—
10 DIAGONAL 14WF 87	f_a = 11.4 OR f_T = 11.4	F_a = 18.65 F_T = 42.0	—	—	—	—
11 EMBEDDED STEEL - 3" THICK PLATES FOR LOWER PINS	f_p = 37.30	F_p = 42.0	F_p = 22.865	F_p = 42.0	f_p = 11.43	F_p = 42.0
12 5"- THICK PLATES AT EL. 92'-0" FOR UPPER 6" φ PINS	f_T = 18.33 F_b = 27.0	F_T = 40.0 F_b = 40.0	f_t = 13.0 f_b = 19.6	F_T = 40.0 F_b = 40.0	f_T = 6.5 f_b = 9.8	F_T = 40.0 F_b = 40.0