

SUMMARY CHART OF DUCT SHELL AND MISCELLANEOUS STRUCTURAL PLATE DEFICIENCIES AT SUPPORTS

SUPPORT No. AND FIELD SKETCH (FS) No.	RUSTED THIN AND THRU AREAS ADJACENT TO SADDLE	BUCKLING IN DUCT AT BOTTOM SADDLE		U.T. READINGS IN THIN AREAS ADJACENT TO SADDLE	OTHER U.T. READINGS IN BUCKLED AREA ADJACENT TO SADDLE	LOWER SADDLE SUPPORT GENERAL INSPECTION FINDINGS (GF)	SIDE BRACKET DEFICIENCIES	CRACKS IN SPLICE BAND TO DUCT WELD
		DEPTH	AREA					
1	----	----	----	----	.19 to .23	GF-19, 21, & 22	----	N/A
1.5	----	1" ±	2'-2" x 4'-2"	INACCESSIBLE		GF-19 THRU 22	----	N/A
2	3" x 18" & 6" x 18"	1 1/4" MAX	1'-8" x 2'-3"		.15 to .19	GF-19 THRU 22	----	N/A
2.5	3" AROUND 3 SIDES OF SADDLE	2 1/2" MAX	CONTINUOUS FROM ~8'-0" NORTH OF SADDLE LINE 2 PAST SADDLE LINE 3.5 (ENTIRE AREA IS RUSTED THIN &/OR THROUGH) REFER TO GF-1		.11 to .19	GF-19 THRU 21, & 23	----	N/A
3	3" x 12"	1 1/2" MAX			.11 to .16	GF-19 THRU 22	----	N/A
3.5	7" x 18"	2 1/2" MAX			.13 to .19	GF-19 THRU 22	----	N/A
4	3" x 18"	1 1/2" MAX	2'-0" x 2'-9"		.13 to .19	GF-19 THRU 22	----	N/A
4.5	----	2" MAX	2'-8" x 4'-2"		.20 to .24	GF-19 THRU 23	----	N/A
5	3" x 18"	1 1/2" ±	1'-8" x 2'-1"		.16 to .20	GF-19 THRU 22	----	1'-6" LONG
5.5	----	1 1/2" MAX	2'-1" x 2'-11"		.13 to .19	GF-19 THRU 22	----	N/A
6	3" x 18"	1 1/4" ±	1'-9" x 1'-10"		.16 to .19	GF-19 THRU 22	----	N/A
6.5	----	1 1/2" ±	2'-7" x 2'-8"		.21 to .19	GF-19 THRU 22	SUPPORT & BUCKSTAY RUSTED THIN & THRU CRACKED THRU WELDS & BOLT DEFICIENCIES	N/A
7	----	1 1/2" ±	2'-8" x 3'-4"			GF-22		4'-0" LONG
7.5	----	1" MAX	1'-10" x 3'-6"		.21 to .25	GF-19 THRU 22	----	N/A
8	----	1 1/2" MAX	2'-0" x 2'-2"		.21 to .24	GF-19 THRU 22	----	N/A
8.5	----	1 1/2" ±	1'-5" x 2'-5"		.19 to .24	GF-19 THRU 23	----	N/A
9	----	----	----		.21 to .24	GF-19 THRU 22	ASSEMBLY SEVERELY TORN & TWISTED	2'-0" LONG + 2 CRACKS & THIN & THRU AREAS
9.5	----	1 1/2" ±	1'-10" x 2'-2"		.21 to .23	GF-20	----	N/A
10	----	----	----		.21 to .24	GF-21	----	N/A
10.5	----	1 1/2" ±	1'-9" x 2'-8"		.19 to .23	GF-19 THRU 23	----	N/A
11	----	1 1/2" ±	1'-6" x 2'-2"		.19 to .23	GF-19 & 21	TOP OF SUPPORT MISSING	N/A
11.5	----	3/4" MAX	2'-6" x 2'-11"		.19 to .23	GF-20 & 23	----	N/A
12	----	2" ±	1'-10" x 2'-7"		.15 to .17	GF-19 THRU 22	----	2'-0" LONG + 1 OTHER CRACK
12.5	----	1" MAX	2'-8" x 3'-2"		.21 to .25	GF-19 & 20	----	N/A
13	1 1/2" CRACK IN DUCT (S.W. CORNER OF SADDLE R)	1 1/4" ±	1'-9" x 2'-3"		.12 to .16	GF-19 THRU 21	----	N/A
13.5	4" & 2" CRACKS IN DUCT (E. CORNERS OF SADDLE R)	1" ±	2'-0" x 2'-4"		.12 to .19	GF-20 & 23	----	N/A
14	----	----	----		.21 to .25	GF-19, 20, & 23	----	N/A
14.5	----	1 1/2" ±	2'-0" x 2'-8"		.18 to .23	GF-20 & 23	----	N/A
15	1" x 12" & 3" x 12"	1 1/2" ±	8" x 1'-6"		.14 to .17	GF-20	----	N/A

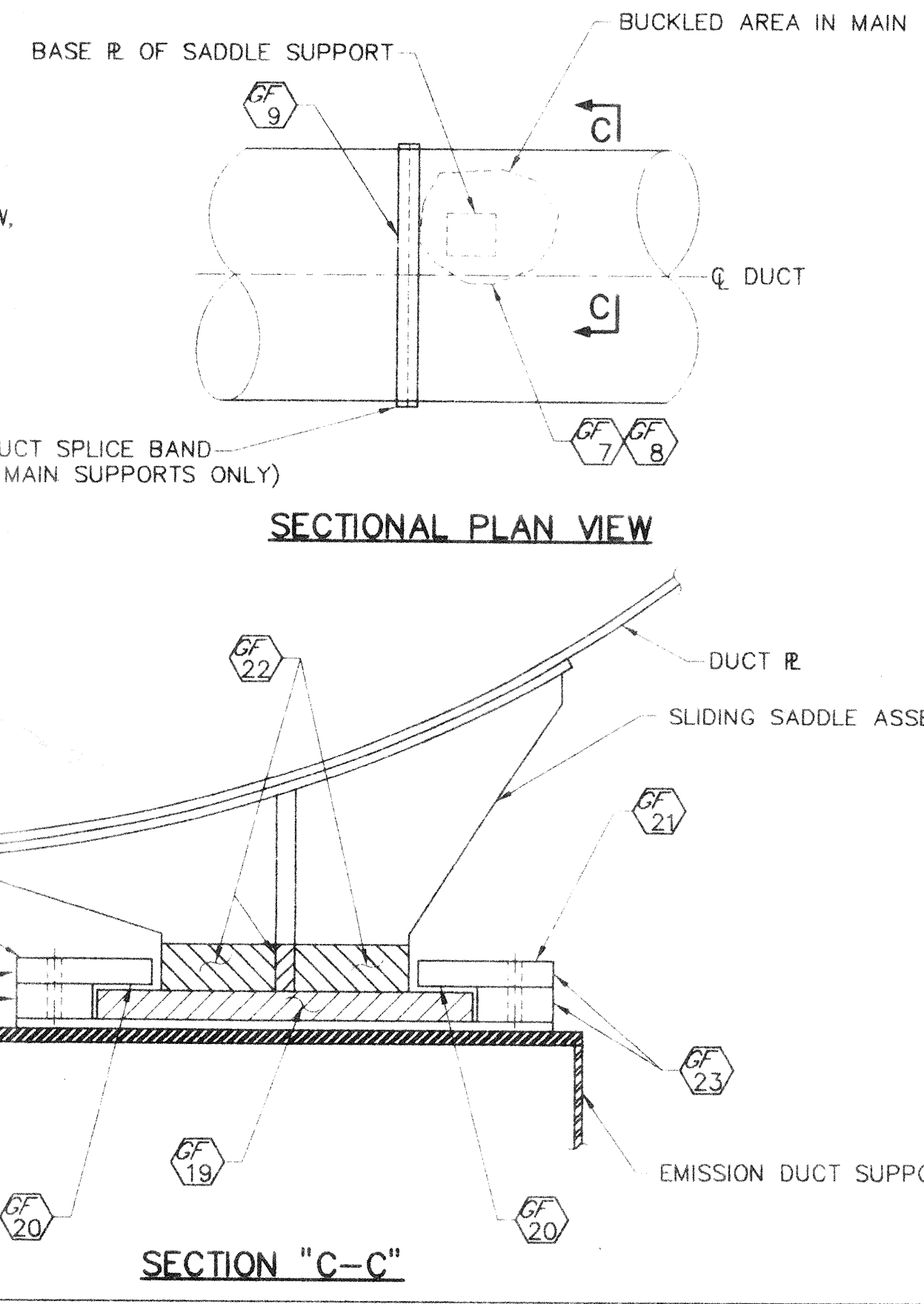
LEGEND: ---- DENOTES NO DEFICIENCY IN THIS LOCATION  
 N/A: DENOTES NOT APPLICABLE  
 U.T.: DENOTES ULTRASONIC THICKNESS  
 FS: DENOTES FIELD SKETCHES  
 GF: DENOTES GENERAL INSPECTION FINDING

GENERAL INSPECTION FINDINGS OF LOWER SADDLE SUPPORTS

GENERAL INSPECTION FINDINGS OF EMISSION DUCT SADDLE SUPPORTS. FOR SPECIFIC LOCATIONS OF THE DEFICIENCIES REFER TO THE SUMMARY CHART, SECTIONAL PLAN VIEW, SECTION "C-C", & FIELD SKETCHES FS-1 TO FS-15.

NOTE: ALL SUPPORTS APPEAR TO BE FROZEN WITH NO VISIBLE MOVEMENT.

- GF 19 THERE IS HEAVY RUST LAYERING OF THE LOWER HORIZONTAL R OF THE SADDLE ASSEMBLY, WITH 10% - 25% APPARENT SECTION LOSS.
- GF 20 THERE IS 3/8" ± RUST PACKING AND SEPARATION AT THE HORIZONTAL SADDLE R TO GUIDE R.
- GF 21 THERE IS HEAVY RUST LAYERING ON THE GUIDE R'S AND THEIR CONNECTION BOLTS, WITH UP TO 25% SECTION LOSS.
- GF 22 THE LOWER 3" ± OF THE VERTICAL SADDLE R'S EXHIBIT HEAVY RUST LAYERING & ARE THINNED TO 3/16" ±, WHICH IS APPROXIMATELY 63% SECTION LOSS.
- GF 23 THE GUIDE R BOLTS HAVE BEEN REMOVED AND R'S MOVED WEST AND THEN WELDED IN PLACE, MOVEMENT WAS TYPICALLY 1" - 2", DEPENDING ON THE DEPTH OF BUCKLING IN THE MAIN.



GENERAL INSPECTION FINDINGS

GENERAL INSPECTION FINDINGS OF EMISSION DUCT SHELL R, SIDE BRACKETS, WALKWAYS, RAIL SUPPORTS, AND CONCRETE FOUNDATIONS.

EMISSION DUCT SHELL R

- GF 1 AN 18" x 100'-0" ± LONG AREA OF SHELL R OVER THE COKE WHARF IS BUCKLED AND RUSTED THIN. (DENTS EASILY WITH A HAMMER AND ULTRASONIC THICKNESS READINGS TAKEN RANGE FROM .11 TO .19.) THREE (3) RUSTED THROUGH AREAS WERE ALSO FOUND AT THIS LOCATION. (REFER TO DWG. 7672-1, SECTION "A-A", & THE SUMMARY CHART.)
- GF 2 THE SHELL R IS TYPICALLY CRACKED BY 3" - 8" AT THE TOE OF THE MAIN RAIL SUPPORTS. (REFER TO SECTION "A-A" & DETAIL 1.)
- GF 3 THE SHELL R IS TYPICALLY CRACKED BY 1" - 2" AT THE TOE OF THE INTERMEDIATE RAIL SUPPORTS. (REFER TO SECTION "A-A" & DETAIL 1.)
- GF 4 THE LOWER WEST SIDE 90° AREA OF THE SHELL R WAS INACCESSIBLE FOR INSPECTION. THESE AREAS DISPLAY RUST PITTING AND SLIGHT GOUGING THROUGHOUT. (REFER TO SECTION "A-A".)
- GF 5 A 6" WIDE AREA OF SHELL R IS HEAVILY RUST LAYERED THROUGHOUT SUPPORTS No. 1 THROUGH 10 AND SPORADICALLY FROM SUPPORTS No. 10 THROUGH 15. THE AREA IS SUSPECTED OF BEING THIN. (REFER TO DWG. 7672-1, SECTION "A-A", & DETAIL 1.)
- GF 6 AT TEN (10) OF TWENTY-NINE (29) SADDLES THE SHELL R WAS FOUND TO BE RUSTED THIN AND THRU OR CRACKS WERE FOUND AT THE TOE OF THE CONNECTION WELD. (REFER TO DWG. 7672-1, SECTION "A-A" & THE SUMMARY CHART.)
- GF 7 AT TWENTY-FIVE (25) OF TWENTY-NINE (29) SADDLES THE DUCT BUCKLES IN AT VARIOUS DEPTHS, SUBSEQUENTLY IT IS ASSUMED THAT THE DUCT HAS DROPPED IN ELEVATION. (REFER TO SECTION "A-A", THE SECTIONAL PLAN VIEW, & THE SUMMARY CHART.)
- GF 8 ULTRASONIC THICKNESS READINGS (RANGING FROM .11 TO .25) WERE TAKEN ADJACENT TO THE SADDLES. AT FOURTEEN (14) LOCATIONS 36% TO 56% SECTION LOSS WAS EVIDENT. THE REMAINDER OF THE AREAS EXPERIENCED 16% TO 32% SECTION LOSS. (REFER TO SECTION "A-A", THE SECTIONAL PLAN VIEW, & THE SUMMARY CHART.)
- GF 9 THE SPLICE BAND TO DUCT WELD WAS FOUND TO BE CRACKED AT FOUR (4) LOCATIONS NEAR THE BOTTOM SUPPORT SADDLE OR THE SIDE BRACKET. AT LOWER SADDLE SUPPORT No. 5 THE CRACKED WELD HAS PROPAGATED TO A 1" GAP. (REFER TO DWG. 7672-1, THE SECTIONAL PLAN VIEW, THE SUMMARY CHART, & FS SHEETS 5, 7, 9, & 12.)

SIDE BRACKETS

- GF 10 FOUR (4) SIDE BRACKETS (COLUMN LINES 6.5, 7, 9, & 11) WERE FOUND TO HAVE SIGNIFICANT DEFICIENCIES INCLUDING MISSING KEEPER BARS, CRACKED WELDS, STRETCHED AND MISSING BOLTS, AND ENTIRE ASSEMBLIES TORN AND TWISTED. OTHER SIDE BRACKETS APPEAR TO BE FROZEN WITH SLIGHT SURFACE RUSTING, BUT OTHERWISE ARE IN FAIR CONDITION. (REFER TO DWG. 7672-1, SECTION "A-A", THE SUMMARY CHART, & FS SHEETS 6.5, 7, 9, & 11.)

WALKWAYS

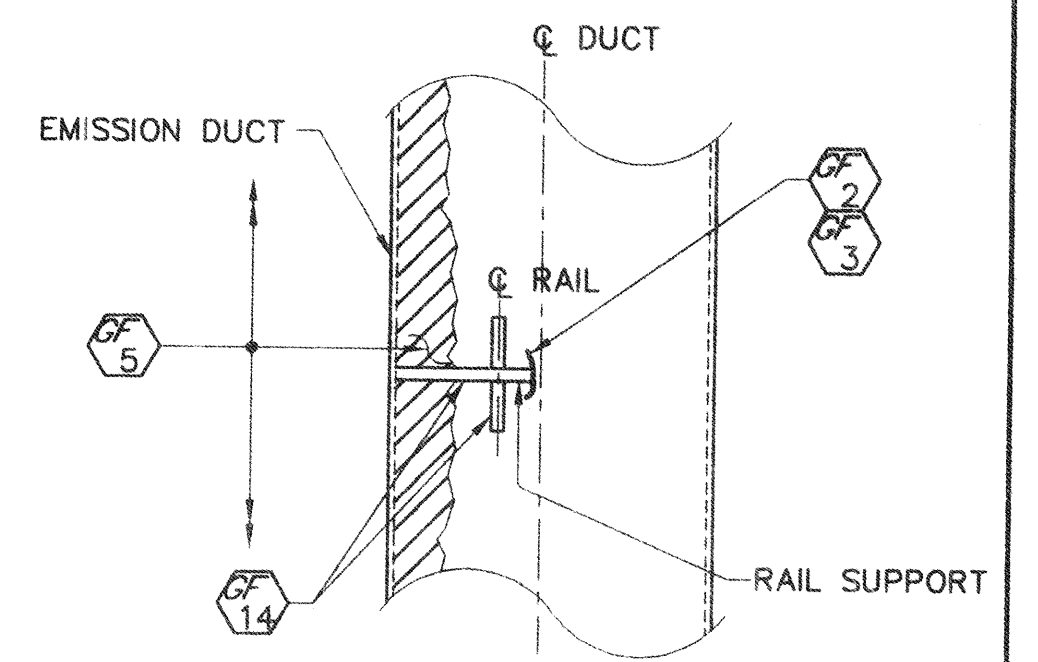
- GF 11 THE 8 ± SOUTHERN MOST WALKWAY SUPPORTS OVER THE COKE WHARF WERE FOUND TO BE HEAVILY RUST LAYERED AND RUSTED THIN. (REFER TO DWG. 7672-1 & SECTION "A-A".)
- GF 12 SEVEN (7) KICK R'S WERE FOUND TO BE EXTREMELY LOOSE. (REFER TO DWG. 7672-1 & SECTION "A-A".)
- GF 13 THE GRATING IS RUSTED THIN AND THRU IN A 4" WIDE x 3'-0" ACROSS AREA. THIS WAS FOUND TO BE TYPICAL AT ALL GRATING SPLICES ABOVE BATTERY No. 2 AND THE SIX (6) SOUTH SPLICES ABOVE BATTERY No. 1. (REFER TO DWG. 7672-1, SECTION "A-A", & DETAIL 2.)

RAIL SUPPORTS

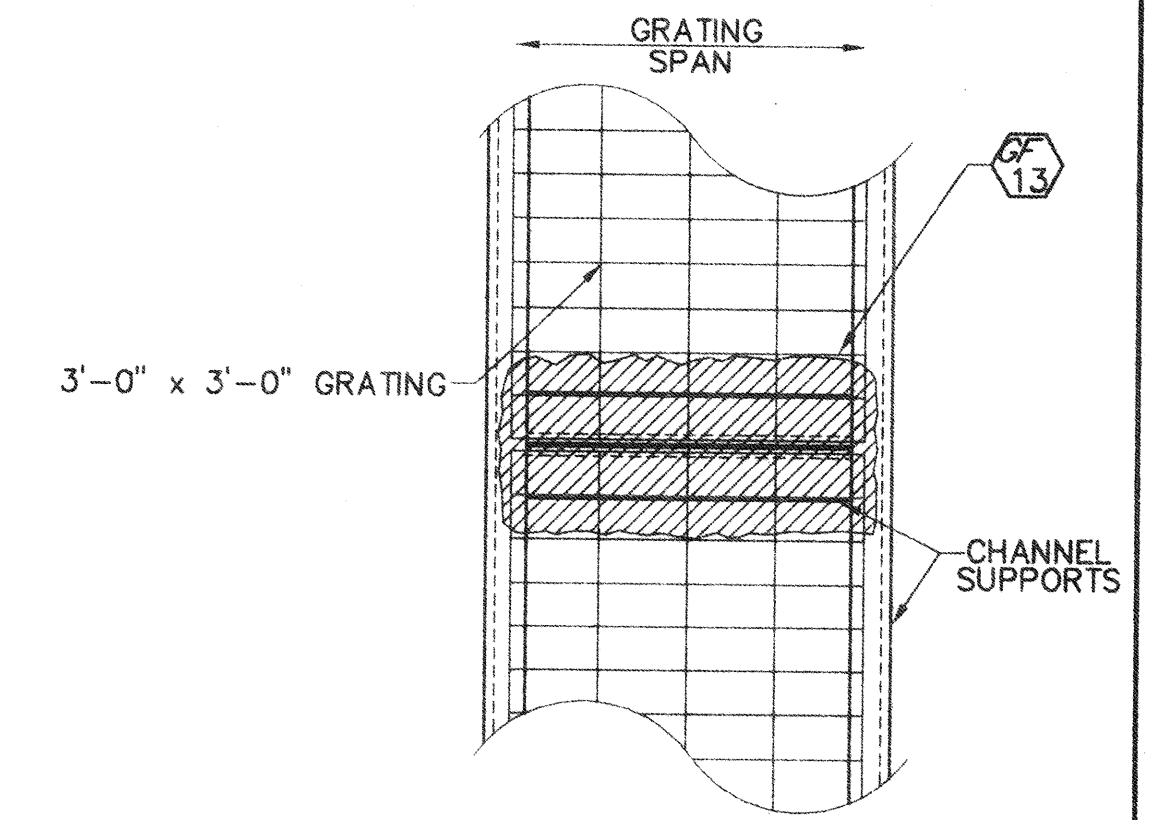
- GF 14 THE STIFFENER R'S THROUGHOUT ARE HEAVILY RUST LAYERED AND RUSTED THIN TO 1/8" ±. (REFER TO SECTION "A-A" & DETAIL 1.)

CONCRETE PIERS

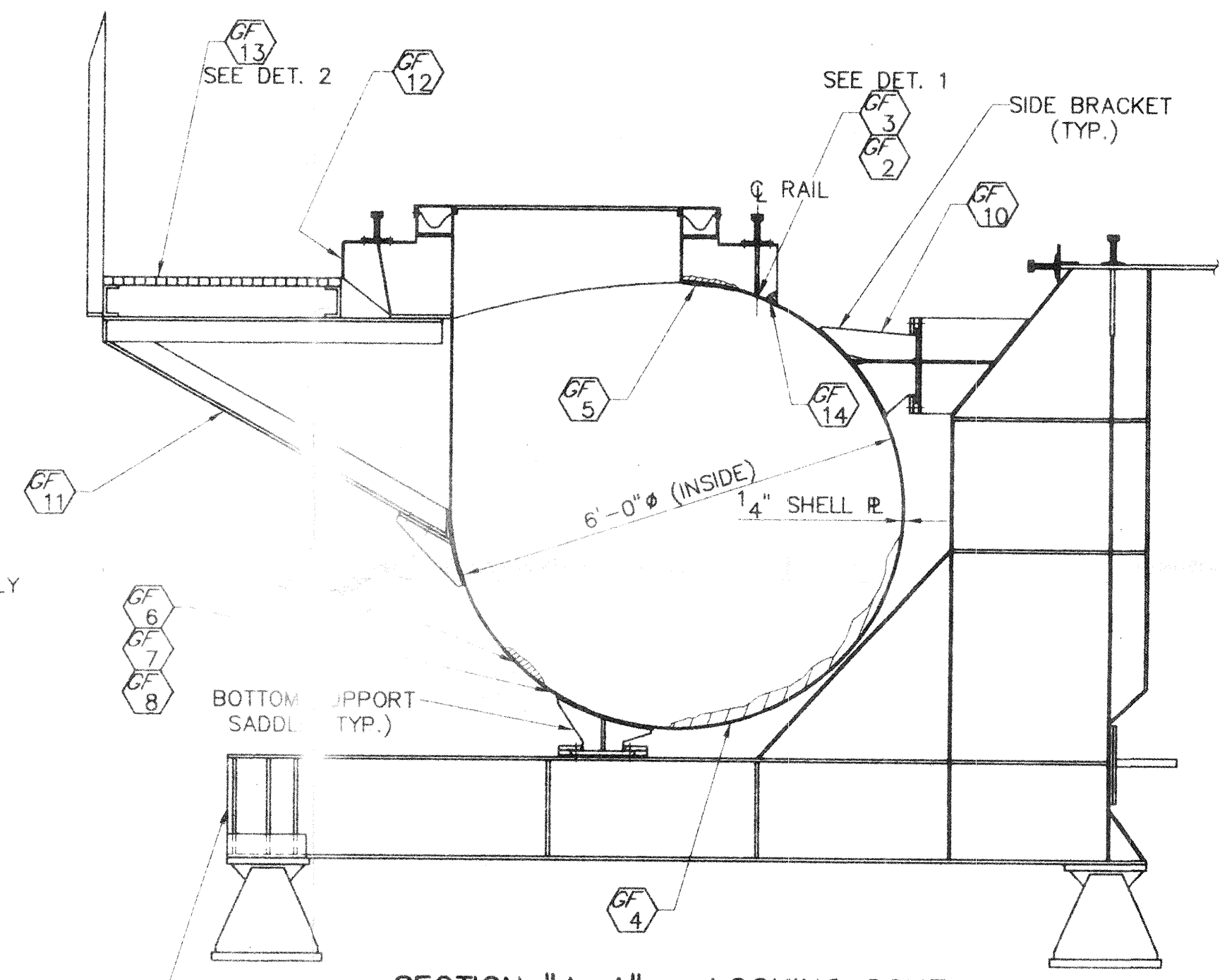
- GF 15 ALL EAST PIERS EXHIBIT VERTICAL CRACKING FROM THE ANCHOR BOLTS TO GRADE. (REFER TO SECTION "B-B" ON DWG. 7672-1.)
- GF 16 ALL EAST PIER GROUT CAPS DISPLAY COSMETICALLY SPALLED, CRACKED, OR MISSING. (NO UNDERMINING HAS OCCURRED.) (REFER TO SECTION "B-B" ON DWG. 7672-1.)
- GF 17 WEST PIERS INSIDE THE WHARF AREA (SUPPORTS 2 THROUGH 6) ARE ENCASED IN STEEL, THE LOWER 12" ± ARE RUSTED THIN AND/OR THROUGH. (REFER TO SECTION "B-B" ON DWG. 7672-1.)
- GF 18 THE WEST PIERS AT SUPPORTS 1 AND 8 THROUGH 15 WERE INACCESSIBLE DUE TO COKE BUILD-UP. (REFER TO SECTION "B-B" ON DWG. 7672-1.)



DETAIL 1 (LOOKING DOWN)



DETAIL 2 (LOOKING DOWN)



WORK THIS DRAWING WITH DRAWING 7672-1.

NOTE: THIS DRAWING MAY NOT BE AN EXACT REPRESENTATION OF THE STRUCTURE AS BUILT, BUT IS INTENDED TO BE A REASONABLY ACCURATE FACSIMILE FOR THE PURPOSE OF DOCUMENTATION OF INSPECTION FINDINGS ONLY.

C-5304 GENERAL ARRANGEMENT
C-5308 CROSS SECTION SUPPORT 1
C-5842 SUCTION DUCT ARRANGEMENT

REFERENCE DRAWINGS LISTED ABOVE

**ACME STEEL COMPANY**  
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ACME STEEL - CHICAGO  
 COKE PLANT  
 PUSHING EMISSION DUCT  
 SECTION, DETAILS, & GENERAL INSPECTION FINDINGS  
 1996 INSPECTION

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 ANGLES ± .5°

JOB No. 05-7672-01 SHT. No. 2

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