



Carolina Power & Light Company
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville SC 29550

Robinson File No.: 13510
Serial: RNP-RA/96-0189

OCT 21 1996

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
INFORMATION REGARDING WATER HAMMER EVENT
ON SAFETY INJECTION LINES DURING TESTING

Gentlemen:

This letter is provided to confirm information provided to the NRC in telephone conference calls conducted on October 18, 1996, regarding a water hammer event on the Accumulator Safety Injection (SI) lines. During restoration from performance of backleakage testing of Pressure Isolation Valves (PIVs) on October 16, 1996, the motor operated accumulator isolation valves in the Accumulator SI lines were opened and water was admitted at approximately 600 psig into apparently partially voided accumulator discharge lines that were essentially depressurized, resulting in a water hammer event.

In order to assess the effects of the event, walkdowns were conducted of all three accumulator discharge lines to the Reactor Coolant System (RCS) cold leg, SI lines cross-connecting the accumulators, and portions of the Residual Heat Removal (RHR) System inside Containment connecting with the SI system. These walkdowns revealed damage to seismic restraint Support SI-2-2434, rubbing but no damage at seismic restraint Support SI-2-454, a scuff mark but no damage at seismic restraint Support SI-2-3971, a loose nut at seismic restraint Support SI-2-6021, and spalled concrete but no damage to seismic restraint Support SI-2-376. No other signs of damage to seismic supports were observed, and no leakage from piping was observed.

The observation criteria utilized in the walkdowns consisted of observation for damaged components, welds, and concrete for seismic restraint supports; damaged components and interaction with other components for deadweight supports; damaged components, interaction with other components, and hot spring load settings for spring supports; and, welds, bending, gouges, damaged insulation, and leakage for piping.

Highway 151 and SC 23 Hartsville SC

9610300307 12PP

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The damage to seismic restraint Support SI-2-2434 consisted of a bent lug capture plate, a bent abandoned welded pipe attachment, and minor spalling of grout and concrete at the embedment plate with no undercutting of the embedment noted. Welded pipe attachments on the remaining seismic restraint supports were visually inspected and no signs of damage were found. Hot load spring settings for spring Supports SI-2-443 and SI-2-451 were observed to be well within the required range. The hot load spring setting for spring Support SI-2-6020 could not be observed due to difficult access conditions; however, the information from spring Supports SI-2-443 and SI-2-451 located upstream and downstream of spring Support SI-2-6020 indicate that spring Support SI-2-6020 is acceptable.

The damage to seismic restraint supports was evaluated in the degraded condition and was found to be acceptable when applying the short term structural integrity criteria.

The damage to the abandoned welded pipe attachment on seismic restraint Support SI-2-2434 was repaired by grinding down the broken welded pipe attachment. The bent lug capture plate on seismic restraint Support SI-2-2434 was repaired. The pipe wall and welded attachment welds were examined utilizing the dye penetrant examination method and were found to be acceptable. The seismic restraint Support SI-2-2434 was inspected visually (i.e., VT-3), and after retorquing of anchor bolts, was found to be acceptable. The bolts on seismic restraint Support SI-2-6021 were retorqued. Additionally, insulation was removed and remaining welded pipe attachments on remaining SI piping within the scope of the walkdowns were observed on October 18, 1996, and no damage was noted.

Since seismic restraint Support SI-2-2434 was modified to add the capture plates during Refueling Outage (RO) 16, and no damage to the welded attachments was observed at that time, we have concluded that the damage to seismic restraint Support SI-2-2434 was the result of this water hammer event. The damage to this support and eyewitness accounts of the event indicate that this event was of greater magnitude than minor pressure transients that have been known to occur during past performance of this test; however, the repairs to the piping and supports have restored the piping and supports to the original design qualification.

The procedure used to conduct backleakage testing of PIVs (i.e., procedure Operations Surveillance Test (OST)-160) will be revised to preclude water hammer events during the conduct of this surveillance procedure.

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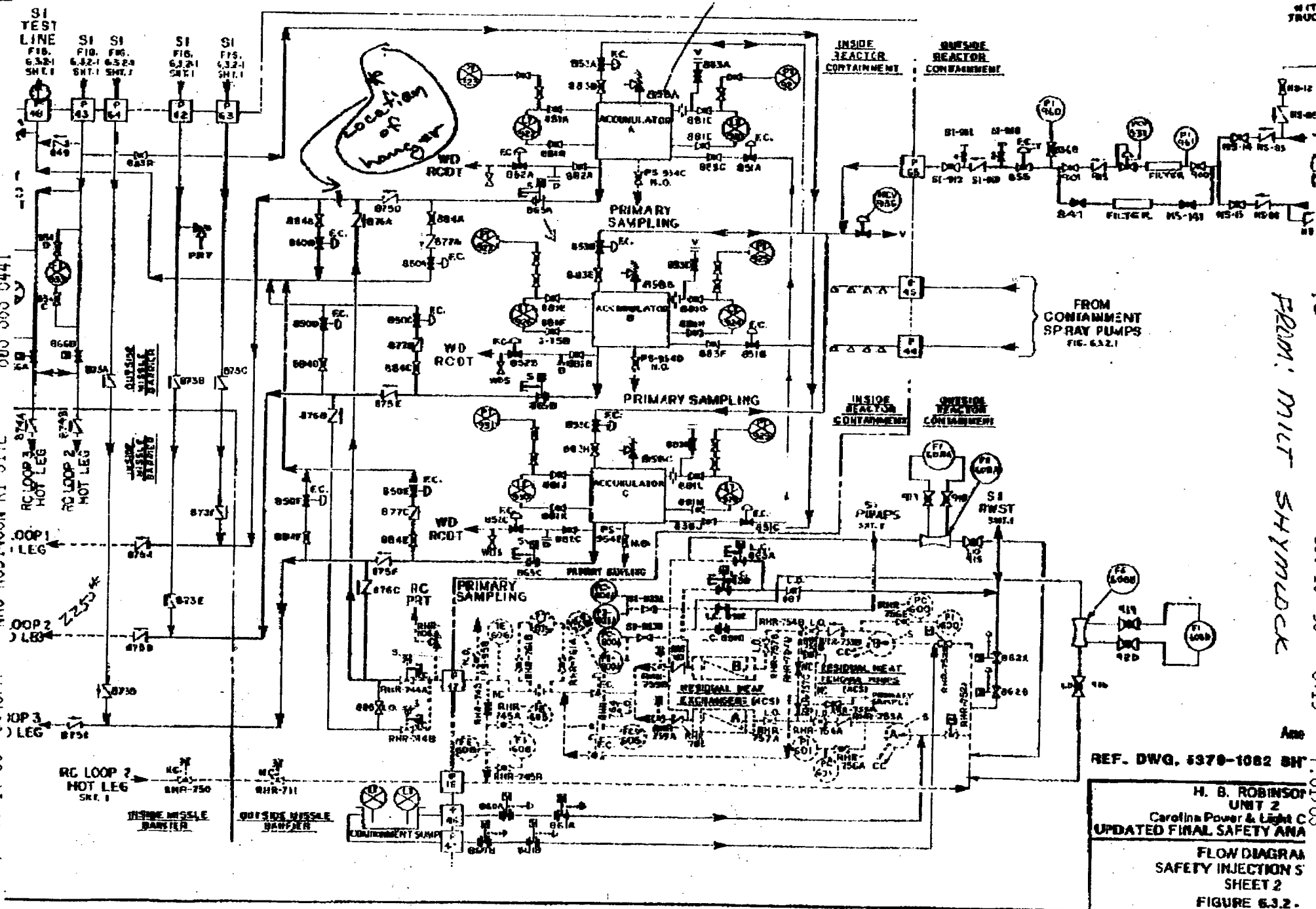
If you have any additional questions regarding this matter, please contact Mr. A. L. Garrou at (803) 857-1544.

Very truly yours,

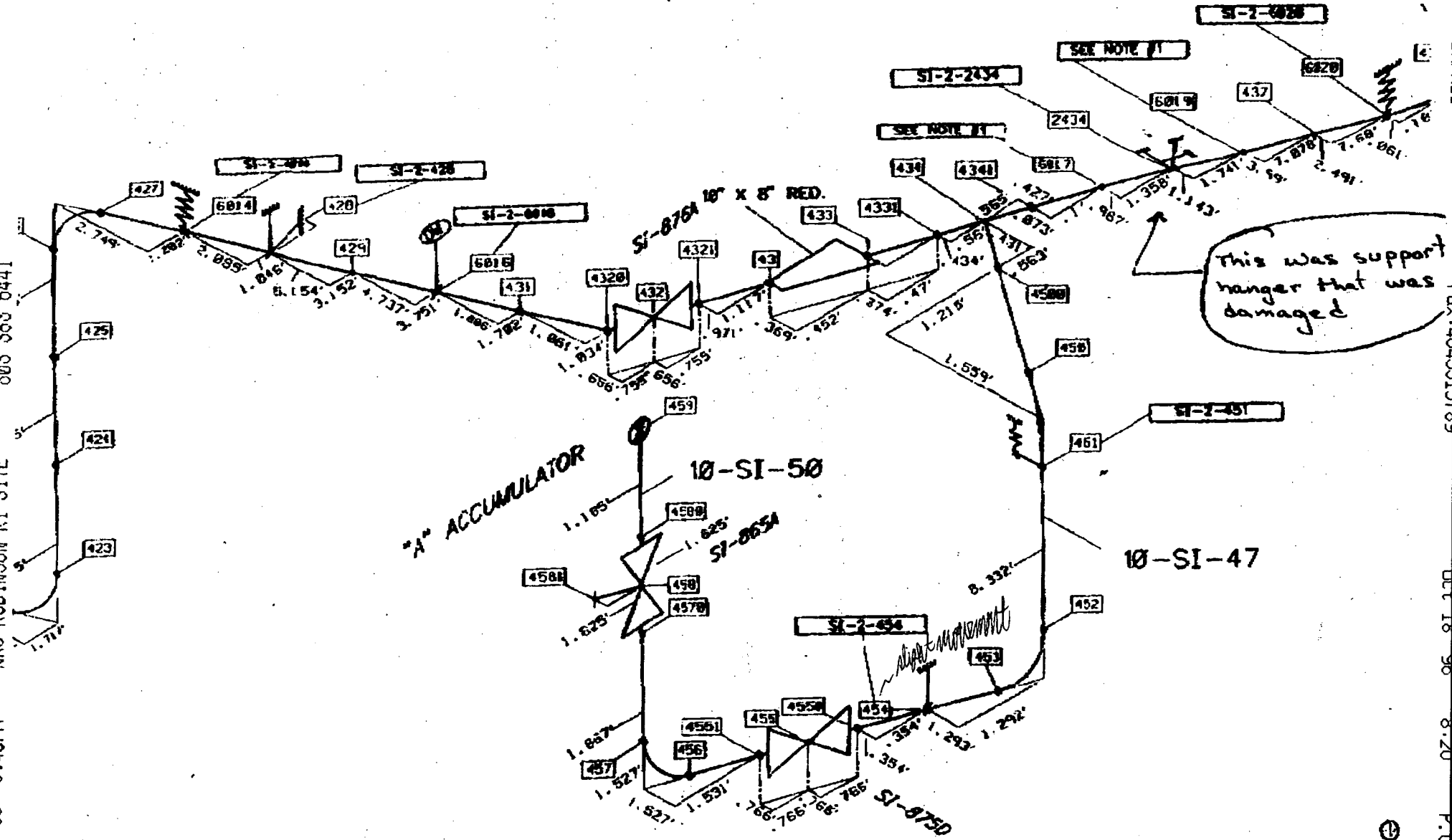
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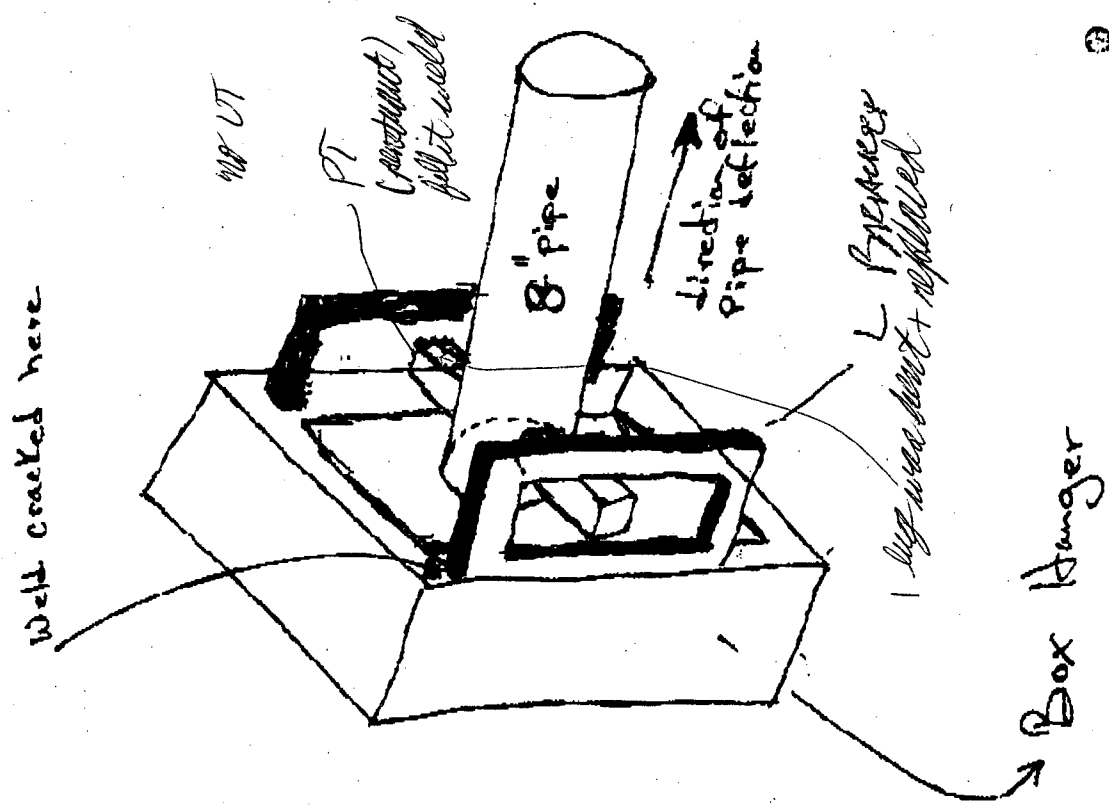
R. M. Krich
Manager - Regulatory Affairs

c: Mr. S. D. Ebner, Regional Administrator, USNRC, Region II
Ms. B. L. Mozafari, USNRC Project Manager, HBRSEP
Mr. J. Zeiler, USNRC Resident Inspector, HBRSEP

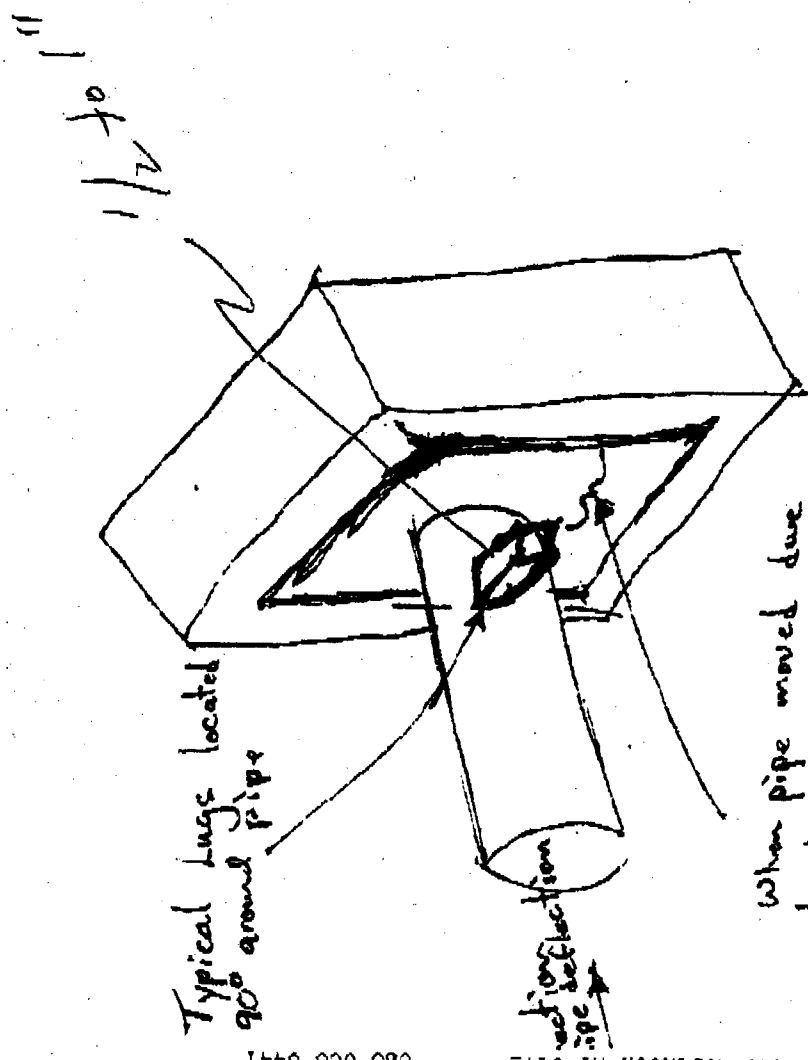


P. 13





Right Side

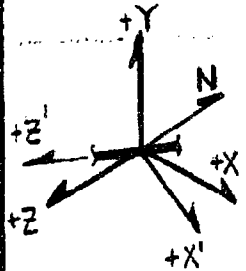


Left Side

AF 16245

SI-47-RAZ-19

BASE PLATE IDENTIFICATION



LOAD CASE

RESTRAINT LOCATION:
SEE ISO NO. SI-2
PT NO. 2434 (2434)

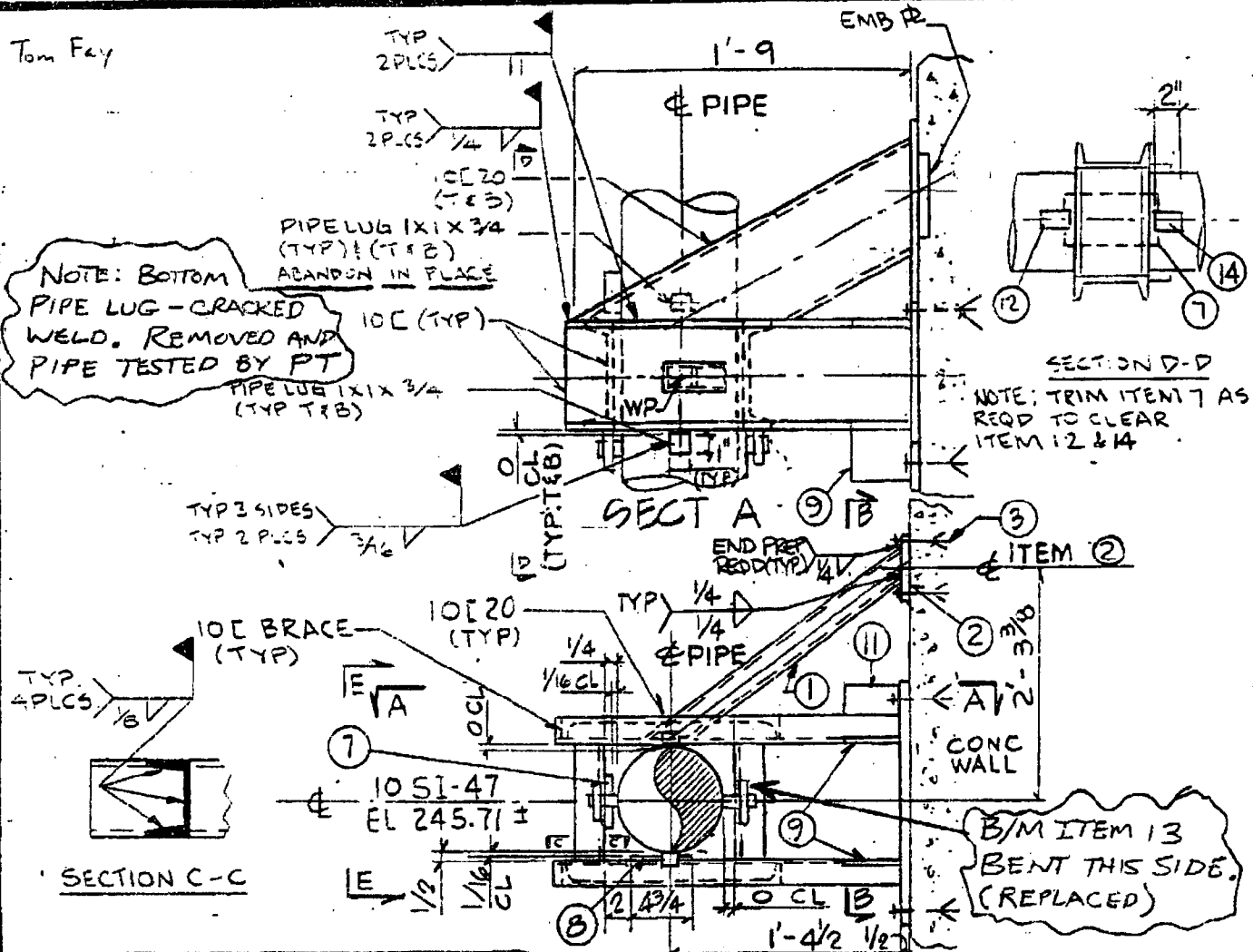
REACTOR BLDG
OUTSIDE CRANE WALL
NORTH WEST QUADRANT

REST. CALC NO. SI-2-2434

MOD NO. M492-REV 3

PMR NO. 3

RESTRAINT LOADS



NUCLEAR SAFETY RELATED ELEV LKG NORTHEAST
REV 4 INCORPORATES 'AS-BUILT' CONDITION

4	5/15/95	BB	CH	TEL
3	5/13/95	DME	RGK	REV
2B	3/21/95	GT	BL	REV
REV	DATE	BY	CHK	APPD

EBASCO SERVICES INCORPORATED
DIV. CIVIL DR. PL
DATE 9/5/94 CH. JM
SCALE NTS JG

H.B. ROBINSON - UNIT 2
AS-BUILT RESTRAINT SKETCH
SYSTEM: SAFETY INJECTION
ISO NO./POINT NO. SI-2/2434

AS-CAR-
SI-2-2434
SH. 1 OF 4

10/18/96

AF 16245

BILL OF MATERIALS

			QA CLASS	
ITEM	QTY	DESCRIPTION	Q	NA
①	1	TS 4 x 4 x 1/2 x 3'-0 LG (CUT TO SUIT) (ASTM A-500 GR B)	YES	
②	1	R 3/4 x 12 x 1'-0	YES	
③	4	3/4 ϕ WEDGE ANCHOR BOLT WS-3470 (ITT PHILLIPS)	YES	
④	3	1/4 ϕ WEDGE ANCHOR BOLT WS-12590 (ITT PHILLIPS)	YES	
⑦	1	SHIM P, THICKNESS AS REQ'D x 2 x 0'-11	YES	
⑧	1	SHIM P, THICKNESS AS REQ'D x 4 3/4 x 0'-9 1/4	YES	
⑨	2	R 1/2 x 4 x 0'-6 3/4 (TRIM AS REQ'D)	YES	
⑩	1	R 1/2 x 5 x 1'-10	YES	
⑪	2	R 1/2 x 2 1/2 x 0'-4	YES	
⑫	1	R 3/4 x 1 x 2 A240 TP 316	YES	
⑬	2	R 1/2 x 4" x 0'-6" (A-36)	YES	
⑭	2	R 1 x 1 x 2 A240 TP 316	YES	

ALL STRUCTURAL STEEL ASTM A 36 UNLESS NOTED

2A	3/2/95	GY	BTL	1/2/95
2	3/17/86	TS	NSW	DD
3	5/13/95	DME	RGK	APW
REV	DATE	BY	CHK	APP'D

EBASCO SERVICES INCORPORATED

 DIV. CIVIL DR. PL
 DATE 9.15.94 CH. JM
 SCALE NONE JG

APPROVED

MVC

CP&L / H. B. ROBINSON - UNIT 2

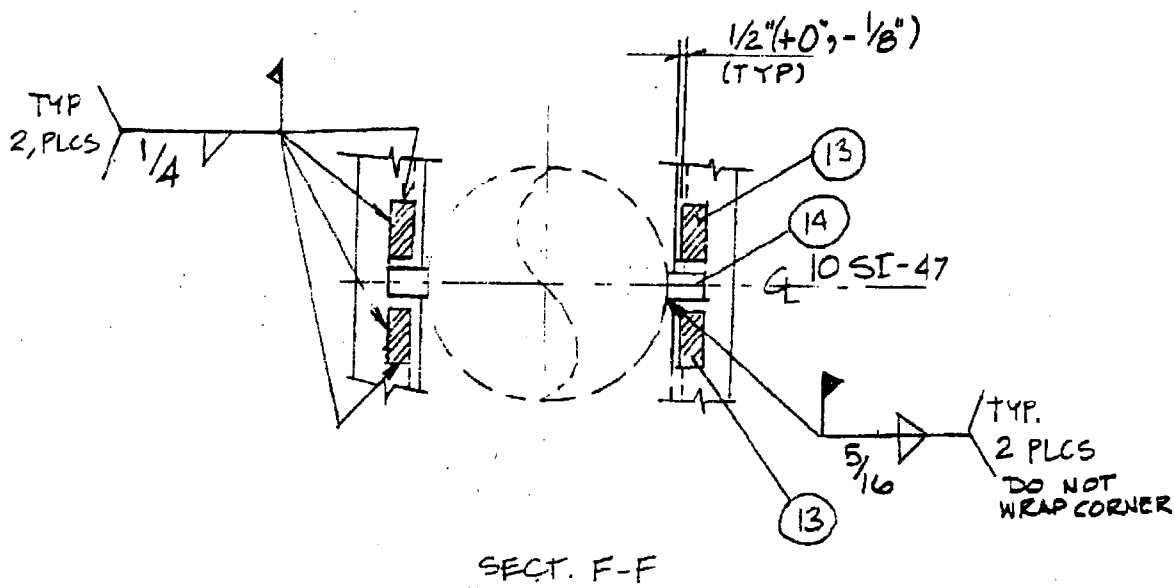
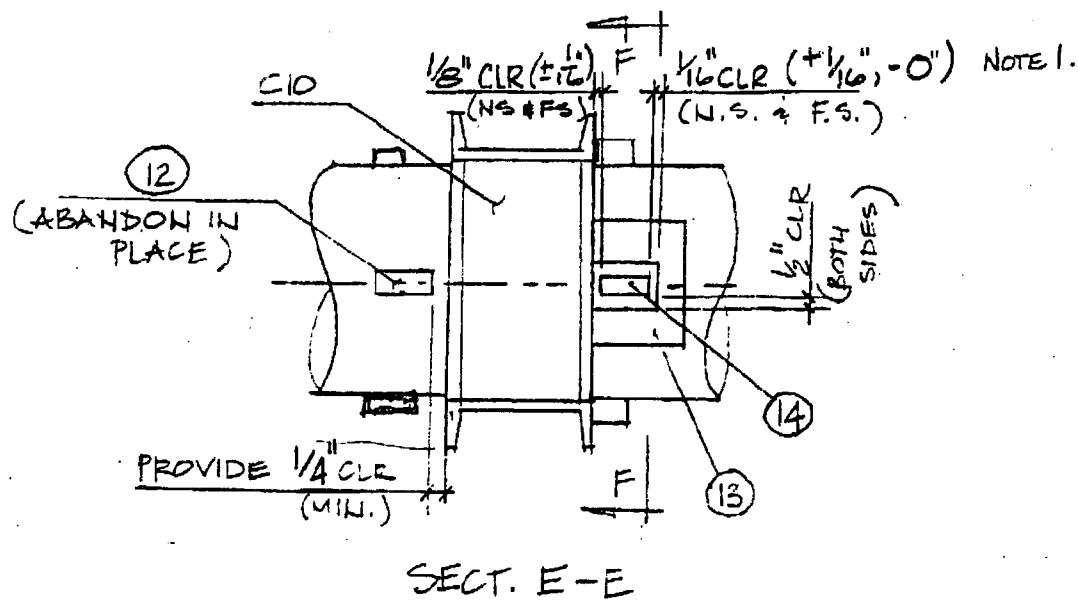
 AS-BUILT RESTRAINT SKETCH
 SYSTEM: SAFETY INJECTION
 ISO NO./POINT NO. SI-2/2434

AB-CAR-

SI-2-2434

SH. 3 OF 4

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NOTE.

1. 1/16" CLEARANCE TO BE EQUAL ON BOTH SIDES ($\pm 1/32$ ")

1	5/15/95	AS-BUILT	BB	PTD	TDF
0	5/13/95	AS-BUILT (INCORP. MCN-016)	CO	RCK	QJN
A	5/10/95	INITIAL ISSUE	BB	ME	LYD
REV	DATE	DESCRIPTION	DWN	CHK	APPR'D

PROFESSIONAL ENGINEER: _____

QUALITY LEVEL: SAFETY RELATED

CAROLINA POWER & LIGHT COMPANY
ENGINEERING SUPPORT SECTION**CP&L**

PLANT: Robinson Project Unit 2

SCALE:

TITLE:

CONTAINMENT BLDG EL. 245.71'
SAFETY INJECTION SYSTEM
SUPPORT NO. SI-2-2434PLANT
DWG. NO:

REV:

SHT:

MOD
SKETCH NO: SI-2-2434

SHT:

4

FILE: o:\pm1164\dmd8dicp.dgn

ORIGINAL