



Carolina Power & Light Company

USNRC REGIONAL
ATLANTA, GEORGIA

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429

02 DEC 20 AIO: 10

December 16, 1982

FILE: B09-13510A
SERIAL: BSEP/82-2819

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 & 2
LICENSE NOS. DPR-71 and DPR-62
DOCKET NOS. 50-325 and 50-324
RESPONSE TO IE BULLETIN 82-03 (REVISION NO. 1)

Dear Mr. O'Reilly:

In response to Mr. R. C. DeYoung's letter on October 28, 1982, transmitting IE Bulletin 82-03 (Revision No. 1), Stress Corrosion Cracking in Thick Wall, Large Diameter, Stainless Steel, Recirculation System Piping at BWR Plants, Carolina Power & Light Company submits the following information for item 4.

Enclosed are isometric drawings of the BSEP Unit No. 1 Recirculation System piping. All of the welds are shown on these drawings and those which are circled will be examined during the upcoming Unit No. 1 refueling outage. The following summarizes the type of welds to be examined and the bases for their selection:

12" Discharge Riser Closure Welds - NUREG-0313.

22" End Caps - Occurrence of cracking at other BWRs - IE Bulletin 82-03.

22" x 12" Sweep-o-let welds - Occurrence of cracking at other BWRs

Other Welds - NUREG-0313 requirements using stress rule index and carbon content evaluation for selection of representative welds from areas most susceptible to IGSCC.

The stress rule index calculations and carbon content evaluation were performed for CP&L by General Electric Company and a copy of the results is enclosed for your information.

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All of the piping in the BSEP Unit No. 1 Recirculation System with the exception of the four-inch diameter bypass line is Type 304 stainless steel. The four-inch diameter bypass line meets the chemistry requirements for Type 304L stainless steel. The diameters and wall thicknesses are as follows:

<u>Diameters</u>	<u>Wall Thickness</u>
28" suction and discharge	1.088"
22" ring header	0.975"
20" RHR connection	0.764"
12" discharge risers	0.568"
4" discharge bypass	0.337"

CP&L expects an accumulated occupational radiation exposure of 40 man-Rem in the performance of these inspections. In order to maintain individual and collective exposures as low as reasonably achievable, shielding will be used wherever possible. In addition, personnel performing the inspections will be closely monitored and rotated accordingly.

For the inspections at Brunswick, Southwest Research Institute's Procedure 600-31 "Manual Ultrasonic Examination of Austenitic Pressure Piping Welds" will be used. This procedure requires the recording of ultrasonic reflectors producing a response greater than 20 percent of the reference level and requires investigation of any suspicious indications. The procedure further specifies the use of a 3/8-inch round, 1.5 MHz, single element transducer and the use of 45-degree and 60-degree wedges for angle beam scanning of the weld area. The calibration standards conform to the requirements of ASME Code, Section XI, Division 1, 1977 Edition through Summer 1978 Addenda.

Scanning will be performed at a minimum gain setting of two times the reference level sensitivity. Scanning overlap is a minimum of 10 percent of the search unit piezoelectric element dimension perpendicular to the direction of scan. The search unit movement rate for scanning will not exceed 6" per second. An additional special scan procedure will be employed by SWRI to ensure the detection of any axial cracking which may have initiated in the ID of the weld.

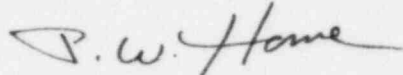
Southwest Research Institute satisfactorily demonstrated their ability to detect intergranular stress corrosion cracking using the technique described above at Battelle Memorial Institute in Columbus, Ohio, in the presence of an NRC representative. The procedure and equipment which were qualified will be used for the BSEP recirculation examinations.

Mr. O'Reilly

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The UT procedure was qualified on a 28" diameter pipe sample which was slightly over 1" wall thickness obtained from Nine Mile Point plant. Since the sample used to qualify the UT techniques is similar to the recirculation piping to be inspected at Brunswick, the procedure will have the same capability for crack detection as in the qualification test at Battelle Memorial Institute in Columbus, Ohio.

Very truly yours,

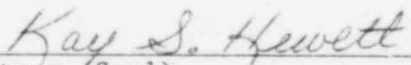


P. W. Howe, Vice President
Brunswick Nuclear Project

RMP/PG/shb/LETSHB

cc: NRC Document Control Desk
Mr. D. O. Myers
Mr. D. B. Vassallo

P. W. Howe, having been first duly sworn, did depose and say that the information contained herein is true and correct to his own personal knowledge or based upon information and belief.



Notary (Seal)

My commission expires: 6-15-86

TABLE I

IGSCC SUSCEPTIBILITY RANKING FOR
BRUNSWICK - 1
B- 32 RECIRCULATION SYSTEM PIPE WELDS
LOOP A

WELD NO.	SRI	CARBON CONTENT (%)	IGSCC SUSCEPTIBILITY RANKING
28-A-2	1.080	0.055	2
28-A-3	1.464	0.059	1
28-A-4	1.410	0.059	1
28-A-5	0.948	0.057	3
28-A-6	0.974	0.057	3
28-A-7	1.379	0.057	1
28-A-8	1.408	0.051	1
28-A-9	1.068	0.040	3
28-A-10	1.584	0.059	1
28-A-11	1.522	0.059	1
28-A-12	1.123	0.051	2
28-A-13	1.128	0.051	2
28-A-14	1.513	0.059	1
28-A-15	1.421	0.059	1
28-A-16	0.979	0.062	3
28-A-17	1.019	0.062	2
28-A-18	0.950	0.075	3
28-A-9BC	1.200	0.055	2
28-A-12BC	1.039	0.071	2
28-A-15BC	0.984	0.071	3
22-AM-1	1.148	0.058	2
22-AM-2	1.112	0.058	2
22-AM-3	1.027	0.048	2
22-AM-4	1.240	0.053	1
22-AM-5	1.175	0.048	2
22-AM-6	1.144*	0.058	2
22-AM-3BC-A	1.196	0.070	4 (SHT)
22-AM-3BC-B	1.200	0.070	4 (SHT)
22-AM-5BC-A	1.193	0.070	4 (SHT)
22-AM-5BC-B	1.160	0.070	4 (SHT)

TABLE I
(CONTINUED)
IGSCC SUSCEPTIBILITY RANKING FOR
BRUNSWICK - 1
B- 32 RECIRCULATION SYSTEM PIPE WELDS
LOOP A

WELD NO.	SRI	CARBON CONTENT (%)	IGSCC SUSCEPTIBILITY RANKING
12-AR-A1	1.081	0.075	2
12-AR-A2	1.479	0.075	1
12-AR-A3	1.458	0.075	1
12-AR-A4	1.273	0.075	1
12-AR-B1	1.005	0.075	2
12-AR-B2	1.393	0.075	1
12-AR-B3	1.505	0.075	1
12-AR-B4	1.362	0.075	1
12-AR-C1	1.571	0.075	1
12-AR-C2	1.579	0.075	1
12-AR-C3	1.544	0.075	1
12-AR-C4	1.599	0.075	1
12-AR-D1	1.081	0.075	2
12-AR-D2	1.457	0.075	1
12-AR-D3	1.436	0.075	1
12-AR-D4	1.348	0.075	1
12-AR-E1	1.142	0.075	2
12-AR-E2	1.565	0.075	1
12-AR-E3	1.528	0.075	1
12-AR-E4	1.584	0.075	1
4-A-1	1.222	0.071	1
4-A-2	1.553	0.021	4
4-A-3	1.535	0.021	4
4-A-4	1.177	0.021	4
4-A-5	1.159	0.024	4
4-A-6	1.299	0.018	4
4-A-7	1.268	0.021	4
4-A-8	1.420	0.021	4
4-A-9	1.449	0.021	4
4-A-10	1.194	0.071	2

Legend: 1 - High
2 - Moderate
3 - Low
4 - Very low

SHT - Solution Heat Treated

* SRI Pending Final Analysis

TABLE II

IGSCC SUSCEPTIBILITY RANKING FOR
BRUNSWICK - 1
B - 32 RECIRCULATION SYSTEM PIPE WELDS
LOOP B

WELD NO.	SRI	CARBON CONTENT (%)	IGSCC SUSCEPTIBILITY RANKING
28-B-2	1.028	0.055	2
28-B-3	1.341	0.059	1
28-B-4	1.324	0.059	1
28-B-5	0.925	0.057	3
28-B-6	0.935	0.057	3
28-B-7	1.361	0.057	1
28-B-8	1.364	0.057	1
28-B-9	1.051	0.040	3
28-B-10	1.514	0.059	1
28-B-11	1.462	0.059	1
28-B-12	1.116	0.051	2
28-B-13	1.121	0.051	2
28-B-14	1.484	0.051	1
28-B-15	1.400	0.057	1
28-B-16	0.972	0.062	3
28-B-17	1.011	0.062	2
28-B-18	0.951	0.053	3
28-B-9BC	1.200	0.055	2
28-B-12BC	1.035	0.071	2
28-B-15BC	0.984	0.071	3
22-BM-1	1.144*	0.056	2
22-BM-2	1.204	0.053	1
22-BM-3	1.214	0.059	1
22-BM-4	1.248	0.059	1
22-BM-5	1.135	0.059	2
22-BM-1BC-A	1.156	0.060	4 (SHT)
22-BM-1BC-B	1.188	0.060	4 (SHT)
22-BM-3BC	1.182	0.060	4 (SHT)
22-BM-4BC	1.212	0.060	4 (SHT)

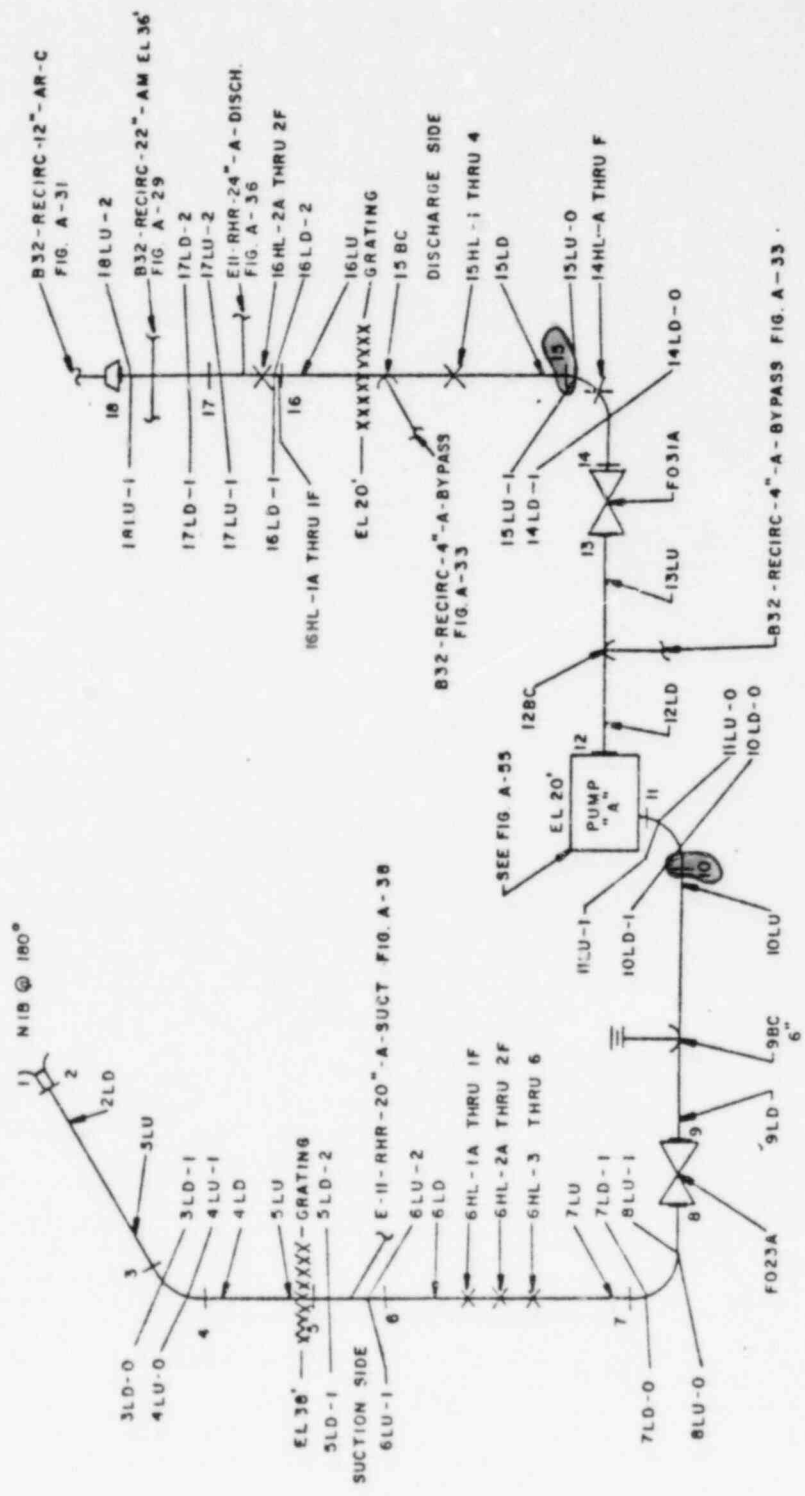
TABLE II
 (Continued)
 IGSCC SUSCEPTIBILITY RANKING FOR
 BRUNSWICK - 1
 B- 32 RECIRCULATION SYSTEM PIPE WELDS
 LOOP B

WELD NO.	SRI	CARBON CONTENT (%)	IGSCC SUSCEPTIBILITY RANKING
12-BR-F1	1.116	0.075	2
12-BR-F2	1.526	0.075	1
12-BR-F3	1.450	0.075	1
12-BR-F4	1.456	0.075	1
12-BR-G1	1.096	0.075	2
12-BR-G2	1.506	0.075	1
12-BR-G3	1.526	0.075	1
12-BR-G4	1.418	0.075	1
12-BR-H1	1.592	0.075	1
12-BR-H2	1.569	0.075	1
12-BR-H3	1.534	0.075	1
12-BR-H4	1.528	0.075	1
12-BR-J1	1.058	0.075	2
12-BR-J2	1.410	0.075	1
12-BR-J3	1.450	0.075	1
12-BR-J4	1.300	0.075	1
12-BR-K1	1.070	0.075	2
12-BR-K2	1.420	0.075	1
12-BR-K3	1.381	0.075	1
12-BR-K4	1.248	0.075	1
4-B-1	1.224	0.071	1
4-B-2	1.556	0.021	4
4-B-3	1.538	0.021	4
4-B-4	1.176	0.021	4
4-B-5	1.159	0.024	4
4-B-6	1.298	0.018	4
4-B-7	1.268	0.021	4
4-B-8	1.417	0.021	4
4-B-9	1.451	0.021	4
4-B-10	1.195	0.071	2

Legend: 1 - High
 2 - Moderate
 3 - Low
 4 - Very Low

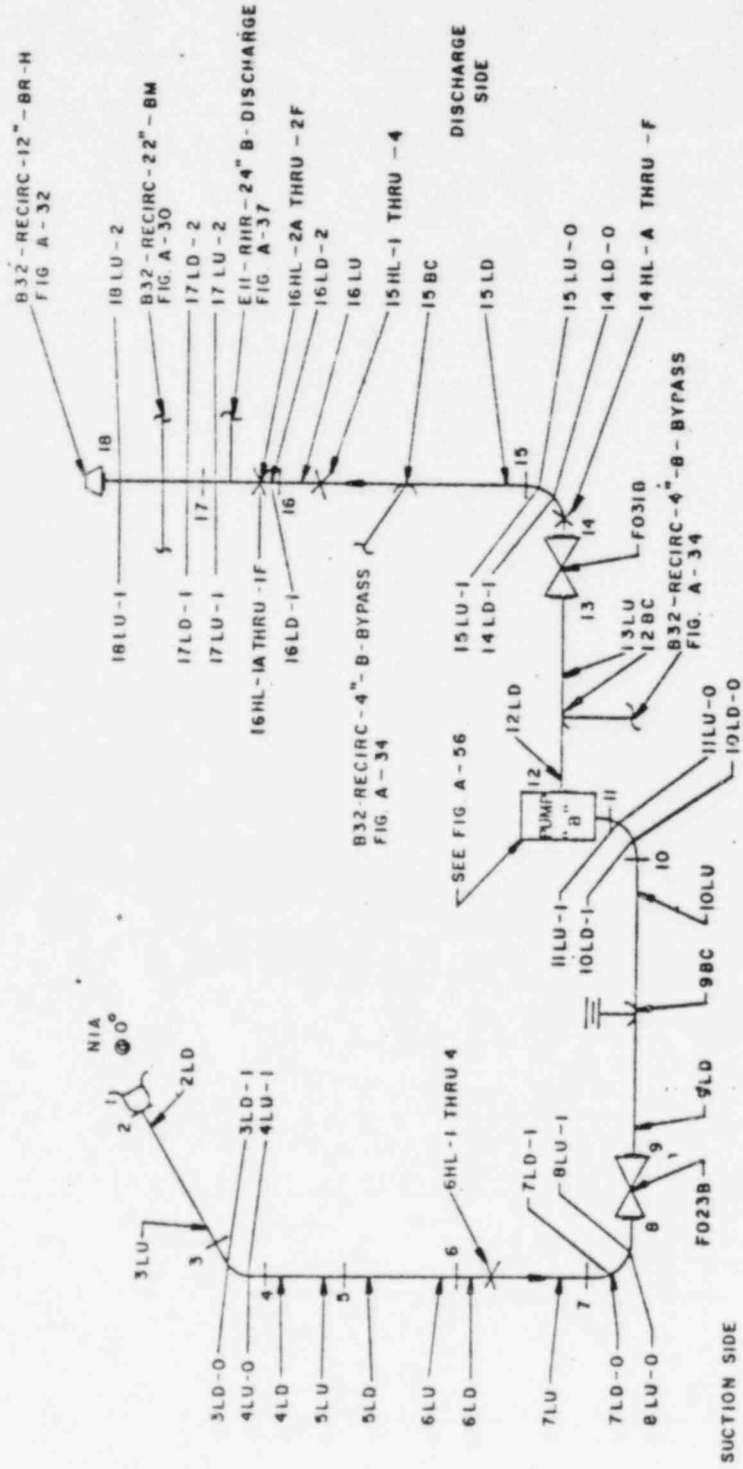
SHT - Solution Heat Treated

*SRI Pending Final Analysis



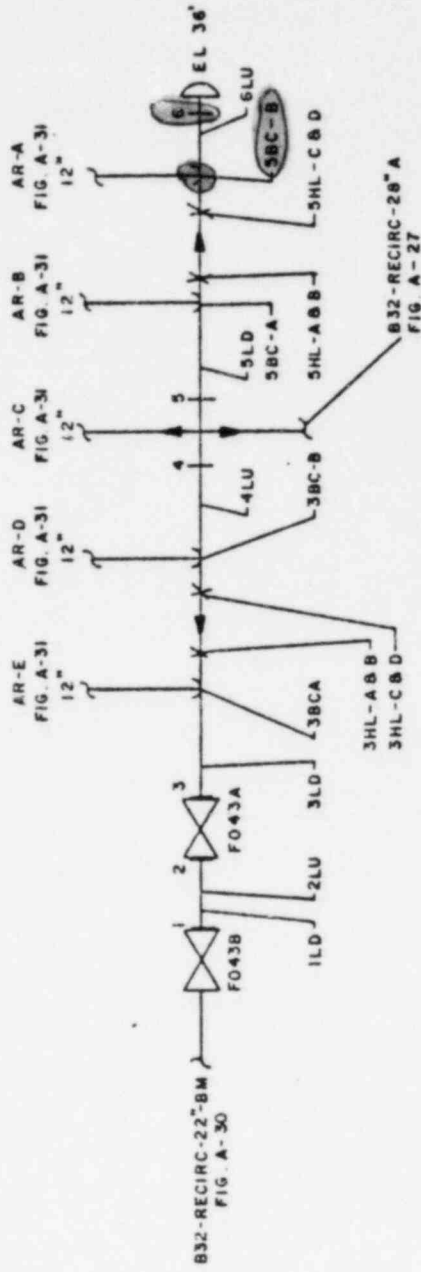
WELD No. : (SYSTEM) B32-RECIRC (LINE) 26"-A (WELD I.D.) 1 THRU 10
A-27

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF DWG.	DATE
BRUNSWICK I	25"-A	SS	1.51"	28"	9-B	B & R FSM 402	6-2-76
		SS	3.0"	28" TEES/CROSS	46-B	SHEET 1 & 2	



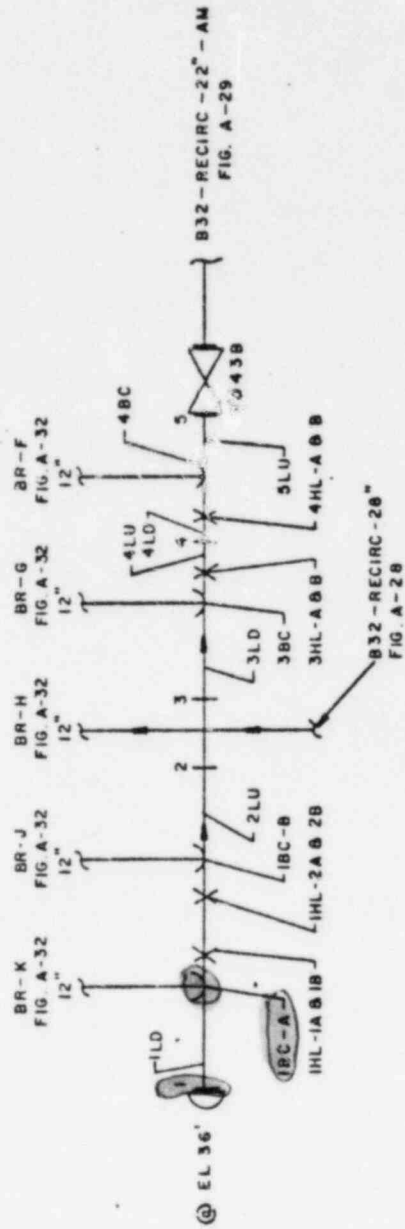
WELD No. (SYSTEM) B32-RECIRC (LINE) 28" B (WELD I.D.) I THRU B
A-28

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B B R REF DWG	DATE
BRUNSWICK I	28" B	SS	1.151"	20"	9-B	B B R FSM 401	6-3-76
		SS	1.315"	20" TEE & CROSS	49-B	SHEET 1 & 2	



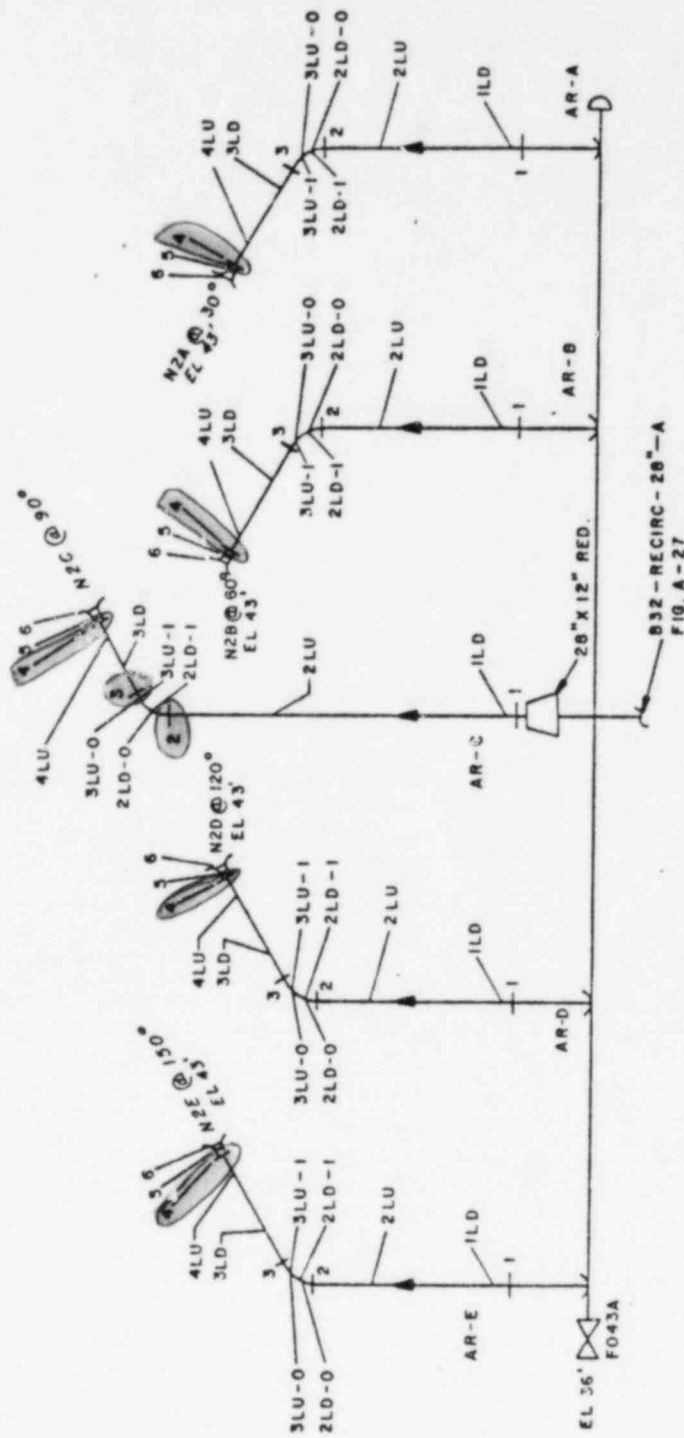
WELD No. 1 (SYSTEM) B-32 RECIRC (LINE) 22" - AM (WELD I.D.) I THRU 6
A-29

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B B R REF DWG.	DATE
BRUNSWICK I	22" - AM	SS	1.038"	22"	7-8	B B R FSM 402 SHEET 1 B 2	6-3-76



WELD No. (SYSTEM) B-32-RECIRC. (LINE) 22"-BM (WELD I.D.) 1 THRU 5
A-30

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF DWG.	DATE
BRUNSWICK I	22"-BM	SS	1.038"	22"	7-B	B & R FSM 401 SHEET 1 & 2	6-4-76



WELD NO. (SYSTEM) B32-RECIRC (LINE) 12"-AR-A,-B,-C,-D,-E (WELD I.D.) 1 THRU 6
A-31

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF.	DWG.	DATE
BRUNSWICK I	12"-AR-A,-B,-C,-D,-E	SS	0.631"	12"	5-B	B & R	FSM 402	6-3-76
		SS	0.844"	N-SE	43-B		SHEET 1 & 2	

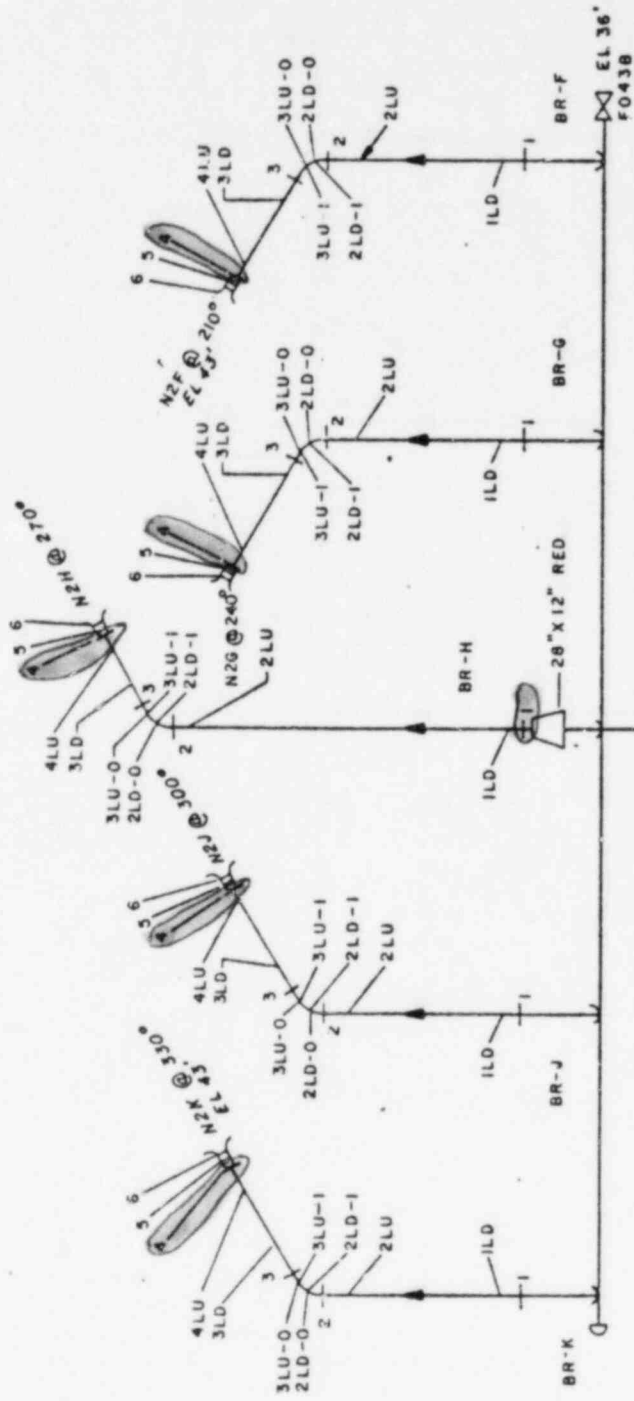


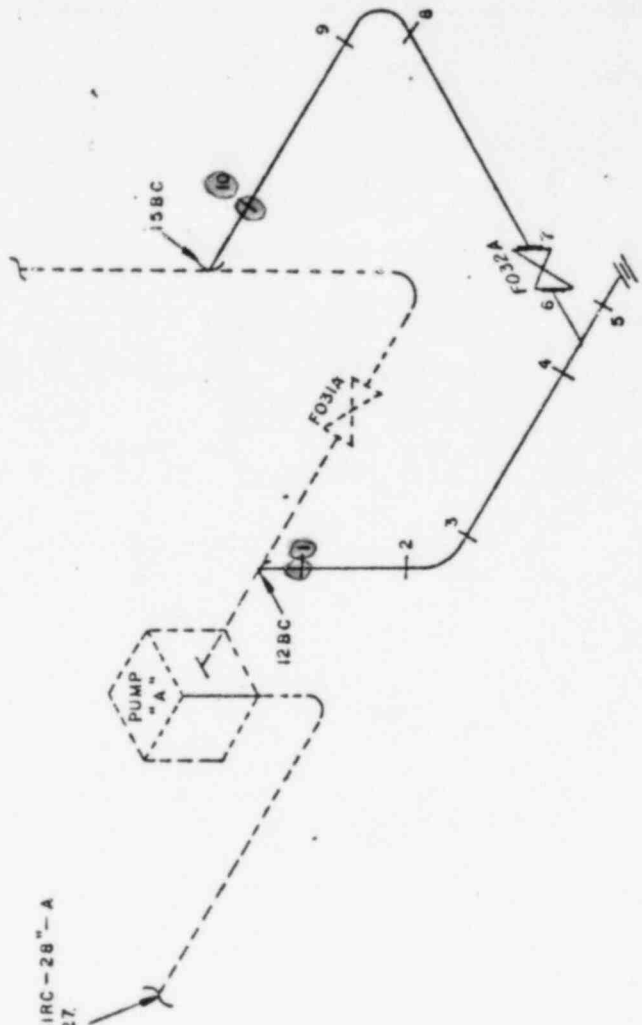
FIG. A-28
B32 - RECIRC - 28" - B

WELD No. (SYSTEM) B32 RECIRC (LINE) 12"-BR-F,-G-H-J-K
(WELD I.D.) 1 THRU 6

A-32

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF	DWG	DATE
BRUNSWICK I	12"-BRF, G-H-J-K	SS	0.631"	12"	5-B	B & R FSM	401	6-3-76
		SS	0.844"	N-SE	43-B	SHEET	1 & 2	

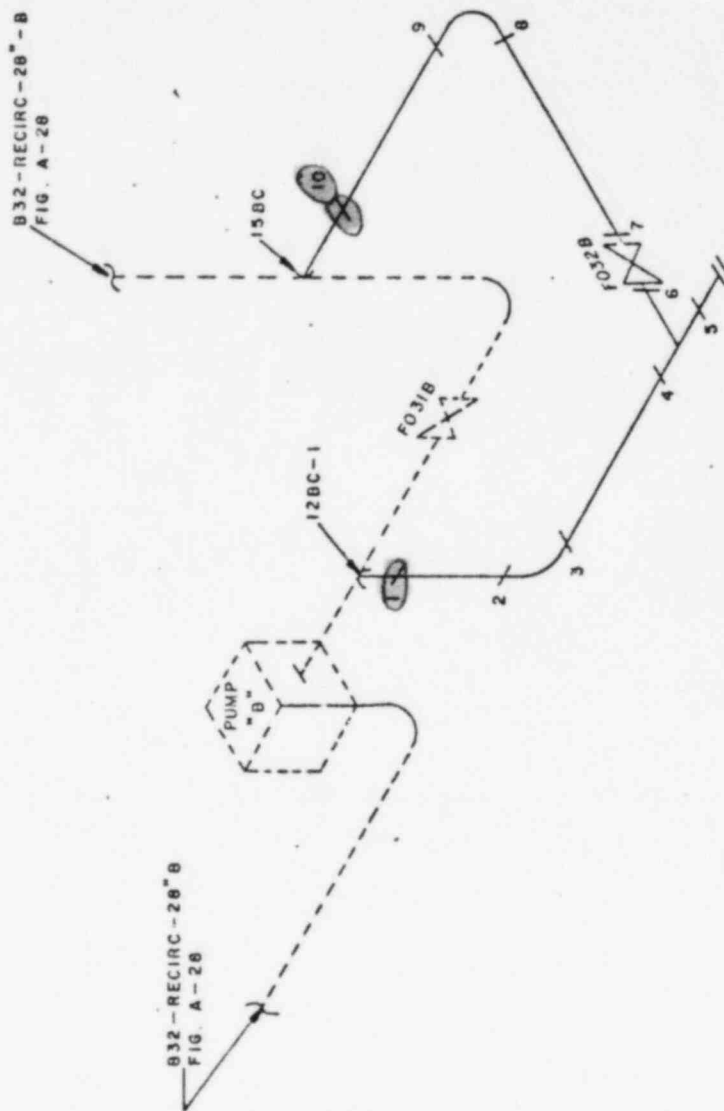
B32-RECIRC-28"-A
FIG. A-27



B32-RECIRC-28"-A
FIG. A-27

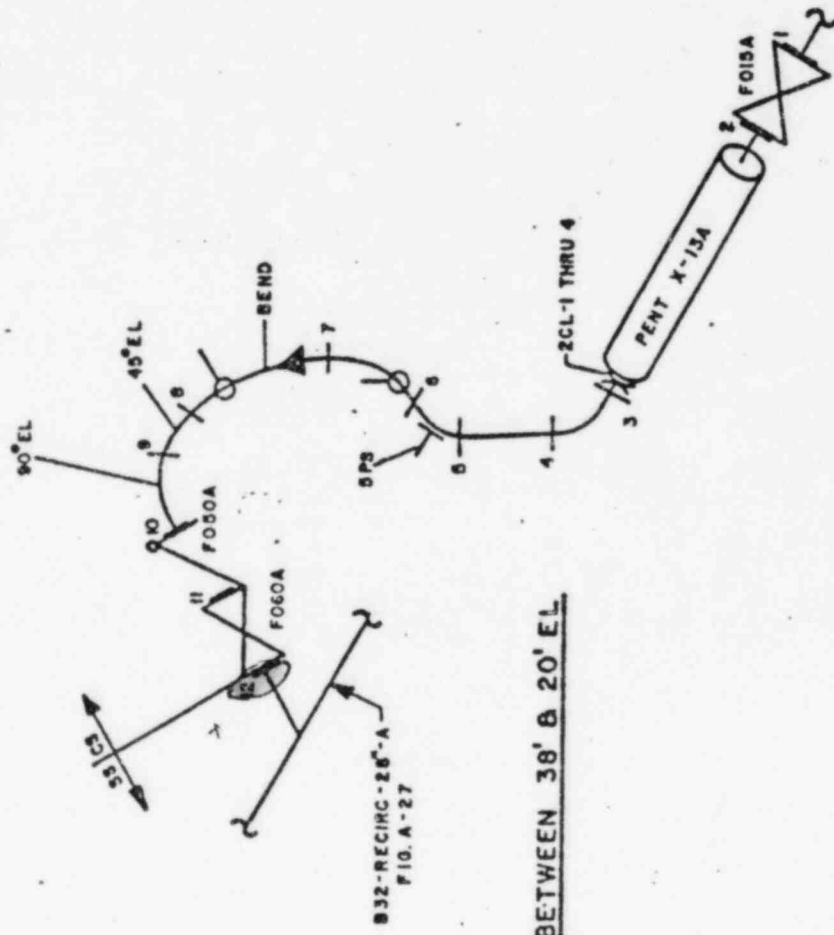
WELD No: (SYSTEM) B32-RECIRC (LINE) 4"-A-BYPASS (WELD I.D.) 1 THRU 10
A-33

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF. DWG.	DATE
BRUNSWICK I	4"-A-BYPASS	SS	0.337"	4"	2-B	B & R FSM 402 SHEET 1 & 2	6-4-76



WELD No. 1 (SYSTEM) B32-RECIRC (LINE) 4"-B-B-PASS (WELD I.D.) 1 THRU 10
A-34

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF. D #G.	DATE
BRUNSWICK I	4"-B-B-PASS	SS	0.337"	4"	2-B	B & R FSM 401 SHEET 1 B 2	6-4-76



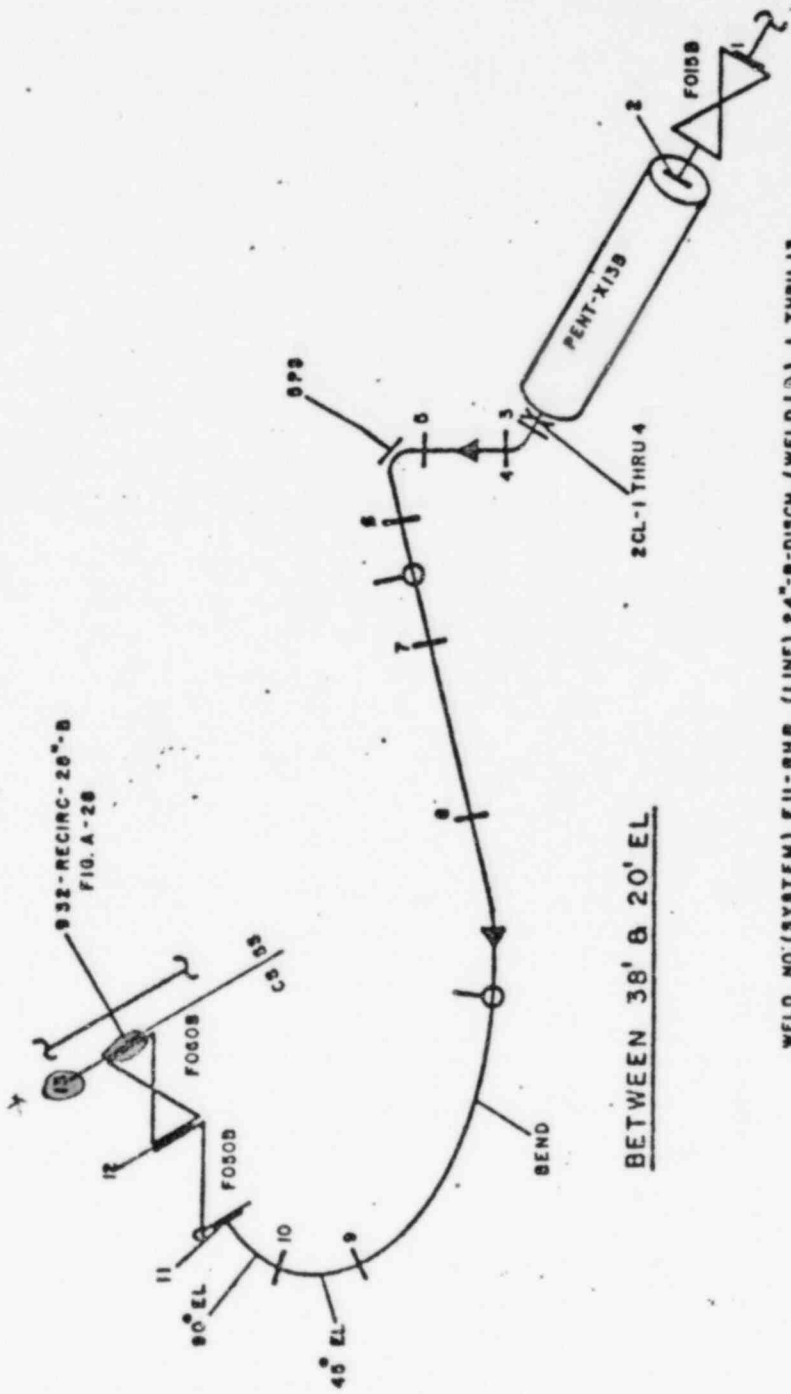
38' RECIRC - 28" A
FIG. A-27

BETWEEN 38' & 20' EL

WELD NO: (SYSTEM) E-11-RHR (LINE) 24"-A-DISCH. (WELD LD.) 1 THRU 12

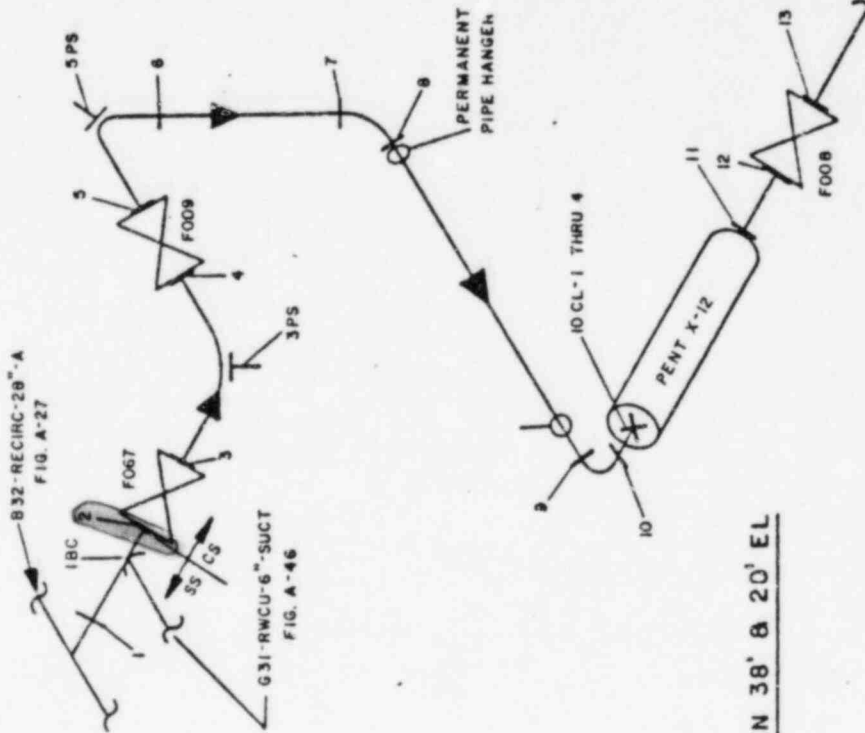
A-36

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF. DWG.	DATE
BRUNSWICK I	24"-A-DISCH	CS	1.531	24"	20-B	B & R FSM 404	6-4-76
		SS	1.151	26"	9-B		



WELD NO. (SYSTEM) E11-RHR (LINE) 24'-B-DISCH. (WELD I.D.) 1 THRU 13
A-37

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B & R REF. DWG.	DATE
BRUNSWICK I	24'-B-DISCH.	CS	1.331"	24"	20-B	B & R FSM 403	6-5-76
		SS	1.151"	28"	9-B		



BETWEEN 38' & 20' EL

WELD NO: (SYSTEM)E11-RHR (LINE)20\"/>

SITE	LINE	MATERIAL	NOMINAL THICKNESS	NOMINAL DIAMETER	CALIBRATION STANDARD	B B R REF. DWG.	DATE
BRUNSWICK I	20\"/>						