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Power Generation Department



January 27, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. John Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC DOCKET 50-321
OPERATING LICENSE DPR-57
EDWIN I. HATCH NUCLEAR PLANT UNIT 1
ANALYSES AND REPAIRS OF RECIRCULATION AND RHR SYSTEM WELDS

Gentlemen:

During the inservice inspection conducted during the Plant Hatch Unit 1 1982 maintenance/refueling outage, several unacceptable ultrasonic indications were observed in Recirculation (Recirc) and Residual Heat Removal (RHR) System piping welds. Georgia Power Company (GPC) hereby submits the following information concerning the inservice inspection, analyses and repairs, future inspections, and modification/replacement plans.

INSERVICE INSPECTION

SCOPE OF EXAMINATIONS

A047
limited Dist

By letter dated December 15, 1982, GPC provided NRC Region II with a listing of examinations that were performed during the recent inservice inspection at Plant Hatch Unit 1. The listing was provided as part of the response to NRC I&E Bulletin 82-03, "Stress Corrosion Cracking In Thick-Wall, Large-Diameter, Stainless Steel, Recirculation System Piping At BWR Plants", issued by NRC on October 14, 1982. A copy of the GPC letter is enclosed herein as Attachment 1 to this submittal. Please refer to the response to Item 4a(1) and Attachment 1 of the subject GPC letter for a discussion on the welds examined and their location in the Recirc System.

The examination sampling basis is discussed in our response to Item 4a(2) and Attachment 2 of the December 15, 1982 letter to NRC Region II.

In addition, pursuant to the requirements of NRC NUREG-0313, Rev. 1, RHR welds were also examined. Enclosed as Attachments 2, 3, and 4 to this submittal are inservice inspection isometric drawings of the 20" and 24" diameter RHR piping examined during the recent inservice inspection. Circumferential welds examined are denoted by encircled weld numbers.

Director of Nuclear Reactor Regulation
 Attention: Mr. John Stolz, Chief
 Operating Reactors Branch No. 4
 January 27, 1983
 Page Two

RESULTS

NRC Region II was provided a listing of results of piping inspections in the GPC letter dated December 15, 1982. Please refer to Attachments 2 and 3 of that letter for a listing of the Recirc welds examined and the results thereof. The listing of reportable indications (Attachment 3 to the December 15, 1982 letter) includes those RHR welds having reportable indications.

EXAMINATION METHODS

Please refer to the responses to Items 4b and 4d of (Attachment 1 to this submittal) NRC I&E Bulletin 82-03 in the GPC letter dated December 15, 1982, for a summary description of the UT procedures and calibration standards used in the examination of the subject piping.

Pursuant to the requirements of I&E Bulletin 82-03, the ultrasonic test procedures used by each of the examination agencies involved with the inservice inspection were successfully qualified on cracked pipe samples at Battelle-Columbus. A discussion on procedure qualifications is discussed in the response to Item 4d of the subject bulletin.

ANALYSES AND REPAIRS

By letter dated January 26, 1983, GPC provided NRC Region II with the listing of welds requiring analysis and repair. That submittal was made to provide a response to Items 2 and 3 of I&E Bulletin 82-03, thus completing the reporting requirements for that bulletin. A copy of that GPC letter is enclosed herein as Attachment 5 to this submittal.

Analyses performed by NUTECH have demonstrated the need to repair six welds at this time in the form of a weld overlay. The welds requiring repair are as follows:

<u>System</u>	<u>Weld No.</u>
Recirculation	1B31-LRC-22AM-1
Recirculation	1B31-LRC-22AM-4
Recirculation	1B31-LRC-22BM-1
Recirculation	1B31-LRC-22BM-4
RHR	1E11-LRHR-20B-D-3
RHR	1E11-LRHR-24B-R-13

Director of Nuclear Reactor Regulation
 Attention: Mr. John Stolz, Chief
 Operating Reactors Branch No. 4
 January 27, 1983
 Page Three

ANALYSES AND REPAIRS (Continued)

In addition, the indications on Recirc System weld 1B31-LRC-22AM-LBC-1 were analyzed and were determined not to require repairs at this time. A leakage detection system for that particular weld is being considered.

As stated in our January 26, 1983 letter, GPC will submit to NRC NRR details of the analyses and repairs. Enclosed for your review as Attachment 6 to this submittal is the NUTECH design report for the Recirc and RHR System weld overlay repairs and flaw evaluations.

FUTURE INSPECTIONS

The following welds discussed in the section above will be examined during the next three successive scheduled refueling outages:

<u>System</u>	<u>Weld No.</u>
Recirculation	1B31-LRC-22AM-1
Recirculation	1B31-LRC-22AM-LBC-1
Recirculation	1B31-LRC-22AM-4
Recirculation	1B31-LRC-22BM-1
Recirculation	1B31-LRC-22BM-4
RHR	1E11-LRHR-20B-D-3
RHR	1E11-LRHR-24B-R-13

In the event that no unacceptable indications are observed, the examination frequency will be extended to three thirty-six month + 12 month examinations. In addition, if no unacceptable indications are observed after the aforementioned examination frequencies, the affected welds will be examined once per eighty months. Future examination frequency is contingent upon the design life of the affected welds (Please refer to Section 1.0 of the attached NUTECH design report).

In addition, fifty percent (50%) of the Recirc manifold sweepolet welds (includes weld 1B31-LRC-22AM-LBC-1) will be examined in a similar manner as discussed above.

All other stainless steel welds will be examined in accordance with the guidance of NUREG-0313, Rev. 1 as stated in our letter to NRC dated June 29, 1981. For your convenience, a copy of that letter is enclosed herein as Attachment 7 to this submittal.

Director of Nuclear Reactor Regulation
Attention: Mr. John Stolz, Chief
Operating Reactors Branch No. 4
January 27, 1983
Page Four

MODIFICATIONS/REPLACEMENTS

Modifications and/or replacements are under consideration. There are, however, no firm plans at this time. Because nonconforming material (as defined in NUREG-0313, Rev. 1) is utilized at Plant Hatch Unit 1, GPC has committed to NRC by letter dated June 29, 1981 (please see Attachment 7 to this submittal), to perform augmented inservice inspection in accordance with the guidance of NUREG-0313, Rev. 1. In addition, it was further committed that in the event that replacement of nonconforming material is required, at such time the affected component will be replaced with conforming material and processed in accordance with Section III of NUREG-0313, Rev. 1.


Assuming acceptable results from the nondestructive examinations and hydrostatic test, it is our intention to return Plant Hatch Unit 1 to power operation upon the completion of the current outage. We believe that the results of the inspection and the repair program provide an adequate basis for safe operation of the unit.

During a telephone conversation on January 24, 1983, with Messrs. G. Rivenbark (NRR Hatch Project Manager) and W. Hazelton (NRR-MTEB), a meeting was scheduled by GPC tentatively for February 1, 1983, at 10:00 a.m. in Bethesda for a presentation of the information contained herein to the appropriate NRC staff personnel. Assisting in the GPC presentation to the staff will be NUTECH and Southern Company Services personnel, as appropriate.

Pursuant to the request of Mr. J. Blake of NRC Region II, a copy of this submittal will be provided concurrently to the NRC regional office so they may assist in the review of the analyses and repairs at Plant Hatch Unit 1.

Should you have any questions in this regard, please contact this office.

Sincerely yours,



L. T. Gucwa
Chief Nuclear Engineer

JAE/mb
Attachments

xc: J. T. Beckham, Jr.
H. C. Nix, Jr.
J. P. O'Reilly (NRC- Region II)
Senior Resident Inspector

Georgia Power Company
333 Piedmont Avenue
Atlanta, Georgia 30308
Telephone 404 526-7020

ATTACHMENT 1

Mailing Address:
Post Office Box 4545
Atlanta, Georgia 30302

December 15, 1982

J. T. Beckham, Jr.
Vice President and General Manager
Nuclear Generation



U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II - Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30303

REFERENCE:
RII: JPO
50-321
I&E Bulletin
82-03

ATTENTION: Mr. James P. O'Reilly

GENTLEMEN:

Georgia Power Company (GPC) hereby submits the following information concerning inservice inspection activities at Plant Hatch Unit 1 in response to Items 1 and 4 of NRC I&E Bulletin 82-03. The subject bulletin pertains to stress corrosion cracking in austenitic stainless steel Recirculation System piping. A response to Items 2 and 3 of the bulletin will be submitted pursuant to bulletin requirements prior to resuming power operation after completion of the maintenance/refueling outage currently in progress.

Response to Item 1

Please refer to the response to Item 4d for discussion on the qualification of ultrasonic test procedures employed during inservice inspection activities at Plant Hatch Unit 1.

Response to Item 4a (1)

A total of fifty-one (51) circumferential and branch connection welds and six (6) longitudinal welds were examined ultrasonically during the 1982 inservice inspection. Please refer to Attachment 1 for isometric drawings of the Recirculation System piping. Welds which have been examined during the 1982 inservice inspection are denoted by circled weld numbers.

Response to Item 4a (2)

Please refer to Attachment 2 for criteria identification for weld sample selection. Discussed are the original scope of examinations, additional code-required examinations resulting from reportable indications observed in the original scope of examinations, and additional examinations in excess of code requirements performed by GPC.

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U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
December 15, 1982
Page Two

Response to Item 4a (3)

The following piping materials are used in the Recirculation System at Plant Hatch Unit 1:

12" Recirculation - Type 304 austenitic stainless steel, welded pipe (with filler metal) per ASTM A-358 Class 1 with ASTM A-240 base material; .568 inch min. wall (based on nominal O.D.).

22" Recirculation - Type 304 austenitic stainless steel welded pipe (with filler metal) per ASTM A-358 Class 1 with ASTM A-240 base material; .975 inch min. wall.

28" Recirculation - Suction side: Type 304 austenitic stainless steel welded pipe (with filler metal) per ASTM A-358 Class 1 with ASTM A-240 base material; 1.088 inch min. wall.

Discharge side: Type 304 austenitic stainless steel welded pipe (with filler metal) per ASTM A-358 Class 1 with ASTM A-240 base material; 1.263 inch min. wall.

Note: Four inch (4") Recirculation not addressed since piping removed during 1977 maintenance/refueling outage and capped.

Response to Item 4a (4)

Approximately thirty (30) man-rem were incurred in the performance of the inservice inspection. The exposure incurred does not include radiation exposure resulting from insulation removal and opening of sacrificial shield doors.

Response to Item 4b

The following is a summary description of procedures and techniques used during ultrasonic examination of austenitic stainless steel piping at the Plant Hatch Unit 1.

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
December 15, 1982
Page Three

Response to Item 4b (Continued)

A. Procedures

1. Southern Company Services (SCS) UT-H-400
2. Southwest Research Institute (SwRI) 600-3/59
3. Southwest Research Institute (SwRI) 700-5/8

These procedures require a 3/8" diameter, 1.5 MHz 45° angle beam transducer to be used during the ultrasonic examination of austenitic piping.

B. Calibration Standards

Stainless steel curved calibration blocks incorporating 1/8" diameter side drilled holes at 1/4T, 1/2T, and 3/4T depths were utilized.

C. Scanning Sensitivity

For manual UT examinations, scanning was performed at 14 dB above the Primary Reference Level. However, upon concurrence of an NDE Level III, this level could be reduced if baseline screen noise hindered the interpretation of the ultrasonic scope CRT. This scanning level was always at least 6 dB above the Primary Reference Level. For mechanized examinations, scanning was performed at 6 dB above the Primary Reference Level.

D. Recording Criteria

All indications which produced a response greater than 20% of the Distance Amplitude Curve (Primary Reference Level) which were not determined to be caused by outside diameter geometry were recorded. In addition, the examiners were instructed that any indication interpreted to be significant should be recorded.

Response to Item 4c

Examinations conducted since 1977 in the Recirculation System have been performed using 1.5 MHz transducers. Reportable indications were identified using such equipment on the 4" RWCU Return piping during the 1981 inservice inspection at Plant Hatch Unit 1. The subject piping is scheduled for replacement during the maintenance/refueling outage currently in progress pursuant to a commitment made to NRC. No other reportable indications due to intergranular stress corrosion cracking (IGSCC) have been observed using 1.5 MHz transducers at Plant Hatch Unit 1.

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
December 15, 1982
Page Four

Response to Item 4d

In cooperation with Electric Power Research Institute (EPRI) and Battelle Laboratories, an evaluation of the crack detection capabilities of ultrasonic procedures and techniques was developed at the Battelle-Columbus Laboratories in Columbus, Ohio. Portions of five 28" stainless steel recirculation system piping welds which contained liquid penetrant-identified IGSCC indications from the Nine Mile Point Nuclear Plant were prepared for ultrasonic examination. SCS and SwRI examined the 5 specimens using procedures and techniques mentioned in the response to Item 4b (excluding the mechanized procedure) and demonstrated to the satisfaction of NRC Inspectors, Mr. Bill Crowley and Mr. James Coley, the ability to adequately detect and evaluate IGSCC. These specimens and the UT procedures and techniques were representative of examinations that were performed at the Plant Hatch Unit 1. However, the SwRI remotely operated mechanized ultrasonic equipment procedures and techniques were not demonstrated at Battelle Laboratories. Upon review of the SwRI procedures and techniques, the ultrasonic examinations conducted with the remotely operated mechanized equipment were determined to be adequate in the detection of IGSCC.

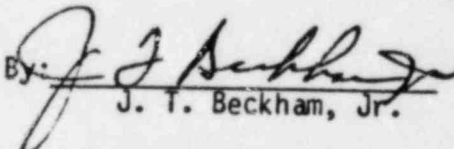
Enclosed as Attachment 3 is a summary of reportable indications observed during the inservice inspection just completed on Plant Hatch Unit 1.

Should you have any questions in this regard, please contact this office.

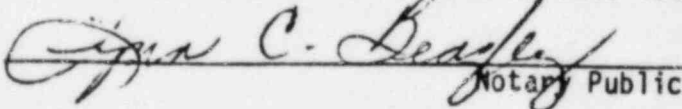
J. T. Beckham, Jr. states that he is Vice President of Georgia Power Company and is authorized to execute this oath on behalf of Georgia Power Company, and that to the best of his knowledge and belief the facts set forth in this letter are true.

GEORGIA POWER COMPANY

Notary Public, Georgia, State of Georgia
My Commission Expires July 27, 1985

By: 
J. T. Beckham, Jr.

Sworn to and subscribed before me this 15th day of December, 1982


Notary Public

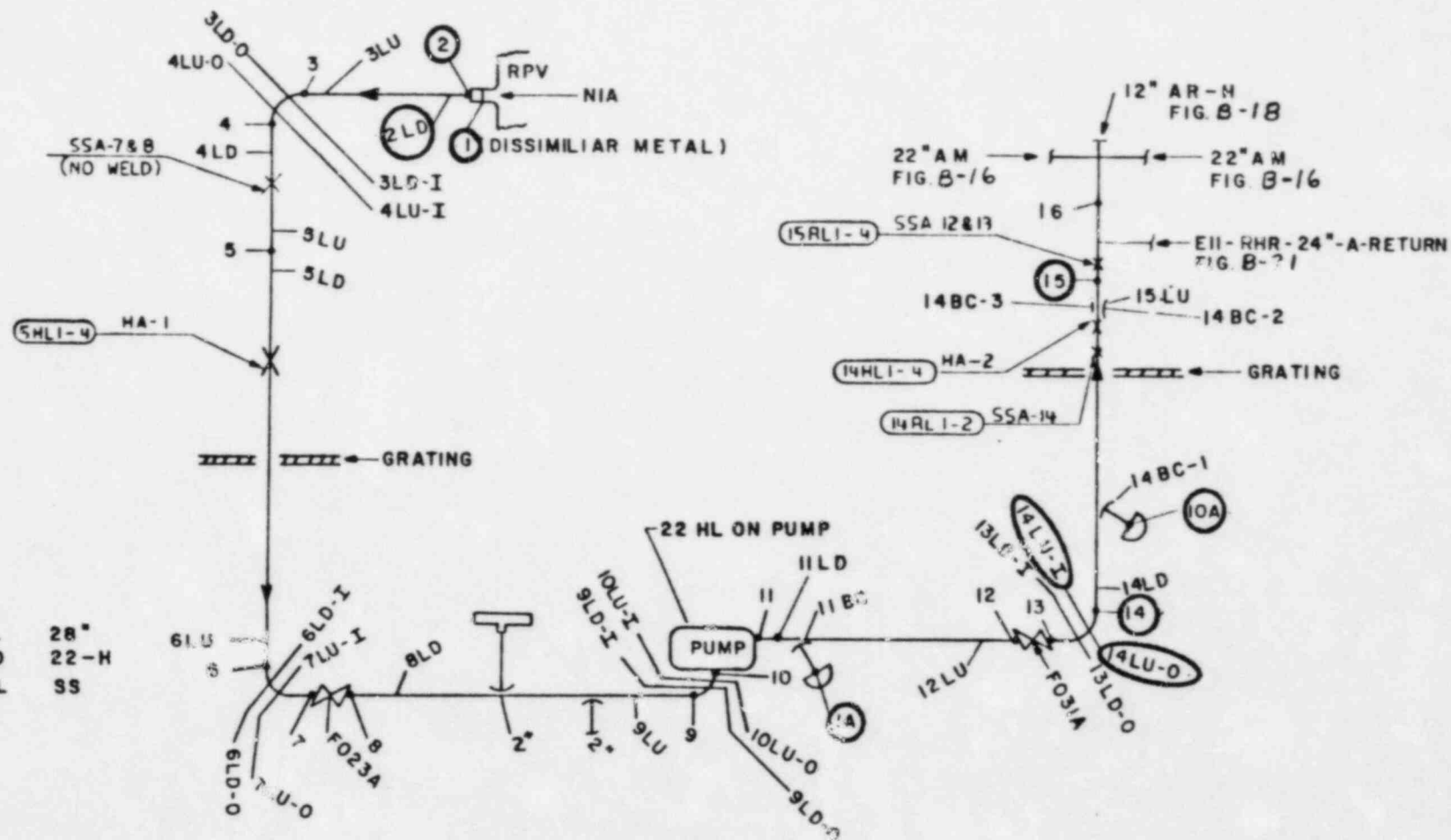
JAE/mb
Enclosure

xc: H. C. Nix, Jr.
Senior Resident Inspector
USNRC, Document Control Desk (Washington)

ATTACHMENT 1

ISOMETRIC DRAWINGS
FOR
RECIRCULATION SYSTEM

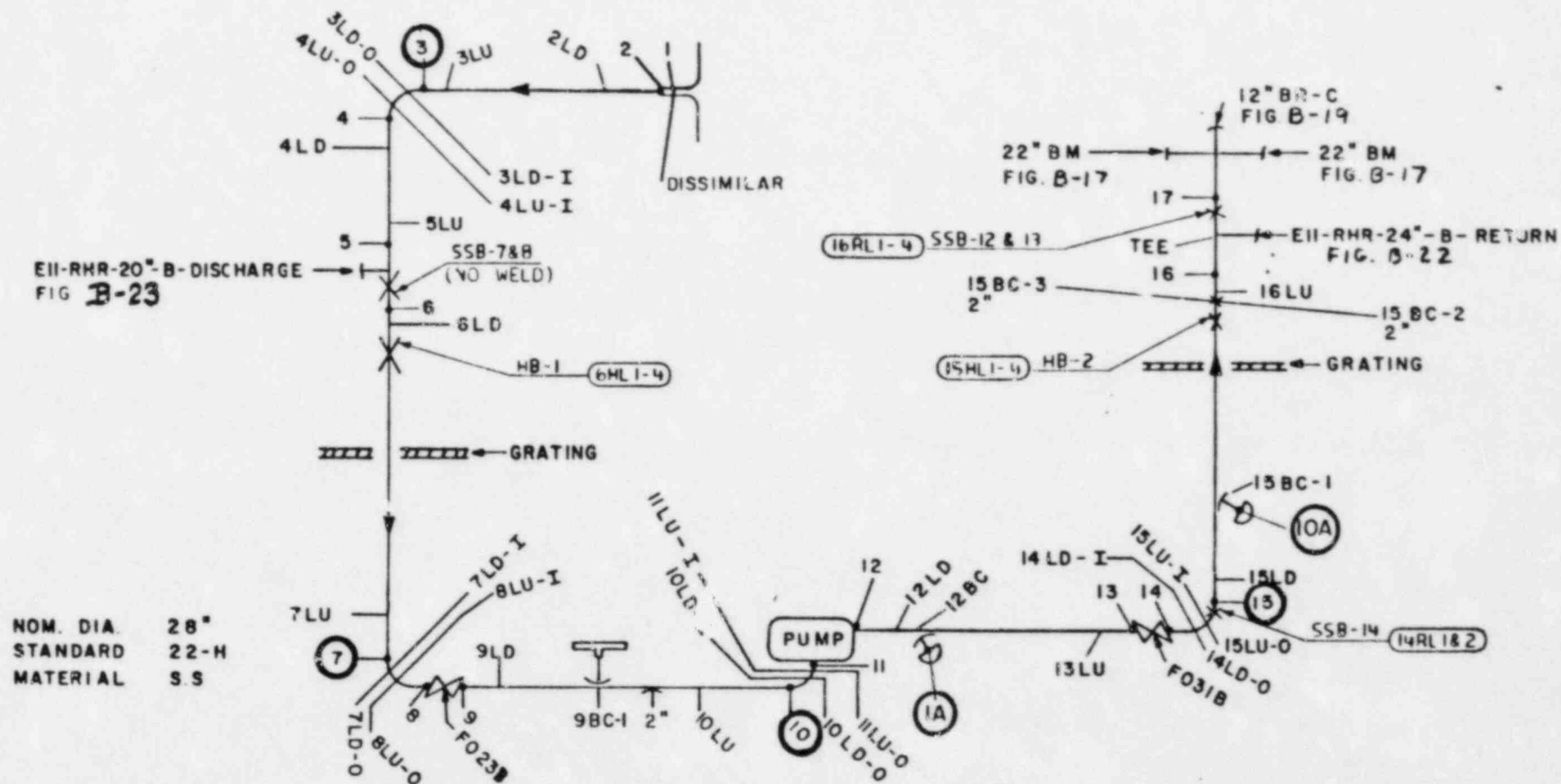
NOM. DIA.	28"
STANDARD	22-H
MATERIAL	SS



GEORGIA POWER COMPANY
EDWIN I. HATCH NO 1

B71 - RECIRC - 28-A -
MAIN RECIRCULATION LOOP "A"

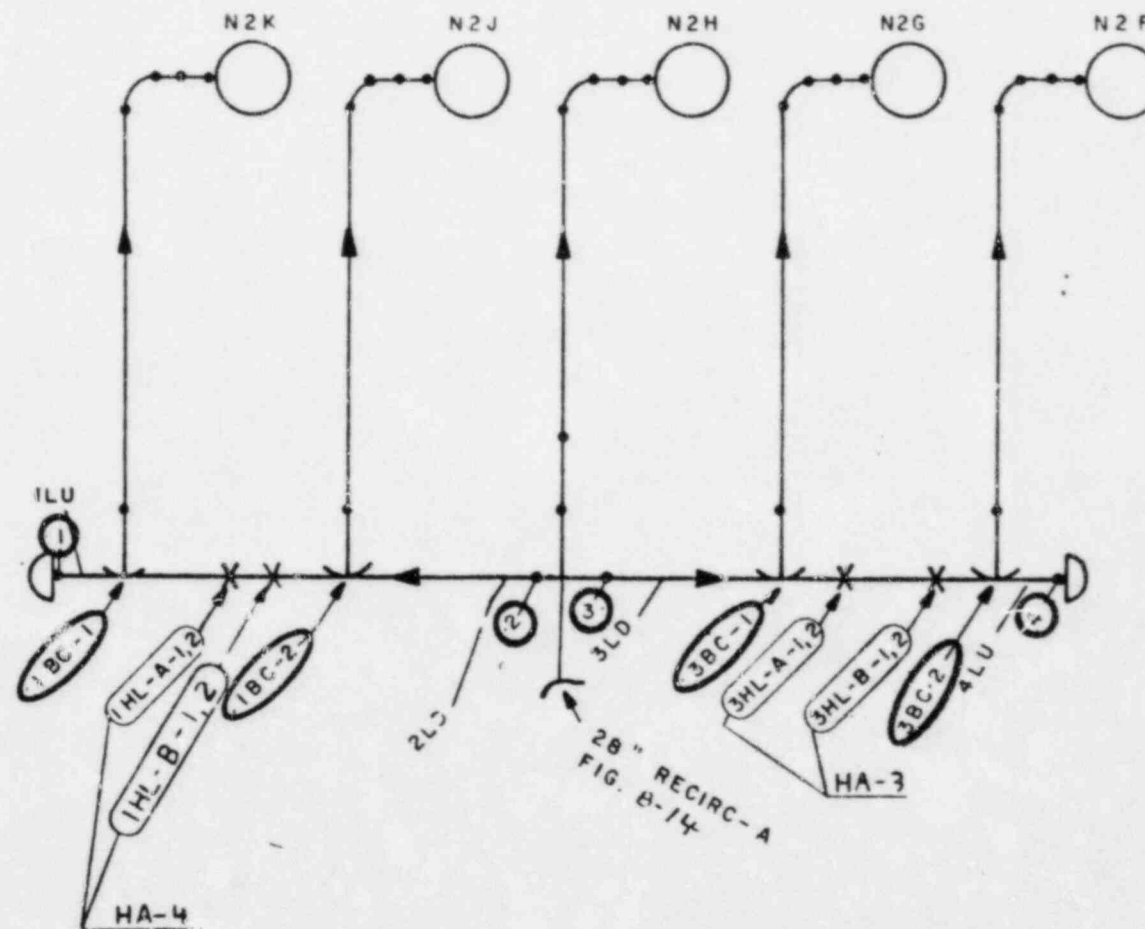
8-14



B31-RECIRC-28-B
MAIN RECIRCULATION LOOP "B"

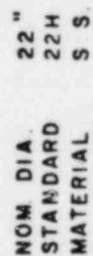
GEORGIA POWER COMPANY
EDWIN I HATCH NO. 1

NOM. DIA. 22"
 STANDARD 22-H
 MATERIAL SS



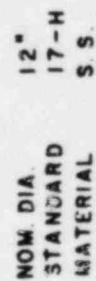
GEORGIA POWER COMPANY
 EDWIN I. HATCH NO. 1

B31-RECIRC-22A-M
 RECIRCULATION MANIFOLD "A"



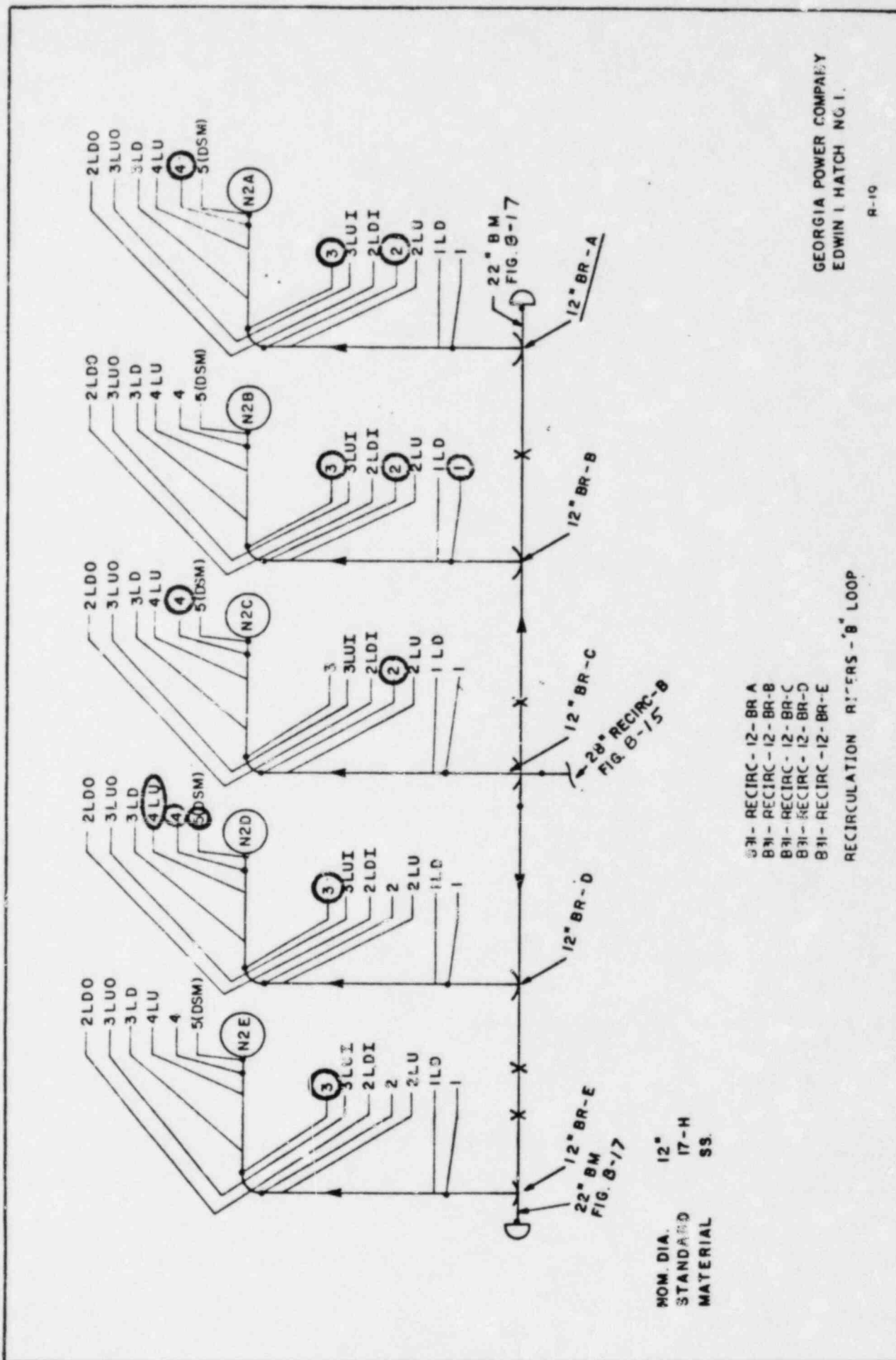
GEORGIA POWER CO.
EDWIN I. HATCH NO. 1

B-17



RECIRCULATION RISERS - "A" LOOP

B-1A



GEORGIA POWER COMPANY
EDWIN I HATCH NO. 1.

R-19

ATTACHMENT 2

EXAMINATION SAMPLE BASIS/LISTING

- ORIGINAL SCOPE OF EXAMINATIONS

Welds from the Recirc System were picked on the basis of ASME Section XI Code, NUREG-0313, Rev. 1 guidance (high stress welds with $S_m \geq 2.4$), and commitments to NRC resulting from the Spring 1982 chloride intrusion. A total of nineteen circumferential welds were examined in the 4", 12", 22" and 28" Recirc System piping. In addition, six longitudinal welds were examined. The following welds were examined:

Weld #

Circumferential and Branch Connections

4A-1A
4A-10A
4B-1A
4B-10A
12 AR-K-1
12 AR-G-4
12 AR-G-5
12 BR-B-1
12 BR-D-4
12 BR-D-5
22 AM-1
22 AM-1BC-1
22 BM-3
22 BM-3BC-1
22 BM-4
28 A-1
28 A-2
28 A-14
28 A-15

Longitudinal

12 AR-G-4LU
12 BR-D-4LU
22 BM-3LD
28 A-2LD
28 A-14LU-O
28 A-14LU-I

- ADDITIONAL CODE-REQUIRED EXAMINATIONS

As a result of reportable indications observed in the original scope of examinations for Recirc, nineteen additional examinations were performed. Welds were chosen on the basis of high preliminary stress rule index (SRI) numbers provided by GE. The following circumferential welds were examined:

<u>Weld #</u>	<u>SRI #</u>	<u>% Carbon Content*</u>
12 AR-F-3	1.534	.075
12 AR-H-4	1.382	.075
12 AR-J-2	1.476	.075
12 BR-A-2	1.409	.075
12 BR-C-4	1.346	.075
12 BR-E-3	1.566	.075
22 AM-1BC-2	1.025	.060
22 AM-2	0.921	.056
22 AM-3	1.041	.059
22 AM-3BC-1	1.041	.060
22 AM-3BC-2	1.063	.060
22 BM-1BC-1	0.99	.060
22 BM-1BC-2	0.988	.060
22 BM-2	1.037	.059
22 BM-3BC-2	1.016	.060
28 B-3	1.484	.059
28 B-7	1.415	.059
28 B-10	1.524	.069
28 B-15	1.496	.059

*Note: % Carbon Content unavailable at time of second sample determination; provided later by GE.

● ADDITIONAL EXAMINATIONS PERFORMED FOR GPC

Eleven additional examinations were performed and were chosen on the basis of revised high SRI and carbon content. The following circumferential welds were examined:

<u>Weld #</u>	<u>SRI #</u>	<u>% Carbon Content*</u>
12 AR-G-2	1.474	.075
12 AR-G-3	1.557	.075
12 AR-H-2	1.537	.075
12 AR-H-3	1.519	.075
12 AR-J-3	1.473	.075
12 BR-A-3	1.508	.075
12 BR-A-4	1.255	.075
12 BR-B-2	1.441	.075
12 BR-B-3	1.447	.075
12 BR-C-2	1.527	.075
12 BR-D-3	1.577	.047

ATTACHMENT 3

SUMMARY OF REPORTABLE INDICATIONS

The following is a summary of reportable indications found during the inservice inspection just completed on Plant Hatch Unit 1:

Weld No. 1B31-1RC-22AM-1
Pipe to Cap

Reference Location: 0° is top dead center of manifold looking toward cap.

Indications: Thirty-one 1/4" to 3/8" long axial indications on cap, 55-100% DAC, located uniformly around cap with a cluster at the bottom of the cap. Maximum depth is 63% through wall located 49" CW from 0°.

Weld No. 1B31-1RC-22AM-1BC-1
Branch Connection

Reference Location: 0° is at the top dead center of the manifold on the upstream side (toward cross). Clockwise is measured from 0° looking up the riser (90° is toward the reactor).

Indications: Seven 1/4" to 1/2" long indications on the weldolet oriented perpendicular to the weld, 20-50% DAC. Five are located from 63" to 77" CW from 0° and have no appreciable depth. Two are located at approximately 200° CW from 0° with one having a maximum depth of 12% and the other having no appreciable depth.

Weld No. 1B31-1RC-22AM-4
Pipe to Cap

Reference Location: 0° is top dead center of manifold looking toward cap.

Indications: Thirty-two 1/4" to 1/2" long axial indications on cap, 30-140% DAC, located uniformly around cap with clusters at top and bottom of cap. Maximum depth is 72% through wall located 56" CW from 0°.

Note: Weld 1B31-1RC-22AM-4 added after reportable indications observed in pipe to cap welds in original scope of examinations.

Weld No. 1B31-1RC-22BM-1
Pipe to Cap

Reference Location: 0° is top dead center of manifold looking toward cap.

Indications: Five 1/4" long axial indications on cap, 40-105% DAC. Two are located approximately 23" CW from 0° and three 60" CW from 0° (near top of cap). Maximum depth is 64% through wall located in the cluster of three near the top of the cap.

Note: Weld 1B31-1RC-22BM-1 added after reportable indications observed in pipe to cap welds in original scope of examinations.

Weld No. 1B31-1RC-22BM-4
Pipe to Cap

Reference Location: 00 is top dead center of manifold looking toward cap.

Indications: Seventeen 1/4" to 1/2" long axial indications on cap, 30-130% DAC. Twelve of the seventeen indications are clustered near bottom of cap. The others are randomly distributed around the circumference of the weld. Maximum depth is 67% through wall located 66 1/2" CW from 00 in a cluster at the top.

Weld No. 1E11-1RHR-20B-D-3
Elbow to Pipe

Reference Location: Looking toward pipe side with 00 on outside of elbow.

Indications: One 1/4" long axial indication on pipe side, 170% DAC, located 23" CW from 00, 94% through wall depth.

Four 1/4" to 3/8" long axial indications on pipe size, 40-140% DAC, located 34" to 37" CW from 00, depth less than above.

One 1 1/2" long circumferential indication on pipe size, 200% DAC, located 27" CW from 00, less than 10% through wall depth.

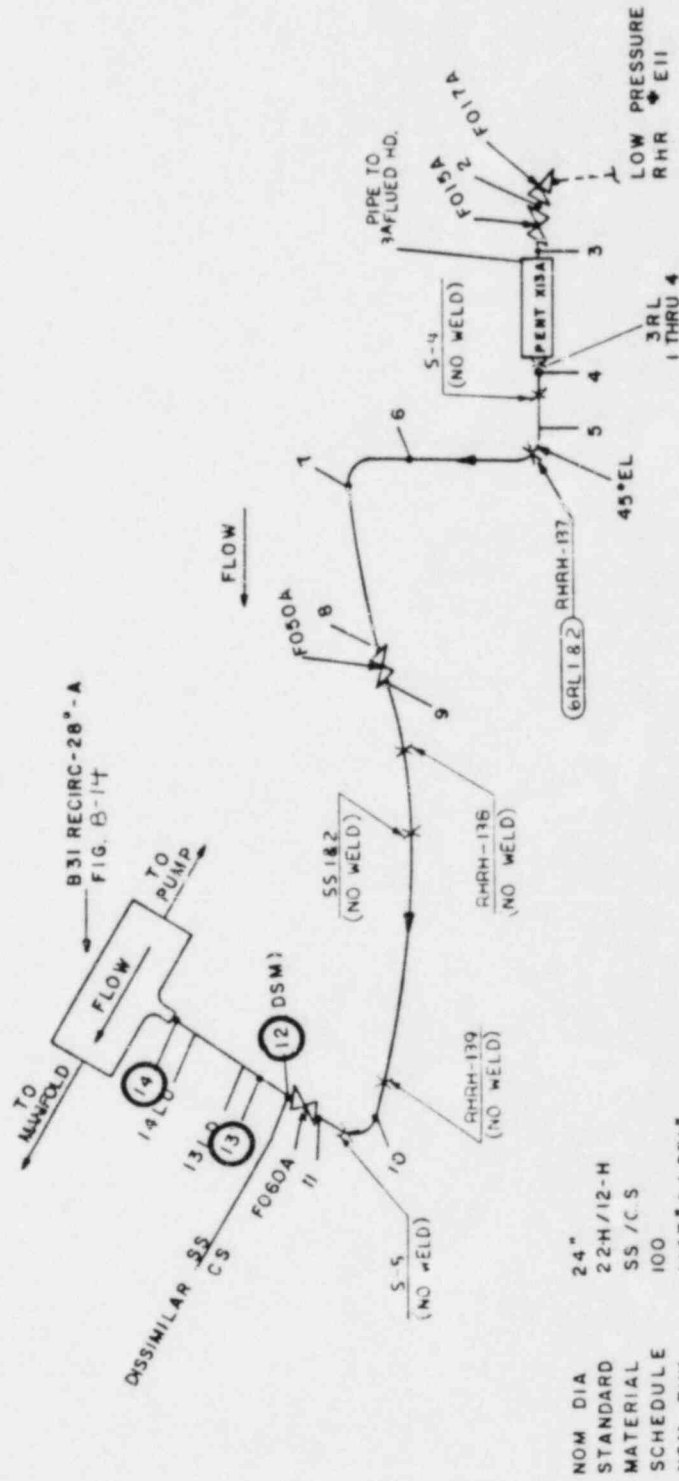
One 1 1/2" long circumferential indication on elbow side, 100% DAC, located 47" CW from 00, 33% through wall depth.

Weld No. 1E11-1RHR-24B-R-13
Pipe to Pipe

Reference Location: 00 is at the top dead center of the pipe looking toward the reactor recirculation system.

Indications: Six 1/4" to 3/8" long axial indications located on the upstream side of the weld. Three indications are located approximately 1" to 3" CW from 00 (top of pipe) and three indications are located approximately 14" to 17" CW from 00. The maximum through wall depth is 47% for an indication located at the top of the pipe (5" CW on I.D. surface).

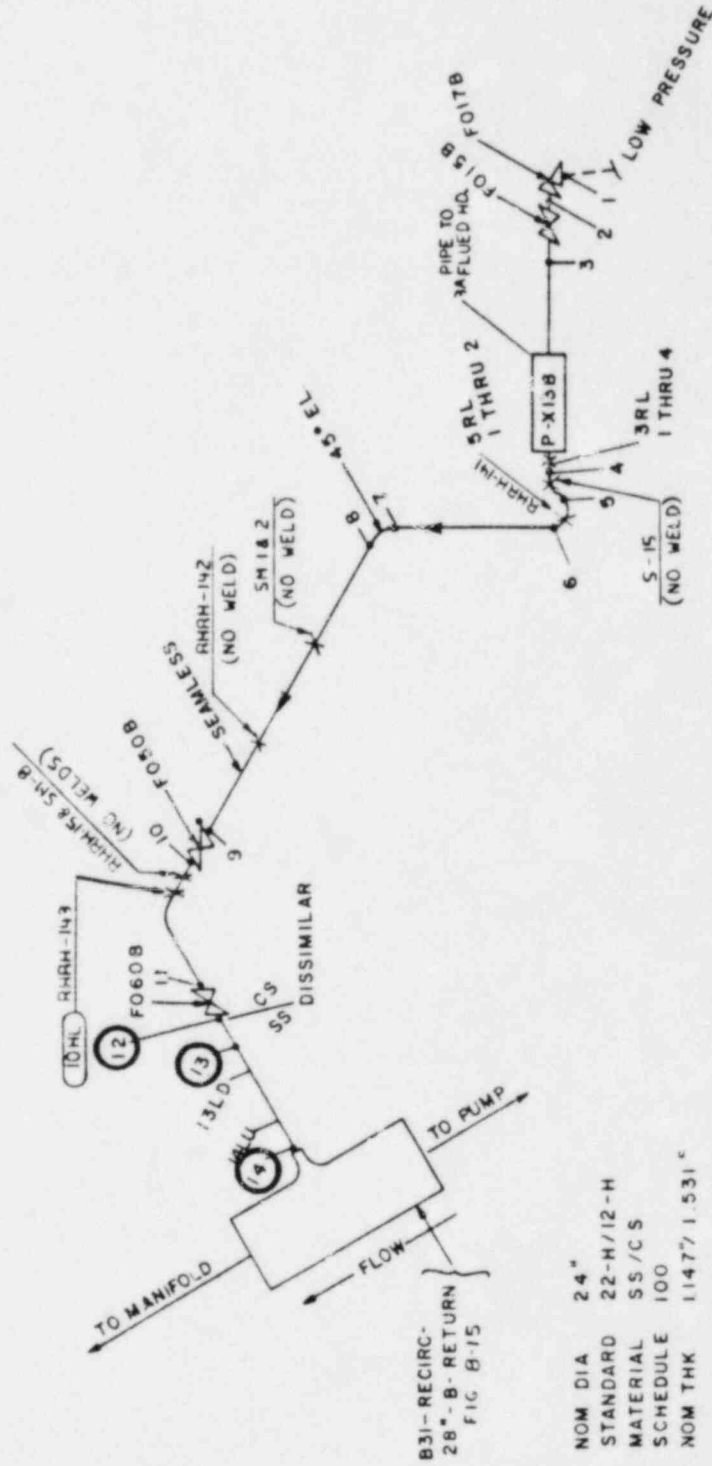
Weld No. 1B31-1RC-28A-14 was ultrasonically examined by SwRI and preliminary evaluations revealed the possibility of a 5 1/2" linear indication. This was reported to GPC by SwRI on a Customer Notification Form. However, extensive investigation, which included a complete reexamination by another inspection contractor (also NDE Level III review), review of the construction (preservice) radiographs, and a reexamination and evaluation by another SwRI NDE Level III, concluded this indication to be inside surface geometry, i.e., counterbore. In addition, a SCS NDE Level III representing GPC reviewed the radiographs and ultrasonic data and concurred with the investigation and the weld was accepted for service.



GEORGIA POWER COMPANY
EDWIN I. MATCH NO. 1

B-21

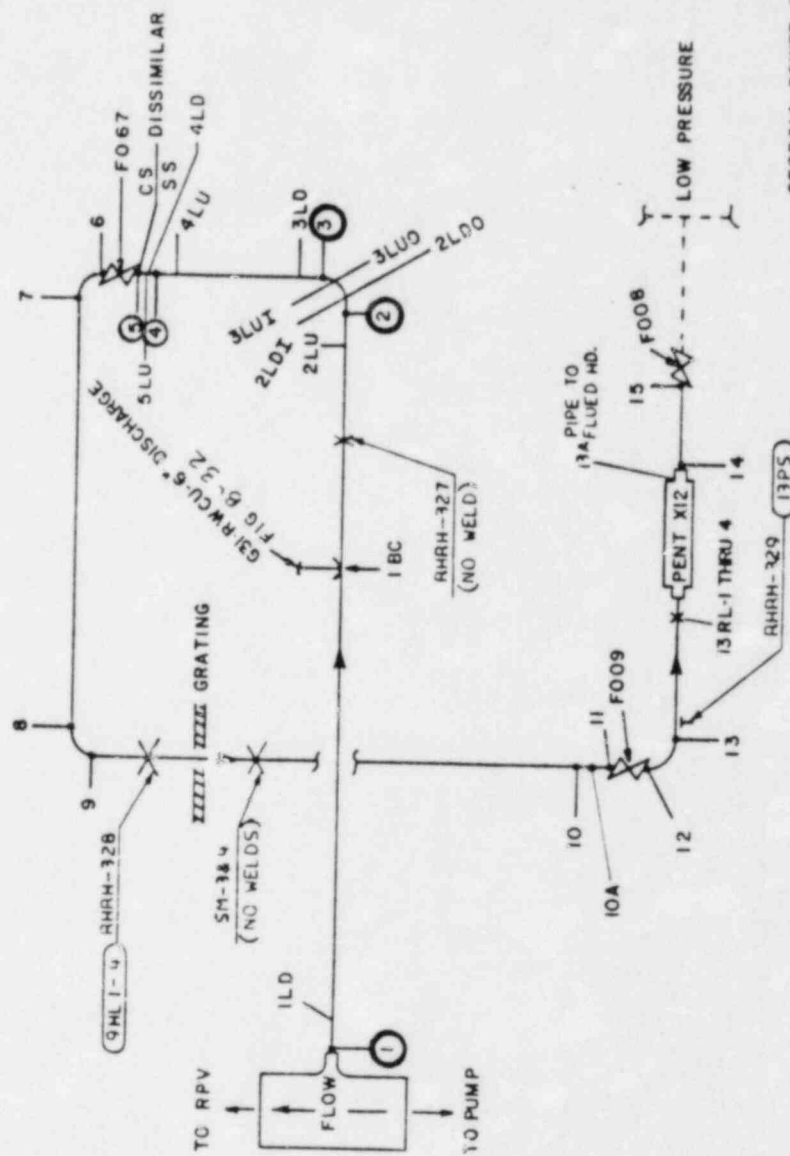
21 - RHR - 24 - A - RETURN
RHR / LPCI RETURN



GEORGIA POWER SUPPLY
EDWIN I. HATCH NO. 1

22-9

EH - HHR - 24 - B - RETURN
HHRH / LPCI - INJECTION



NOM DIA 20"
 STANDARD 21-H/14-H
 MATERIAL (S) SS / CS
 SCHEDULE 80
 NOM THK 1.315 / 1.281"

EII-RHD-20-B-DISCHARGE
 RHR DISCHARGE

GEORGIA POWER CO
 EDWIN I. HATCH NO. 1

B-23