

Iowa Electric Light and Power Company

December 1, 1982
NG-82-2653

LARRY D. ROOT
ASSISTANT VICE PRESIDENT
NUCLEAR GENERATION

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Response to IE Bulletin 82-03, IGSCC

Dear Mr. Keppler:

This letter and attachments are submitted in response to your IE Bulletin 82-03, Revision 1, issued October 28, 1982. In accordance with your request, this letter provides response to those items in your Bulletin for which you requested information by December 1, 1982. Additional information will be developed prior to and during the DAEC Cycle 7 refueling outage which is currently scheduled to begin on February 11, 1983. This additional information will be forwarded to you as it is developed.

Attachment 1 responds on an item by item basis to IEB-82-03. For convenience, we have also reproduced the questions and requests for information of your Bulletin. Four additional attachments are provided which contain detailed information.

Preparation and submittal of this letter and information to the NRC is estimated to have required approximately three man weeks of engineering effort. Estimates of resources that will be devoted to preparing future submittals will be provided in subsequent correspondence.

In accordance with your request, this letter and attachments are submitted under oath and affirmation.

IOWA ELECTRIC LIGHT AND POWER COMPANY

BY Philip M. Root
Larry D. Root

8212100295 821201
PDR ADOCK 05000331
G PDR

LDR/WJM/dmh*
Attachments

cc: W. Miller
D. Arnold
L. Liu
S. Tuthill
F. Apicella
NRC Resident Office
Ref: Commitment Control No. 82-0434

Subscribed and sworn to Before Me on
this 1st day of December 1982.

Mary E. Benfield
Notary Public in and for the State of Iowa

1882 - A CENTURY OF SERVICE -

MARY E. BENFIELD
COMMISSION EXPIRING
SEPTEMBER 30, 1983

DEC 6 1982
IE 11

(1)

ATTACHMENT 1

IEB 82-03 Item 1

Actions To Be Taken by Licensees of BWR Facilities Identified in Table 1:

1. Before resuming power operations following the current refueling or extended outage, the licensee is to demonstrate the effectiveness of the detection capability of the ultrasonic methodology used or planned to be used to examine welds in recirculation system piping. This demonstration shall be made on representative service-induced cracked pipe samples. Arrangements should be made to allow NRC to witness this demonstration. This demonstration shall employ those procedures and standards, the same type of equipment (same transducer size, frequencies and calibration-standards), and representative UT personnel from the inservice inspection (ISI) organization utilized or to be utilized in the examinations at the plant site.*

Response to Item 1

The Level III Inspector that DAEC will utilize for the Cycle 7 DAEC refueling outage inspections is Mr. Elwin L. Thomas of the firm of Lambert, Macgill and Thomas. Mr. Thomas has previously demonstrated on behalf of Northeast Utilities the effectiveness of UT methodology that is functionally equivalent to that to be employed at DAEC. This demonstration was conducted at the Battelle Memorial Institute in Columbus, Ohio and included samples of the Nine Mile Point Unit 1 Plant. It is our understanding that representatives of the NRC were present to witness this demonstration.

It is our intent not to repeat the demonstration by Mr. Thomas. In the event the NRC believes a repeat of this demonstration is necessary, we request prompt notification to allow scheduling of a demonstration that will avoid impacting the DAEC refueling schedule.

IEB 82-03 Item 2

2. Before resuming power operations following the current refueling or extended outage, the licensee is to provide a listing of results of recirculation system piping inspections.

Response to Item 2

The requested information will be provided prior to resuming power operations following DAEC Cycle 7 refueling outage.

*We understand that Electric Power Research Institute (EPRI) has arranged to have samples from the Nine Mile Point Unit 1 plant available for industry demonstrations of UT methodology. The samples have been taken to Battelle Memorial Institute in Columbus, Ohio for characterization and subsequent use.

(2)
Attachment 1

IEB 82-03, Item 3

3. Before resuming power operations following the current refueling or extended outage, the licensee (if the inspections indicate the presence of cracks) is to describe the corrective actions taken and report these in accordance with the appropriate regulations.

Response to Item 3:

The requested information will be provided prior to resuming power operations following DAEC Cycle 7 refueling outage.

IEB 82-03, Item 4a

4. To assist NRC's further evaluation of this issue, the following shall be submitted by December 1, 1982:
 - a. A description of the sampling plan used or to be used during this outage for UT examinations of recirculation system piping welds and the bases for the plan. The description should:
 - (1) Provide an isometric drawing of the recirculation system piping showing all the welds, and the number of welds and their locations that have been examined or will be examined.
 - (2) Identify criteria for weld sample selection (e.g., stress rule index, carbon content, high stress location, and their values for each weld examined).
 - (3) Describe piping material(s), including material type, diameter, and wall thickness.
 - (4) Estimate the occupational radiation exposure incurred or expected and briefly summarize measures taken to maintain individual and collective exposures as low as reasonably achievable.

Response to Item 4a:

- (1) Attachment 2 contains isometric drawings of the DAEC recirculation system and a matrix of prior and scheduled weld inspections for the DAEC Cycle 7 refueling outage.
- (2) Criteria for weld sample selection for all recirculation system welds that have been examined since the 1980 refueling outage and those welds to be examined during the 1983 outage have been based upon stress rule index and carbon content. In addition to the above, all welds in these recirculation system bypass loops have been examined during each refueling outage since 1975. Also, all welds in the recirculation inlet risers will have been examined once and more than

(3)
Attachment 1

fifty percent of the riser welds will have been examined a second time with the 1983 outage examinations. The isometric drawings and IGSCC Susceptibility Matrix (Attachment 2) identifies all welds and the year of the latest examination. Also, the Stress Corrosion Cracking Evaluation Program Report - Duane Arnold Energy Center; dated April 23, 1980 (Attachment 3) identifies the carbon content of material and the stress rule index for each weld.

- (3) Attachment 3 identifies each component in the recirculation system by size and material specification and type. The main loop piping is 22 inch O.D. Schedule 80 pipe and fittings.

The ring headers are nominal 16" O.D. with nominal thickness of 1 and 1/8". The header cap is 16" O.D. with a minimum wall thickness of 0.708". The inlet risers are 10" schedule 80 nominal size pipe and the bypass loops are 4" Schedule 80 nominal pipe size.

- (4) The estimated occupational exposure for personnel involved in preparing for scheduled recirculation system inspections (insulation removal for example), conducting inspections, and restoring the piping systems to pre-inspection status is 37 man rems. This calculation does not include exposure that would be incurred in the event any repairs are warranted.

The primary means that will be utilized to limit occupational dose is: (a) the installation of temporary shielding blankets and (b) limiting worker time in radiation fields. Based on past experience, installation of heavy shielding or internal systems decontamination are not judged to be cost effective or effective in dose reduction due to increased exposure to install heavy shielding or to decontaminate systems.

IEB 82-03, Item 4b

- b. A summary description of the UT procedures and calibration standards used or to be employed in the examination at the licensee's plant site. This description should include the scanning sensitivity, the evaluation sensitivity and the recording criteria.

Response to Item 4b:

Iowa Electric plans to use Ultrasonic Procedure #UT-27 Revision 0 with field changes in our next refueling outage. This procedure has successfully detected cracks at Duane Arnold in 4" schedule 80 pipe which was verified by Dye Penetrant Test after pipe removal. A description of #UT-27 Revision 0 is as follows:

- (1) The primary reflection is 5% notchs for Class 1 piping.

(4)
Attachment 1

- (2) Evaluation sensitivity is established by setting the nearest notch echo to 80% of full calibrated scale.
- (3) Scanning sensitivity shall be 6 db greater than the primary response.
- (4) A calibration check is required before and after each examination.
- (5) Examiners must be certified at a minimum as Level II in Ultrasonic Testing to evaluate results and subsequent review and evaluation by Level III, will be provided.
- (6) Evaluation is in accordance with IWA 3100 (b) of ASME Section XI (1974) with addenda through Summer, 1975. Iowa Electric plans to continue its policy of recording any indication determined to be a crack regardless of amplitude or size.
- (7) Strip chart recordings are planned for recording shear wave results.
- (8) All recorded chart signals shall be identified.
- (9) Calibration blocks shall be of the same nominal size, thickness, material, and surface finish as the pipe to be examined in the 1983 outage.

IEB 82-03, Item 4c

- c. A summary of the results of any previous inspection of the recirculation system piping welds which used the validated examination methodology as discussed in Action Item 1 above.

Response to Item 4c:

Attachment 4 summarizes the results of 1981 and 1982 recirculation system inspections. These inspections were conducted with functionally equivalent UT examination techniques as is discussed in the response to items 1 and 4b, above.

IEB 82-03, Item 4d

- d. An evaluation of the crack-detection capability of ultrasonic methodology used or planned to be used to examine recirculation system piping welds. This evaluation should result from conducting the demonstration required in Action Item 1 above, and should include a comparison of the service-induced pipe crack sample to those welds actually examined in the licensee's plant in terms of pipe wall thickness and diameter, weld geometry, and materials.

(5)
Attachment 1

Response to Item 4d:

The requested information will be provided in a future submittal prior to DAEC resuming power operations following Cycle 7 refueling outage.

0 - 1.20

1.21 - 1.50

STRESS RULE INDEX

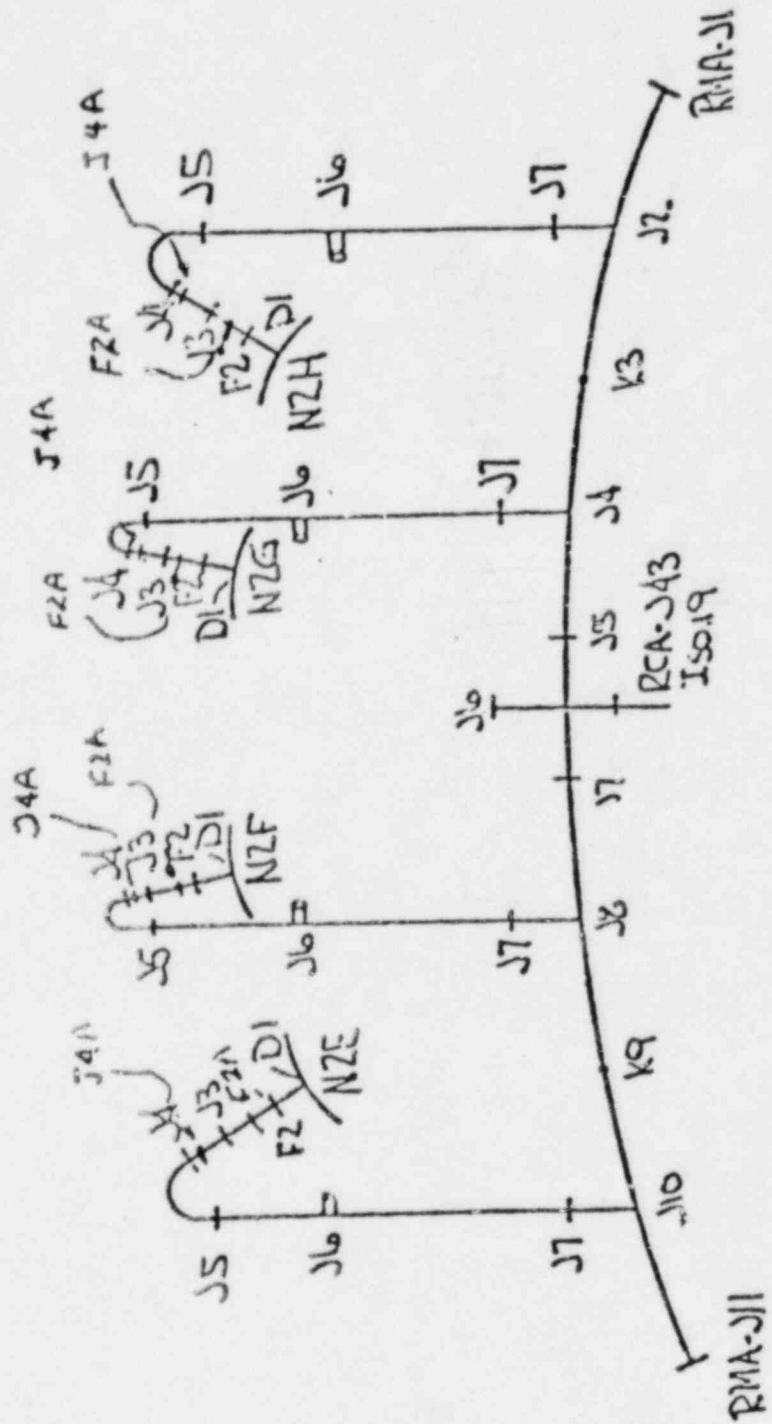
1.51 - 2.00

2.01 +

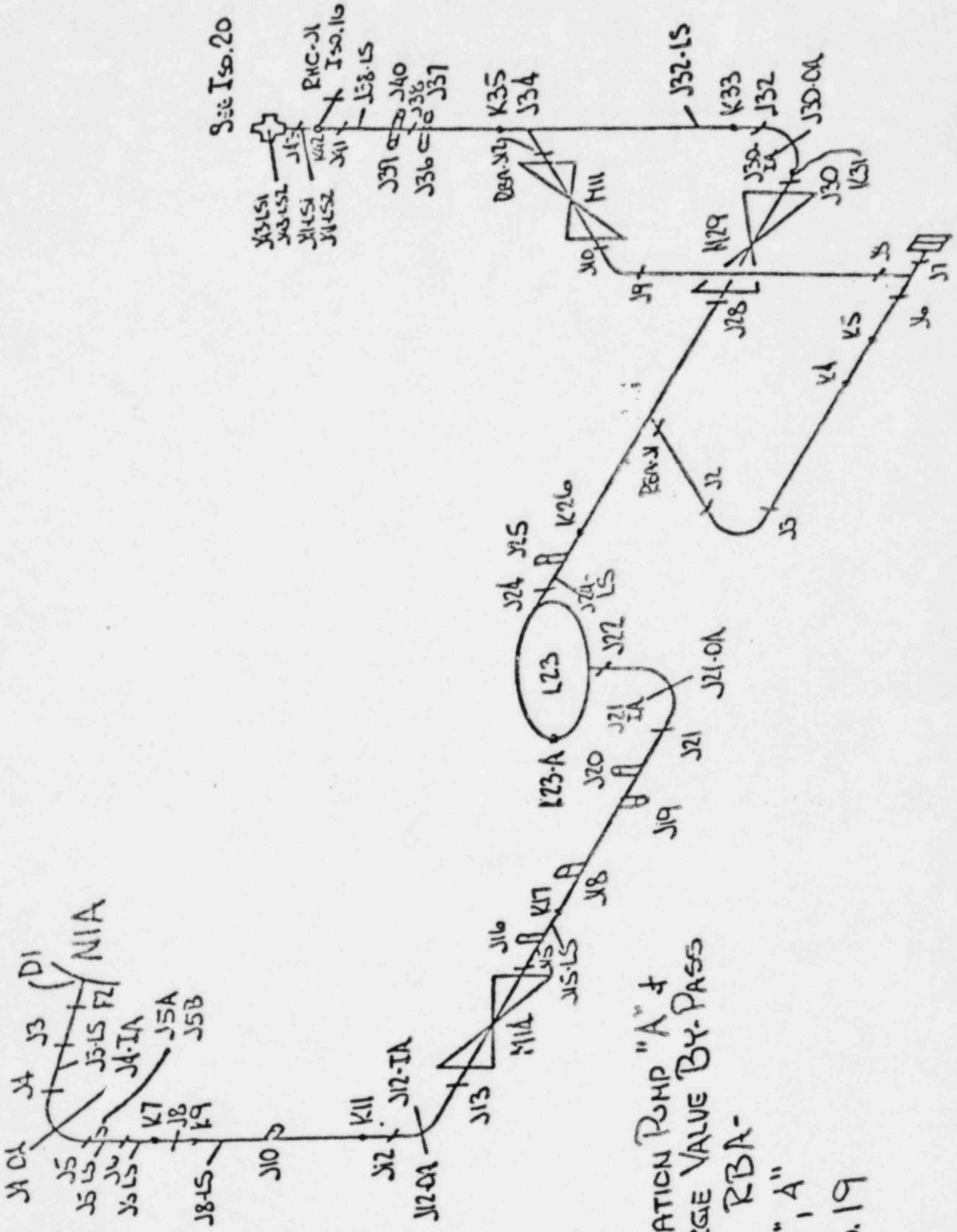
ATTACHMENT 2 CARBON CONTENT (%)	.070 +	RRA-J7 (5,7) RRD-J7 (5) RRE-J7 (3) RRF-J7 (5) RRH-J7 (5)	RCA-J18 (7) RMA-J10 (5) RRG-J7 (5) RCB-J21 (5) RRB-J7 (5) RRC-J7 (5)	RMA-J4 (5) RMA-J2 (5) RMB-J11 (5) RMB-J2 (5)	RMA-J8 (5) RMB-J5 (5) RMB-J9 (5)
	.060 - .059	RCA-J27 (5) RBA-J7* (5) RCB-J30 (5) RHC-F2 (7) RHD-F2 (2)	RCA-J34 (5) RBA-J1* (5,7) RRE-J4 (6) RRF-J4 (6) RRC-J4 (6,7) RRD-J4 (5,7) RCB-J3 (5)	RBB-J1* (5) RBB-J7* (5) RBB-J12* (5,7) RHC-J1 (7) RHD-J1 (2)	RRA/H-J5 (8 WELDS) (5) RBA-J6* (5,7) RBA-J8* (5,7) RRG-J4 (5,7) RRH-J4 (5,7) RRA-J4 (6) RRB-J4 (6) REGION III (HIGH SUSCEPTIBILITY)
	.050 - .059	RCA-J7 (7) RCB-J27 (4) RCA-J15 RCB-J31 (3) RCA-J24 (4) RCB-J41 RCA-J28 (3) RMB-J1 RCA-J38 RMB-J12 (3) RMA-J1 RHB-J1 (1) RMA-J11 (3) RRA/H-J4A (8 WELDS) A,B,E,F (6) C,D,G,H (5,7)	RCA-J12 (1) RMA-J5 (7) RCB-J27 (7) RCA-J13 (1) RMA-J7 (7) RMB-J27 (7) RCA-J21 (4) RBA-J2 (5) RMB-J7 (7) RCA-330 (7) RBA-J3 (5) RMB-J7 (7) RCA-J32 (7) RCB-J6 (7) RBB-J6 (5) RCA-J41 (7) RCB-J7 (7) RBB-J3* (5) RCA-J43 (7) RCB-J33 (7) RMA-J6 (7) RCB-J35 (3,7) RRA/H-J3 (8 WELDS) A,B,E,F (6) C,D,G,H (5,7)	RBA-J9* (5) RBB-J9* (5)	
	.035 - .049	RCA-J3 (1) RCA-J6 (1) RCB-J3 (1) RCB-J9 (1) RCB-J18	RCA-J4 (1) RCB-J24 (7) RCA-J5 (1) RCB-J46 (2) RBA-J12* (5,7) RCB-J4 (1) RCB-J5 (1) RCB-J15 (1) RCB-J16 (1)	RCA-J22 (4) RBA-J10* (5) RCB-J25 (7) RBB-J10* (5)	
	<.035	RHB-F3 (1) RCA-F2 (1) RCB-F2 (1) RRA/H-F2A (8 WELDS) A,B,E,F (6) C,D,G,H (5,7)			REGION I (LOW SUSCEPTIBILITY)

NOTES

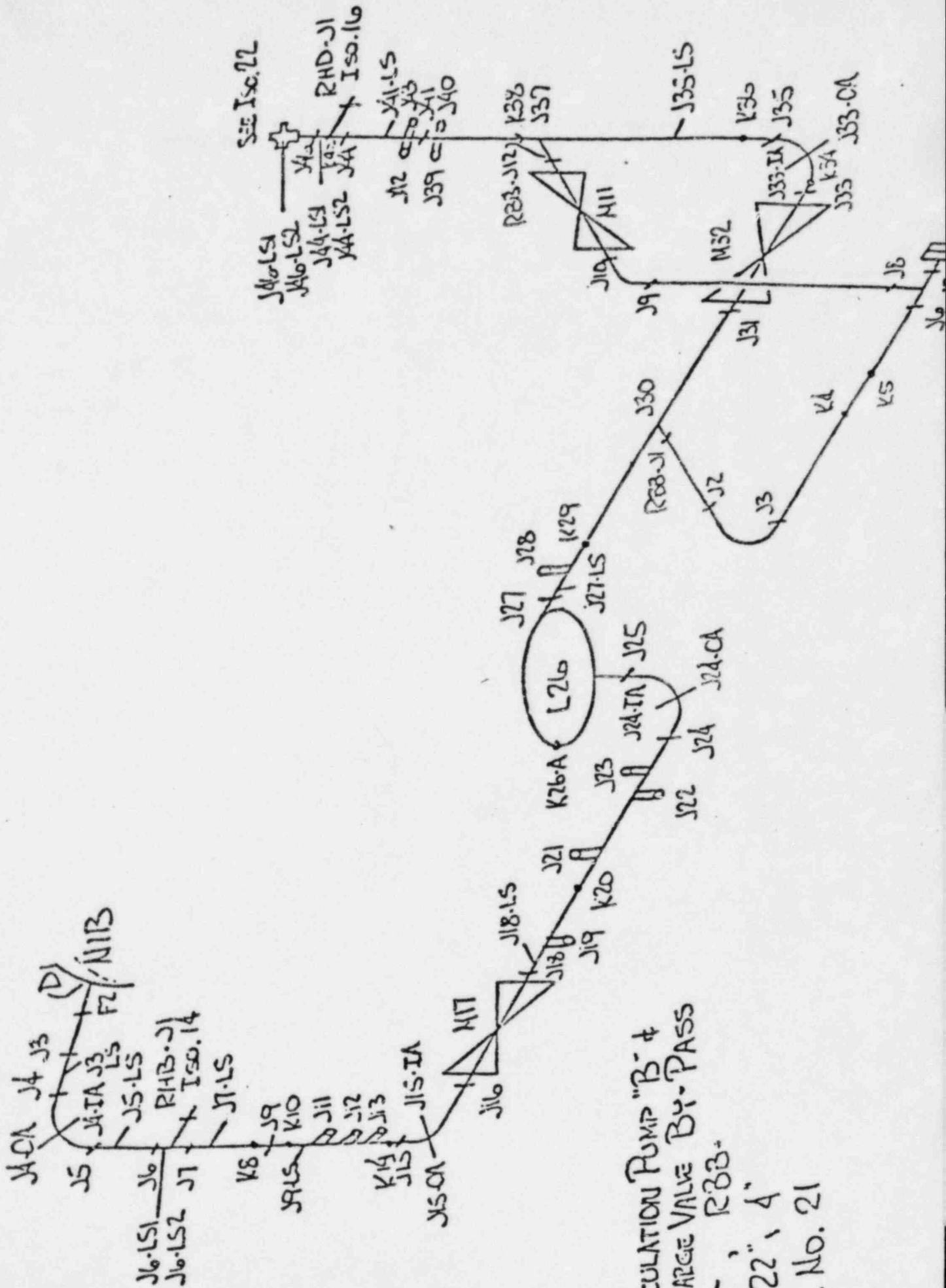
- | | |
|-------------------------------|--------------------------------------|
| * In Service Sensitive Lines | (4) Last examination in 1980 |
| xxx Shop Water Sprayed Cooled | (5) Last examination in 1981 |
| (1) Last examination in 1976 | (6) Last examination in 1982 |
| (2) Last examination in 1977 | (7) Scheduled for 1983 Refuel Outage |
| (3) Last examination in 1978 | |



RECIRCULATION MANIFOLD "A" & RISERS E, F, G, H
 RMA-, RRE-, RRF-, RRG-, RRH-
 SS, 16", 10"
 Iso. No. 20

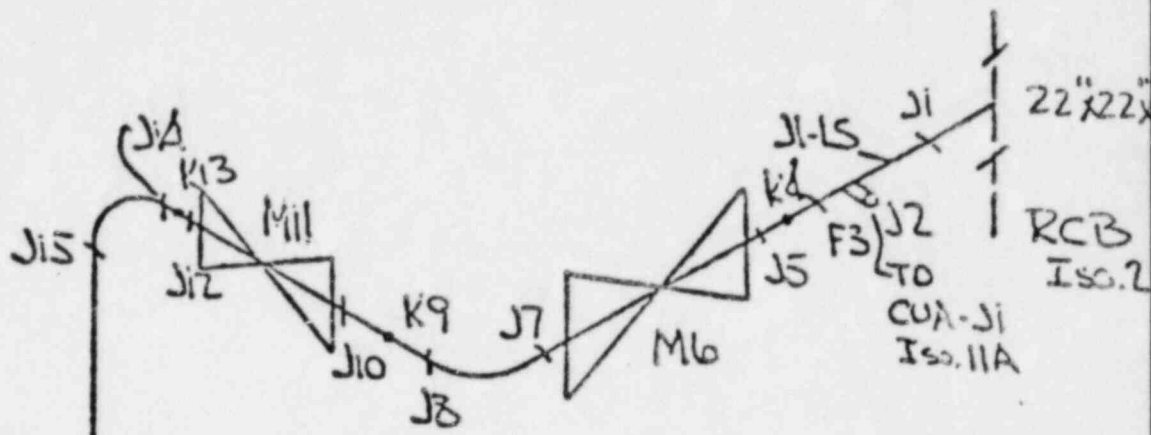


CIRCULATION PUMP "A" &
 CHARGE VALVE BY-PASS
 CA-1, RBR-
 SS, 22" A"
 Iso. No. 19



See Iso. 22

CIRCULATION PUMP "B" &
 DISCHARGE VALVE BY-PASS
 1B, 22" 4"
 ISO. No. 21

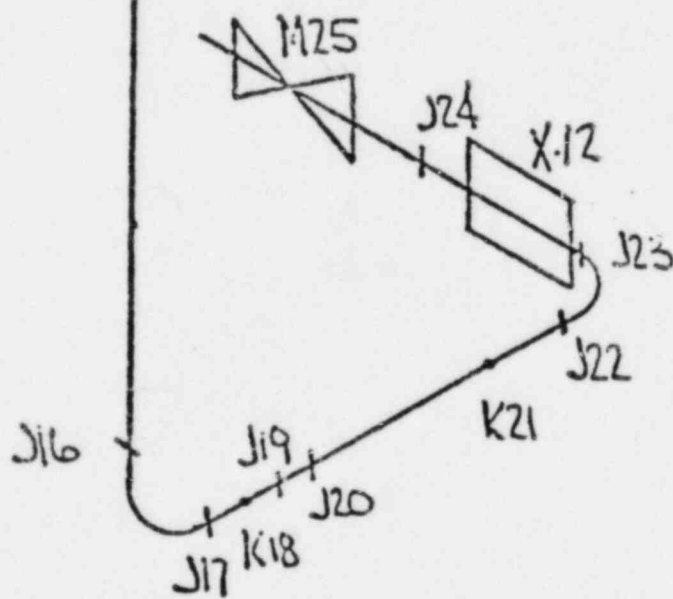


RESIDUAL HEAT REMOVAL-18B

RHB-

SS, CS, 18"

ISO. NO. 14

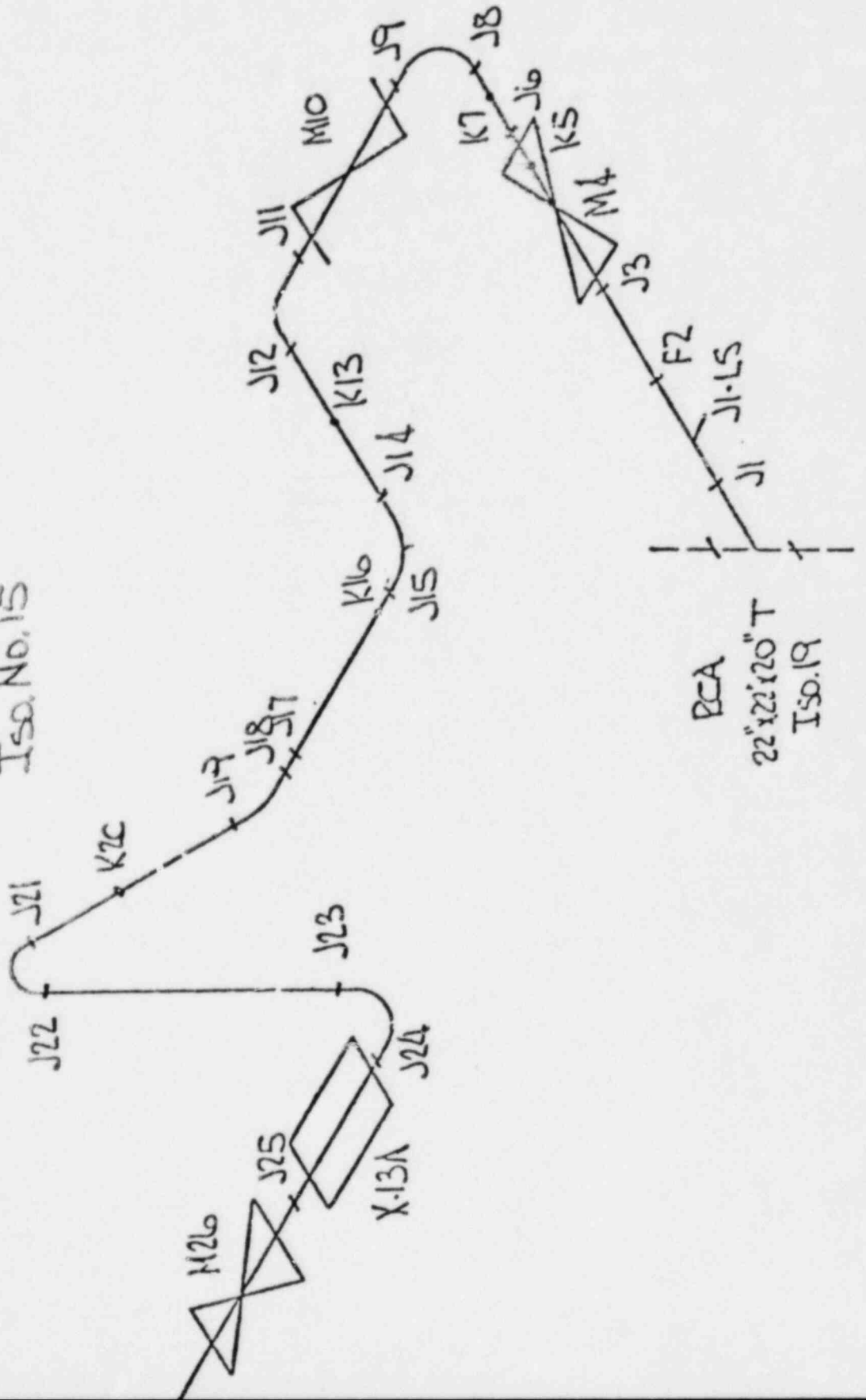


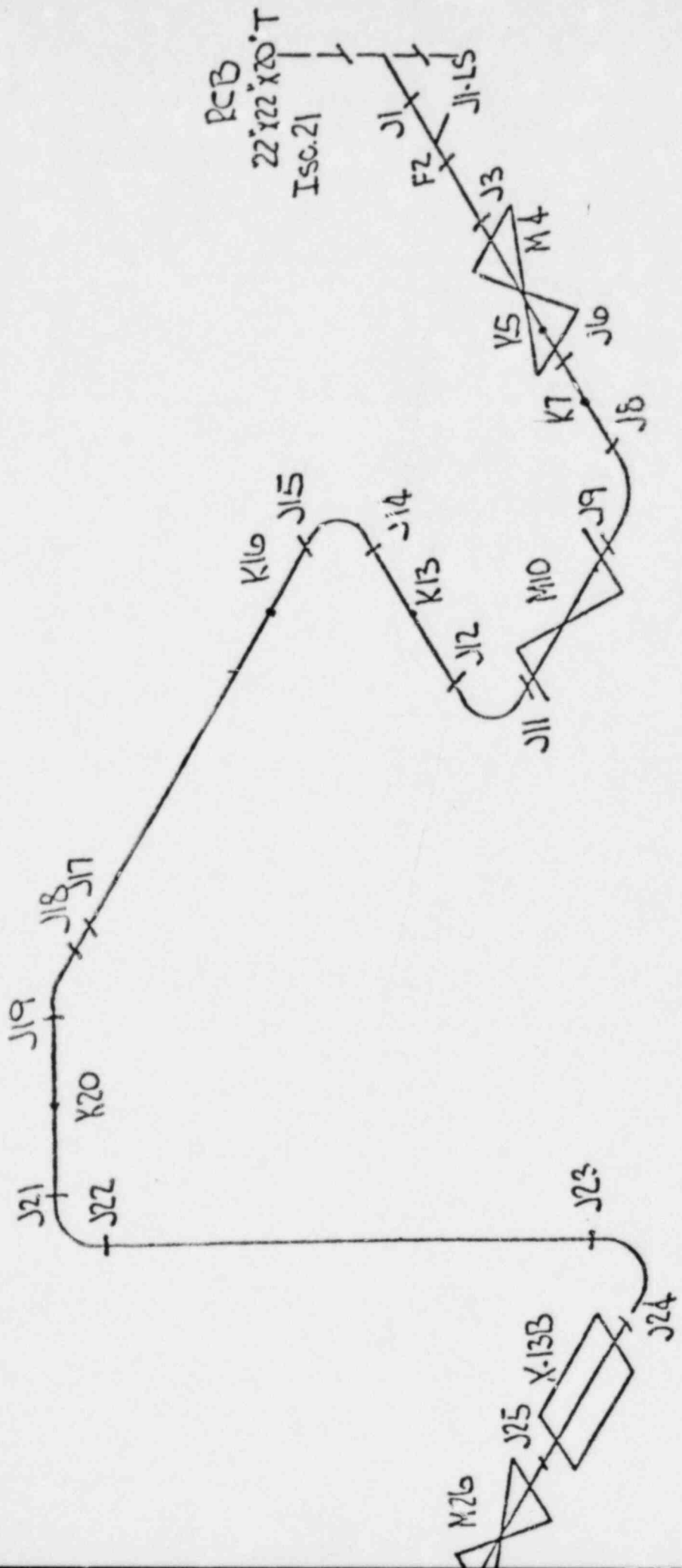
RESIDUAL HEAT REMOVAL - 20A

RHC-

SS, CS, 20"

Iso. No. 15





RESIDUAL HEAT REMOVAL - 20B
 RHD -
 SS, CS, 20"
 I.S. No. 16