DmB 016

Docket No. 50-366

AUG 18 1983

LICENSEE: Georgia Power Company

FACILITY: Hatch Unit 2

SUBJECT: SUMMARY OF JULY 7, 1983 MEETING WITH GEORGIA POWER COMPANY CONCERN THE ANALYSIS AND REPAIR OF HATCH UNIT 2 PIPE CRACKS

Georgia Power Company (GPC) management met with the NRC staff management in Bethesda, Maryland on July 7, 1983 to explain why it believes the pipe cracking problem at Hatch Unit 2 has been resolved sufficently to justify restart and operation of the Unit. The meeting was held at the request of the NRC staff. The agenda for th GPC presentation and the presentation slides used by GPC are provided in Enclosures 1 and 2. A list of meetings attendees is provided in Enclosure 3.

The NRC staff management informed GPC management that, as a condition to startup of the Unit, it would require that GPC 1) perform an inspection within 6 months to determine the extent that pipe crack growth has progressed since the current inspection, and 2) submit its proposed plan for performing this inspection within 30 days of receipt of an NRC order allowing startup. GPC agreed that it would meet this requirement and that it would provide a written commitment to this effect.

Original signed by
George Rivenbark, Project Manager
Operating Reactors Branch #4
Division of Licensing

Enclosures:
As stated

cc
See next page

OFFICE		ORB#4:DL					
SURNAME		GRivenbark;ps					
DATE		8/17/83					

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

August 18, 1983

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George Rivenbark, Project Manager
Operating Reactors Branch #4
Division of Licensing

Enclosures:
As stated

cc
See next page

MEETING SUMMARY DISTRIBUTION

Licensee:

*Copies also sent to those people on service (cc) list for subject plant(s).

Docket File
NRC PDR
L PDR
ORB#4 Rdg
Project Manager : G. Rivenbark
JStolz
EGrimes (Emerg. Preparedness only)

OELD
NSIC
ELJordan, IE
JMTaylor, IE
ACRS (10)

NRC Meeting Participants:

W. S. Hazelton
W. V. Johnston
S. A. Kiaw
C. Y. Cheng
W. Koo
P. R. Matthews
F. Schroeder
E. G. Case
D. B. Vassallo
A. R. Herdt
G. C. Lainas
H. Denton
R. Vollmer
R. K. Godby
C. T. Jones
J. A. Edwards
G. Mead
L. Gucwa

Enclosure 1

AGENDA

HATCH UNIT 2 RECIRC & RHR IGSCC ANALYSES/REPAIRS MEETING
BETHESDA, MARYLAND
July 7, 1983

I. INTRODUCTION

II. INSERVICE INSPECTION

- A. SCOPE OF EXAMINATIONS
- B. RESULTS
- C. EXAMINATION METHODS VALIDATION

III. INVESTIGATION INTO THE CAUSE OF CRACKING

- A. BACKGROUND
- B. INVESTIGATION
- C. SUMMARY OF CAUSE OF CRACKING

IV. ANALYSES AND REPAIRS

V. JUSTIFICATION FOR PLANT OPERATIONS

Enclosure 2
PRESENTATION SLIDES

SCOPE OF EXAMINATIONS

RECIRCULATION SYSTEM

ASME CATEGORY B-F WELDS EXAMINED:

12" - 5 welds
23" - 1 weld
Total - 6 welds

ASME CATEGORY B-J WELDS EXAMINED:

4" - 4 welds
6" - 2 welds
12" - 41 welds
22" - 16 welds
28" - 33 welds
Total - 96 welds

TOTAL NUMBER OF RECIRCULATION SYSTEM WELDS EXAMINED:

102 welds

RHR SYSTEM

ASME CATEGORY B-F WELDS EXAMINED:

20" - 1 weld
24" - 2 welds
Total - 3 welds

ASME CATEGORY B-J WELDS EXAMINED:

20" - 2 welds
24" - 6 welds
Total - 8 welds

TOTAL NUMBER OF RHR SYSTEM WELDS EXAMINED:

11 welds

RWCU SYSTEM

ASME CATEGORY B-F WELDS EXAMINED:

6" - None, not applicable
Total - None, not applicable

ASME CATEGORY B-J WELDS EXAMINED:

6" - 5 welds
Total - 5 welds

TOTAL RWCU SYSTEM WELDS EXAMINED:

SCOPE OF EXAMINATIONS (CONT.)

TOTAL NUMBER OF RECIRCULATION, RHR, AND RWCU WELDS EXAMINED:

118 welds*

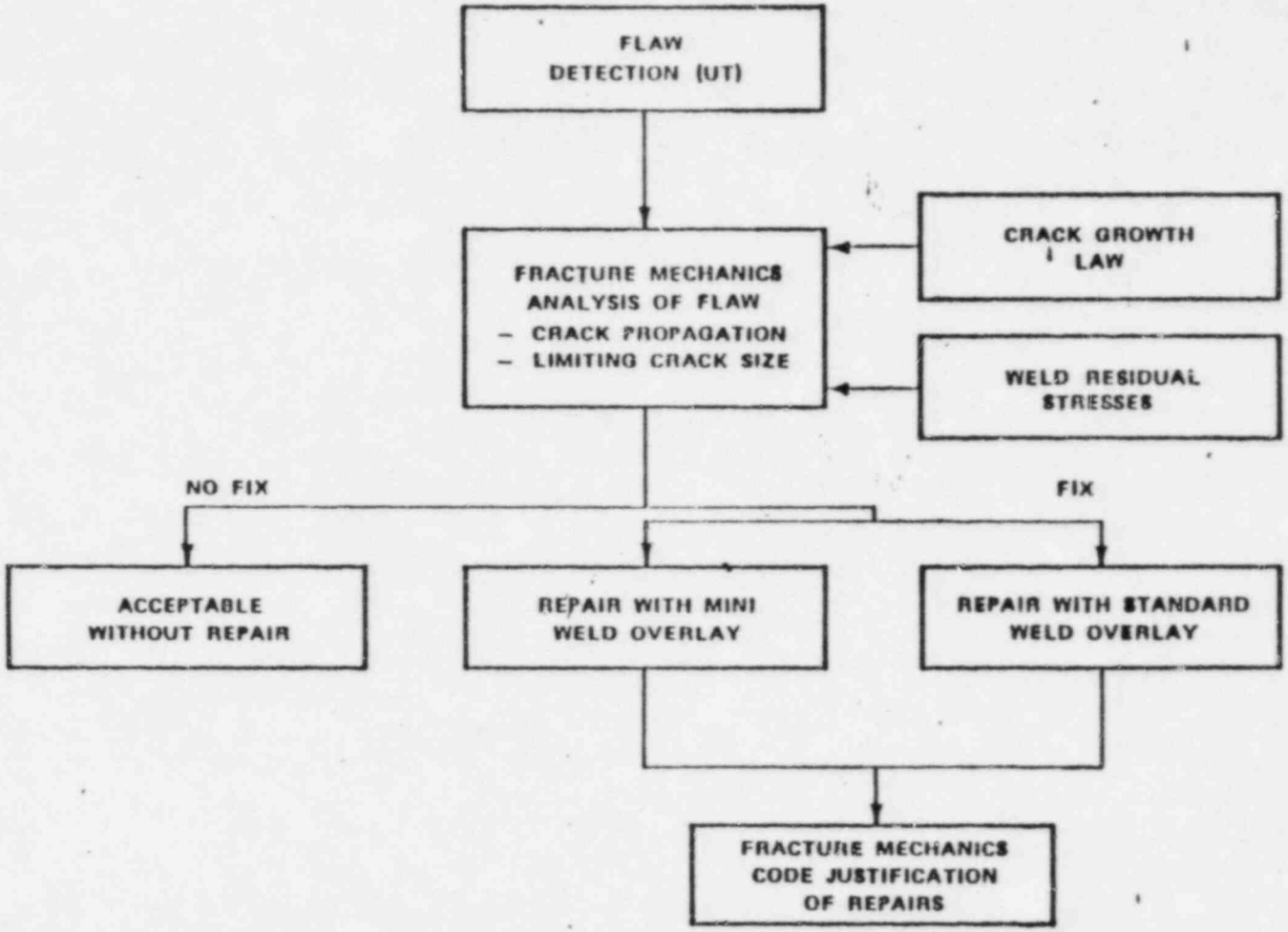
* This number equates to 85.5% of all stainless steel welds in the Class 1 portions of the Recirculation, RHR, and RWCU systems

Summary of Thru-Wall Depth Characterization
Vs.
Results of Destructive Testing on Selected
IGSCC Samples at Battelle Laboratories-Dec. 1982

Weld Number	Indication Number	Destructive Testing		UT MEASURED DEPTH					
		Measured Max. Depth	% Thru Wall			Depth	% Diff.		
14S-SW-11	1	.215	16.5			.244	+14%		
	2	.275	21.1			No Results	N/A		
	3	.205	15.7			.191	-7%		
12D-SW-19	1	.320	23.2			.407	+27%		
	2	.235	17.0			.306	+30%		
	3	.240	17.4			.408	+70%		
	4	.250	18.1			.260	+4%		

All depth measurements in inches

FRACTURE MECHANICS CONSIDERATIONS



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FLAW EVALUATION METHODOLOGY

- SELECT HIGHEST APPLIED STRESS IN SIZE OF PIPING BEING EVALUATED
- USE ASME SECTION XI TABLES OR SOURCE EQUATIONS TO DETERMINE END OF INSPECTION INTERVAL "ALLOWABLE" FLAW SIZE
- DETERMINE FLAW SIZE AT BEGINNING OF CYCLE FROM UT DATA
- DETERMINE CRACK GROWTH USING CONSERVATIVE CRACK GROWTH CURVE TO IDENTIFY "CALCULATED" END OF CYCLE FLAW SIZE
- COMPARE "CALCULATED" TO "ALLOWABLE" CRACK DEPTH AT END OF CYCLE TO DETERMINE THE NEED FOR REPAIR

nytech

WELD OVERLAY AS A REPAIR

DEVELOPMENT OF OVERLAY DESIGN

- JAN-1982 $T_{(OVERLAY)} \geq T_{(PIPE)}$

  OVERLAY STRENGTH $\geq$ NOMINAL PIPE STRENGTH

- OCT 1982 $T_{(OVERLAY)} \geq T_{(PIPE\ MIN)}$

  OVERLAY STRENGTH $\geq$ CODE REQUIRED PIPE STRENGTH

- JAN 1983 $T_{(OVERLAY)} < \frac{T_{(PIPE)}}{4}$
  (AXIAL CRACKS),

  $T_{(OVERLAY)} < \frac{T_{(PIPE)}}{2}$
  (CIRCUMFERENTIAL CRACKS)

  REQUIRED OVERLAY THICKNESS PER IWB-3640 WITH NO CREDIT FOR OVERLAY RESIDUAL STRESS IMPROVEMENT

- MARCH 1983 $T_{(OVERLAY)} <$ 1/8" TO 1/4"

  REQUIRED OVERLAY THICKNESS PER IWB-3640 WITH CREDIT TAKEN FOR OVERLAY RESIDUAL STRESS IMPROVEMENT

nutech ENGINEERS

UNREPAIRED PIPE

- CONSERVATISMS
  - FULL DEPTH 360° CRACK
  - IWB-3640 SAFETY FACTORS

    MEMBRANE 3.0

    BENDING $8/\pi$
  - "C" DIMENSION THICKNESS
  - (A/T) ALLOW 63% (STRESS LOWERED THAN TABULATED VALUES)

- RESULT

LOCATION	U.T. SIZING	BEGINNING OF CYCLE ALLOWABLE	RATIO
28B-10	20%	59%	2.9
28B-15	23%	60%	2.6

WELD OVERLAY REPAIRS

- CONSERVATISMS
  - HIGHEST STRESSED LOCATION
  - FULL DEPTH 360° CRACK
  - IWB-3640 SAFETY FACTORS

    MEMBRANE 3.0

    BENDING $8/\pi$
  - MINIMUM DESIGN THICKNESS
  - ORIGINAL DESIGN CODE S.I.F.

- RESULT

LOCATION	U.T. SIZING %	U.T. SIZING INCHES	BEGINNING OF CYCLE ALLOWABLE SIZE %	BEGINNING OF CYCLE ALLOWABLE SIZE INCHES	RATIO
12" MINI	30	0.21"	52	0.42"	2.0
12" STANDARD	32	0.22	56	0.50"	2.3
22" STANDARD	42	0.46	66	0.89	1.93

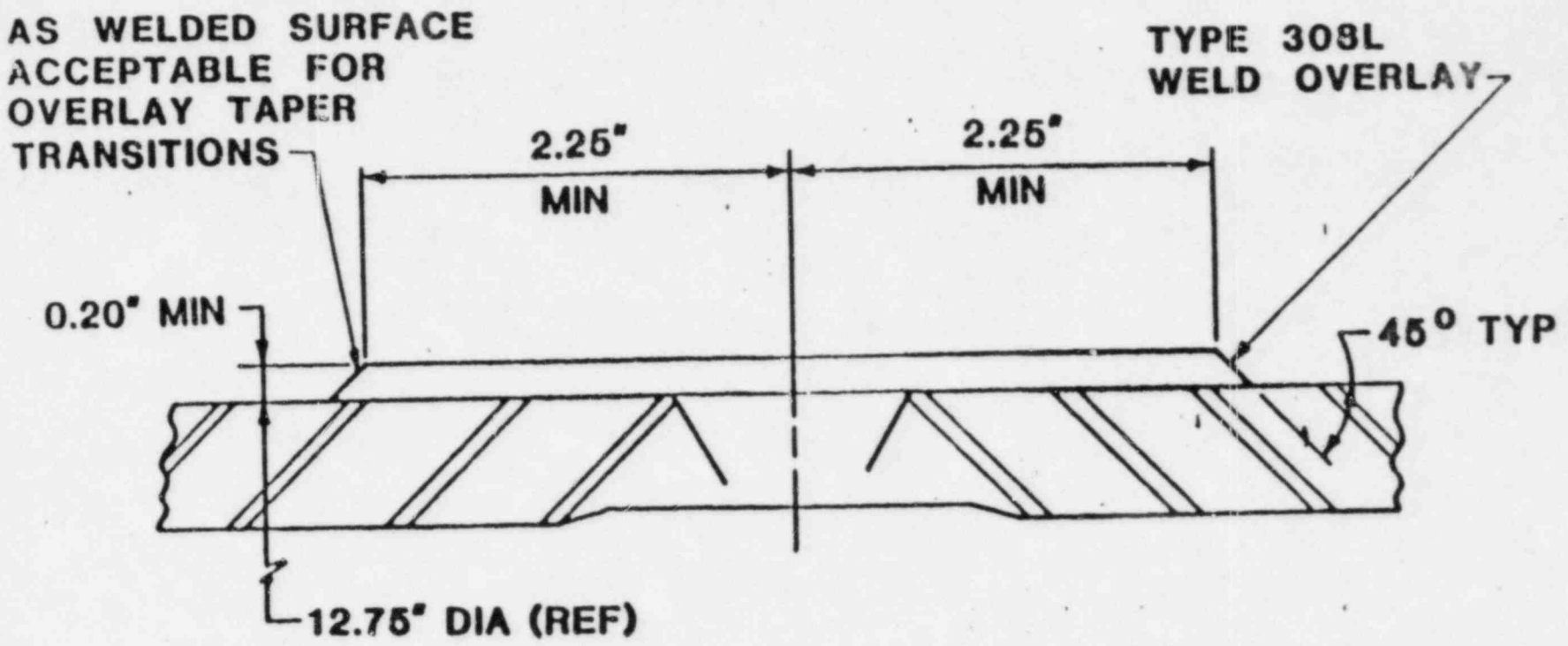

Figure 2

STANDARD OVERLAY DESIGN

HATCH, UNIT 2

RECIRCULATION RISER INDICATIONS

PATENT APPLIED FOR

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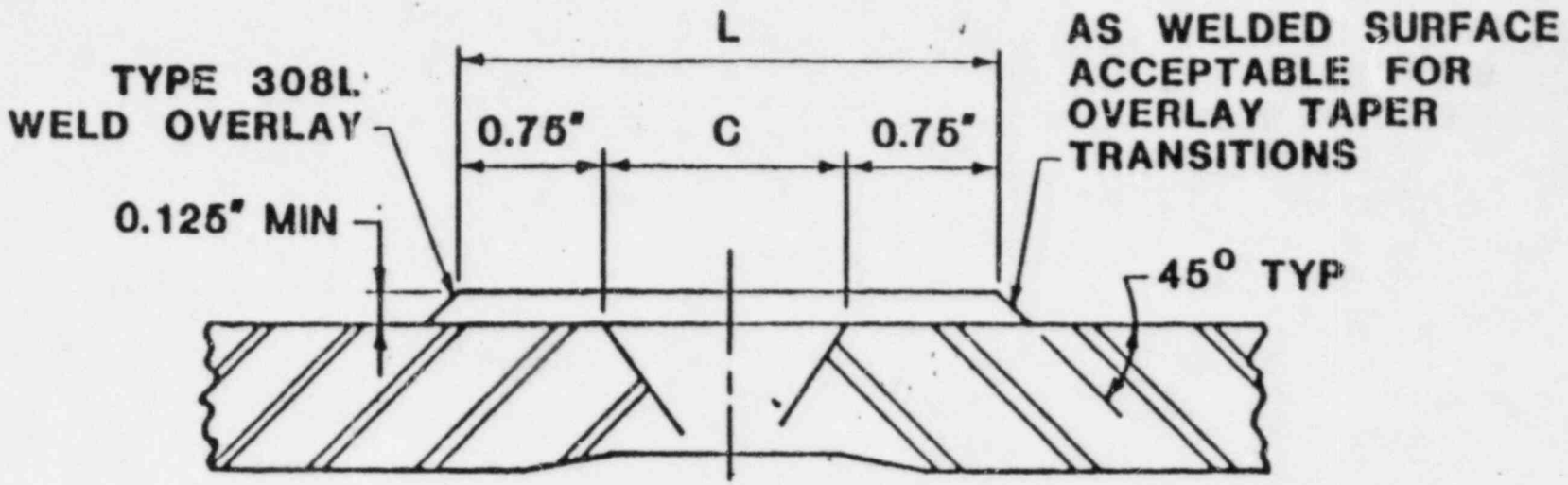

$L_{MINIMUM} = 1.5" + C$

C = WELD CROWN WIDTH

Figure 3

MINI-OVERLAY DESIGN

HATCH, UNIT 2

RECIRCULATION RISER INDICATIONS

PATENT APPLIED FOR

nytech

Hatch 2 1983 ISI
Thru-Wall Estimates

12" RC

Estimates from 0% to 10% 3
" " 11% to 20% 8
" " 21% to 30% 11
" " 30% to 40% (32%) 1

Therefore, estimates from 0% to 30% 22
and " " 31% to 40% 1

Large Diameter Piping (22"+28" RC and 20"+24" RHR)

Estimates from 0% to 10% 3
" " 11% to 20% ~~9~~
" " 21% to 30% ~~1~~
overlayed " " 31% to 40% 2 (End Cap Weld)
overlayed " " 41% to 50% 42% 1 (End Cap Weld)

Therefore, estimates from 0% to ~~23%~~ % 13
and " " 31% to 50% ~~3~~

Enclosure 3

HATCH UNIT 2
Pipe Crack Meeting
July 7, 1982
List of Attendees

Name	Affiliation
P. K. Nagata	INEL
G. Rivenbark	NRC-DL
J. M. Agold	SCS ISI Group
J. Mark Davis	SCS ISI Group
R. K. Godby	GPCO Engineering
C. T. Jones	GPCO Hatch
J.A. Edwards	Georgia Power Co.
P. C. Riccardella	Structural Integrity Assoc.
D. W. Fouts	Bechtel Power Co.
W. S. Hazelton	NRC/DE/MTEB
W. V. Johnston	NRC/DE
B. A. Kiaw	NRC/DE/MTEB
J. E. Charnley	NUTECH
L. J. Sobon	NUTECH
David Pitlairn	NUTECH
Donald P. Hill	Battelle-Columbus Labs.
C. Y. Cheng	NRC/DE/MTEB
W. Koo	NRC/DE/MTEB
Thomas P. Gooeneveld	Battelle-Columbus Labs.
P. R. Matthews	NRC/NRR/DST
F. Schroeder	NRC/NRR/DSt
E. G. Case	NRC/NRR/Dep. Dir.
D. B. Vassallo	NRC/NRR/DL
A. R. Herdt	NRC-Region II
G. C. Lainas	NRC/DL
H. Denton	NRC
R. Vollmer	NRC/DE
B. Epps	Southern Co. Ser.
G. Head	Georgia Power Co.
L. Gucwa	Georgia Power Co.