



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

August 31, 1979

Dockets Nos.: 50-269, 270, 287, 289, 302, 312, 313 & 346

FACILITIES: OCONEE NUCLEAR STATION, UNITS NOS. 1, 2 & 3
THREE MILE ISLAND, UNIT NO. 1
CRYSTAL RIVER, UNIT NO. 3
RANCHO SECO NUCLEAR GENERATING STATION
ARKANSAS NUCLEAR ONE, UNIT NO. 1
DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

LICENSEES: DUKE POWER COMPANY
METROPOLITAN EDISON COMPANY
FLORIDA POWER CORPORATION
SACRAMENTO MUNICIPAL UTILITY DISTRICT
ARKANSAS POWER & LIGHT COMPANY
TOLEDO EDISON COMPANY

SUBJECT: SUMMARY OF MEETING HELD ON AUGUST 24, 1979, TO DISCUSS AN ALTERNATE
PROPOSAL TO THE REQUIREMENTS OF IE BULLETIN 79-13 FOR BABCOCK &
WILCOX (B&W) OPERATING PLANTS

On August 24, 1979, a meeting was held in Bethesda, Maryland, during which a subcommittee of the B&W Owner's Group presented to the NRC staff an alternate proposal to the requirements of Inspection and Enforcement (IE) Bulletin 79-13. A list of attendees is provided as Enclosure 1.

Background

As a result of the discovery of cracks in feedwater lines at various nuclear power facilities, the Office of IE issued IE Bulletin 79-13 dated June 25, 1979, requiring volumetric examinations of feedwater lines for all pressurized water reactor facilities with an operating license. For B&W facilities, this bulletin requires examination of all welds inside of containment and upstream of the external ring head or vessel nozzels for each steam generator. Also, all welds of one inlet riser on each feed ring of each steam generator are required to be examined. The examinations are to be completed during the next extended outage of sufficient duration, or at the next refueling outage. The examinations are to be performed using radiographic testing supplemented by ultrasonic testing as necessary.

Discussion

The basis of discussion by the B&W Owner's Group was contained in a letter from W. B. Garrett to N. C. Mosley dated August 13, 1979, shown as Enclosure 2. Copies of each viewgraph used in Mr. Garrett's presentation during the meeting

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August 24, 1979

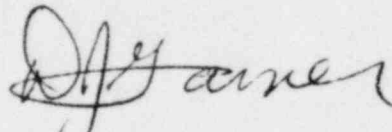
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are provided in Enclosure 3. The primary thrust of the presentation was the emphasis on the design differences of the B&W steam generator when compared to those of Westinghouse and Combustion Engineering. Except for the auxiliary feedwater line connections on three B&W plants (Rancho Seco, Davis-Besse, Oconee 3), all main feedwater and auxiliary feedwater lines are through an external ring header. Risers from the headers are bolted, not welded, to the steam generator. The auxiliary feedwater lines for the three mentioned plants are connected to the steam generator by welded nozzles. For this reason, it was proposed that the examinations for B&W plants be limited to the auxiliary feedwater lines on these three plants.

Much of the staff's questioning concerned operations of the steam generators, including startup and shutdown. It was stated that a large concern at this point is the temperature difference between the steam generator's shell and incoming feedwater. The B&W Owner's Group response was that a large temperature difference does not occur under normal operation.

Conclusion

The owner's group was advised that the information presented at the meeting would be correlated with incoming reports from non-B&W plants to determine if any relief could be granted to the requirements of IE Bulletin 79-13. The staff agreed to make available to the group information received by NRC relating to reports from non-B&W plants on the results of inspections. No commitments were made by the licensees.



D. J. Garner, Project Manager
Operating Reactors Branch #4
Division of Operating Reactors

Enclosures:

1. List of Attendees
2. Ltr. from WBGarrett to NCMosley
dtd. 8/13/79
3. Viewgraphs used during
Garrett's presentation

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LIST OF ATTENDEES
8/24/79

Sacramento Municipal Utility District

W. Garrett

Florida Power Corporation

R. Bright
S. Johnson

Duke Power Company

J. Norton
S. Lewis

Arkansas Power & Light Company

W. Hinton
M. White

Toledo Edison Company

C. Daft

Metropolitan Edison Company

W. Ream

Florida Power & Light Company

G. Gotch

Consumers Power Company

H. Slayer

Babcock & Wilcox

P. Sherburne
R. Finnin
B. Short
J. Uhl

NRC

E. Jordan (IE Headquarters)
B. Crowley (IE, Region II)
W. Hazelton (DOR, EB)
R. Hermann (DOR, EB)
T. Liu (DOR, EB)
C. Sellers (DOR, EB)
R. Reid (DOR, ORB#4)
D. Garner (DOR, ORB#4)

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SMUD

SACRAMENTO MUNICIPAL UTILITY DISTRICT 6281 S Street, Box 15830, Sacramento, California 95813 (916) 451-1111

August 13, 1979

Mr. Norman C. Mosley
 Nuclear Regulatory Commission
 Division of Reactor Operations Inspections
 4350 East West Highway
 Washington, D. C. 20555

Docket Nos.: 50-313 Arkansas Nuclear 1
 50-302 Crystal River 3
 50-346 Davis Besse
 50-269 Oconee 1
 50-270 Oconee 2
 50-287 Oconee 3
 50-312 Rancho Seco
 50-289 Three Mile Island I
 50-320 Three Mile Island II

Dear Mr. Mosley:

Acting as chairman of the Babcock and Wilcox (B&W) Users Group Subcommittee on Feedwater Pipe Cracking, IE Bulletin 79-13, the purpose of this letter is to confirm arrangements for a meeting between members of your staff and of the utilities utilizing reactors designed by Babcock and Wilcox (B&W) to discuss the type and extent of examinations required to be performed under the requirements of IE Bulletin 79-13. Participating utilities are Sacramento Municipal Utility District, Arkansas Power and Light, Metropolitan Edison, Florida Power Corporation, Toledo Edison and Duke Power.

As you are aware, some plants of the Westinghouse design have exhibited cracking in fittings welded to the main feedwater nozzles on steam generators. To date, in all plants inspected, only the nozzle-to fitting welds have exhibited degradation due to cracking.

Cracking has been postulated by plant personnel at Westinghouse facilities to be initiated by thermal stress, propagated by loading stress assisted by corrosion. Thermal stresses have been of a low cycle, high stress type. Instrumentation installed at a number of Westinghouse facilities has shown that during plant startups, feedwater transients and Auxiliary Feedwater pump testing, large temperature gradients exist across the nozzle to fitting weld. Corrosion has been evidenced at the Westinghouse facilities by pitting inside nozzles and fittings and by cracks filled with corrosion products.

Specific differences in configuration and operations exist between B&W and Westinghouse plants which lead us to believe that this problem is not specific to B&W facilities for the reasons listed below:

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- 1) B&W Once Thru Steam Generators (OTSG) do not utilize nozzles for the attachment of Main Feedwater piping to the vessel. Main Feedwater enters the OTSG through a ring header attached to the OTSG by 32 riser pipes with bolted connections (see Figure 1). Auxiliary Feedwater piping is also connected to the OTSG by means of an external ring header attached to the OTSG with 7 risers with bolted connections at all plants except Rancho Seco, Davis Besse, and Oconee 3, where a welded nozzle connection with an internal ring header is used. This design differs from the Westinghouse design where Main and Auxiliary Feedwater enter the steam generator through a single welded nozzle connection.
- 2) All B&W facilities utilize AVT chemistry control and full flow demineralizers. In addition, all plants have recirculation loops wherein feedwater is "cleaned up" to minimum requirements prior to feeding the OTSG during startup. During startup transients, feedwater level within the OTSG is maintained constant and no intermittent feeding is utilized. All Westinghouse facilities initially utilized phosphate chemistry control. Only recently have some of the facilities switched to AVT control. Full flow demineralizers are an uncommon feature of Westinghouse plants as are feedwater recirculation loops.
- 3) A total of 95 welds has been examined at B&W facilities in Main and Auxiliary Feedwater piping. A tabulation of these welds appears in Table 1. Of the 95 welds inspected, only 5 contained reportable indications. Further, it is important to note that these reportable indications were construction type fabrication defects and not cracks.
- 4) Augmented examinations of Main and Auxiliary Feedwater piping, risers and nozzles requested by NRC have been performed at Crystal River Unit 3 and at Davis Besse. These examinations were carried out under NRC regional office direction and utilized radiographic inspection techniques. No welds were found with cracks.

As a result of the facts outlined above, we propose the inspection outlined below will provide compliance to, and meet the intent of, IE Bulletin 79-13 at B&W facilities:

- 1) Volumetric inspection of all Auxiliary Feedwater nozzle to piping welds at Davis Besse, Oconee 3 and Rancho Seco.
- 2) The addition of ultrasonic testing as a "primary test." A procedure with proven ability to detect cracks which are of concern and which has NRC staff concurrence would be utilized. It should be noted that normal Section XI ultrasonic testing procedures utilized at a number of Westinghouse facilities confirmed radiographic results and in some cases saw more than was seen with radiography.

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Mr. Norman C. Hoxley

-3-

August 13, 1979

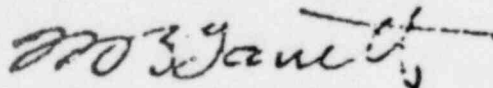
- 3) Evaluation and disposition of ultrasonic testing results in accordance with Section XI of the ASME Code and evaluation and disposition of radiographic results in accordance with the original construction code of the piping.

Results of the nozzle to pipe weld examinations will be reported in accordance with Item 4 of IE Bulletin 79-13.

As a result of the ISI performed to date at B&W facilities, augmented examinations performed at Crystal River Unit 3 and Davis Besse which found no indications of cracking problems, and the fact that no cracks have been seen at any Westinghouse facility in welds other than nozzle to fitting welds, no additional examination of Main and Auxiliary Feedwater piping other than that normally required by Section XI is deemed necessary or appropriate at any of the B&W facilities.

We understand this meeting is to be held in Washington, D. C. on Friday, August 24, 1979. We request that the authors of IE Bulletin 79-13, personnel who are responsible for review of inspection results, and any other members of your staff you deem necessary, be present. Please contact myself at Rancho Seco Nuclear Generating Station (209) 748-2751 with any questions you may have.

Respectfully,



W. B. Carrett
Plant Mechanical Engineer
Rancho Seco Nuclear Generating Station

Chairman, B&W Users Group Subcommittee on
Feedwater Pipe Cracking, IE Bulletin 79-13

WBG:sc

Attachments

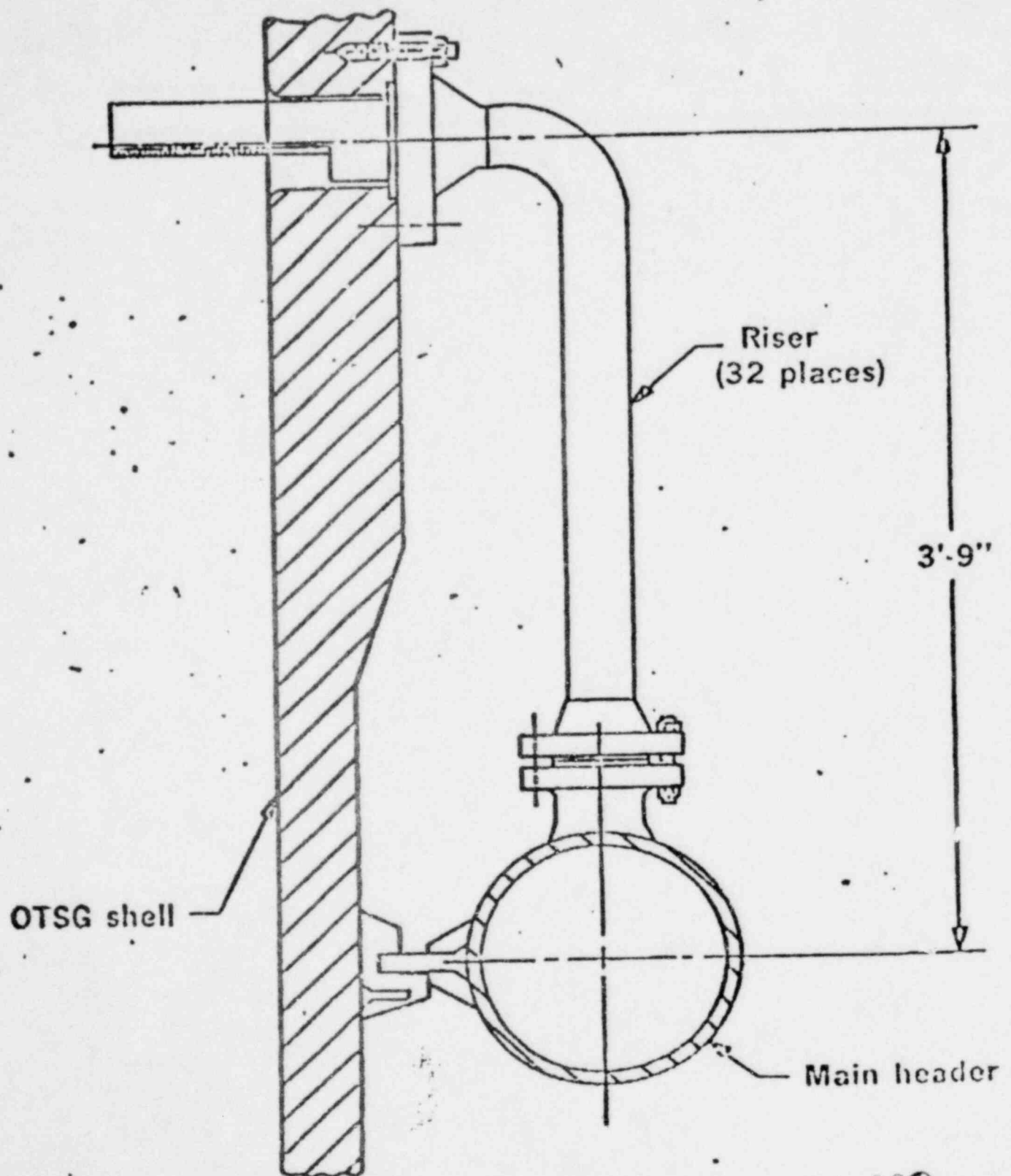
cc: D. Ransch, Chairman, B&W Users Group, SHUD
S. W. Johnson, FPC
C. T. Daft, TECO
H. White, AP&L
J. Potter, Met. Ed.
J. D. Norton, Duke

bcs: R. J. Rodriguez
J. V. McColligan
D. C. Blachly
Admin File

POOR ORIGINAL

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177 FA OTSG feedwater nozzle assembly



- FIGURE 1. -

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F.W. SYS./LOOP	SIZE/SCHED.	#WELDS	#EXAMS		TYPES OF WELDS EXAMINED	#REPORTABLE/PLANT	COMMENTS
			RT	UT		(All FOUND BY RT)	
MAIN 'A'	24" S/80	4	4	0	PF	11 Rec OCO 1,2,3	
	20" S/80	13	4	11	P-Pen (2) PF(7) FV(1) FF(1)	6 Rec OCO 1,3	
	18" S/80	3	3	0	PF (2) PV (1)	4 Rec CR-3	
	14" S/80	11	10	1	PF	20 Rec OCO 1,2,3	
	10" S/80	0	0	0		CR-3	
	6.75" .80 wall	1	0	1	PF		
	6" S/80	8	8	0	PF(4) FF(2) PV(1) FV(1)		
	3" S/80	0	0	0			
MAIN 'B'	24" S/80	1	1	0	PF	7 Rec OCO 3	Reportable were fabrication defects
	20" S/80	11	2	11	P-Pen(2) PF(7) FV(1) FF(1)		
	18" S/80	3	3	0	PF(2) PV(1)	12 Rec CR-3	
	14" S/80	13	11	2	PF(11) FF(2)	14 Rec, 1 Rep OCO 2,3 6 CR-3	
	10" S/60	1	1	0			
	6" S/80	2	2	0	PF(1) PV(1)	3 Rec OCO 1,3	
	3" S/80	3	3	0	PF(2) FF(1)	8 Rec, 3 Rep CR-3	
AUX 'A'	6" S/80	7	6	1	PF(6) P-Pen (1)	7 Rec OCO 1,2,3	
	6" S/120	1	1	0	PV	2 Rec OCO 3	
	3" S/80	0	0	0			
AUX 'B'	6" S/80	8	8	0	PV(2) PF(5) PP(1)	12 Rec, 2 Rep OCO 1,6 CR-3	Reportable were fabrication defects
	6" S/120	1	1	0	PF	4 Rec OCO 2	
	6" S/140	1	1	0	PF		
	3" S/80	3	3	0	PF(2) FF(1)	6 Rec CR-3	
TOTALS:		95	72	27		116 Rec 6 Rep	

P-PIPE
 F-FITTING
 V-VALVE
 N-NOZZLE
 PEN-PENETRATION

POOR ORIGINAL

NOTE: Total number of welds disagrees with
 total number of exams due to the fact
 that the P-Pen welds were tested by
 both methods (R.S.).
 All reportable flaws are fabrication defects.

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MEETING AGGENDA

NRC/ B&W OWNERS GROUP

FR_DAY- AUGUST 24, 1979

INTRUDUCTIONS

BACKGROUND

DISCUSSION OF B&W PLANTS

- Design differances between B&W and Westinghouse facilities
- Previous inspections
- Operation
- Chemistry control

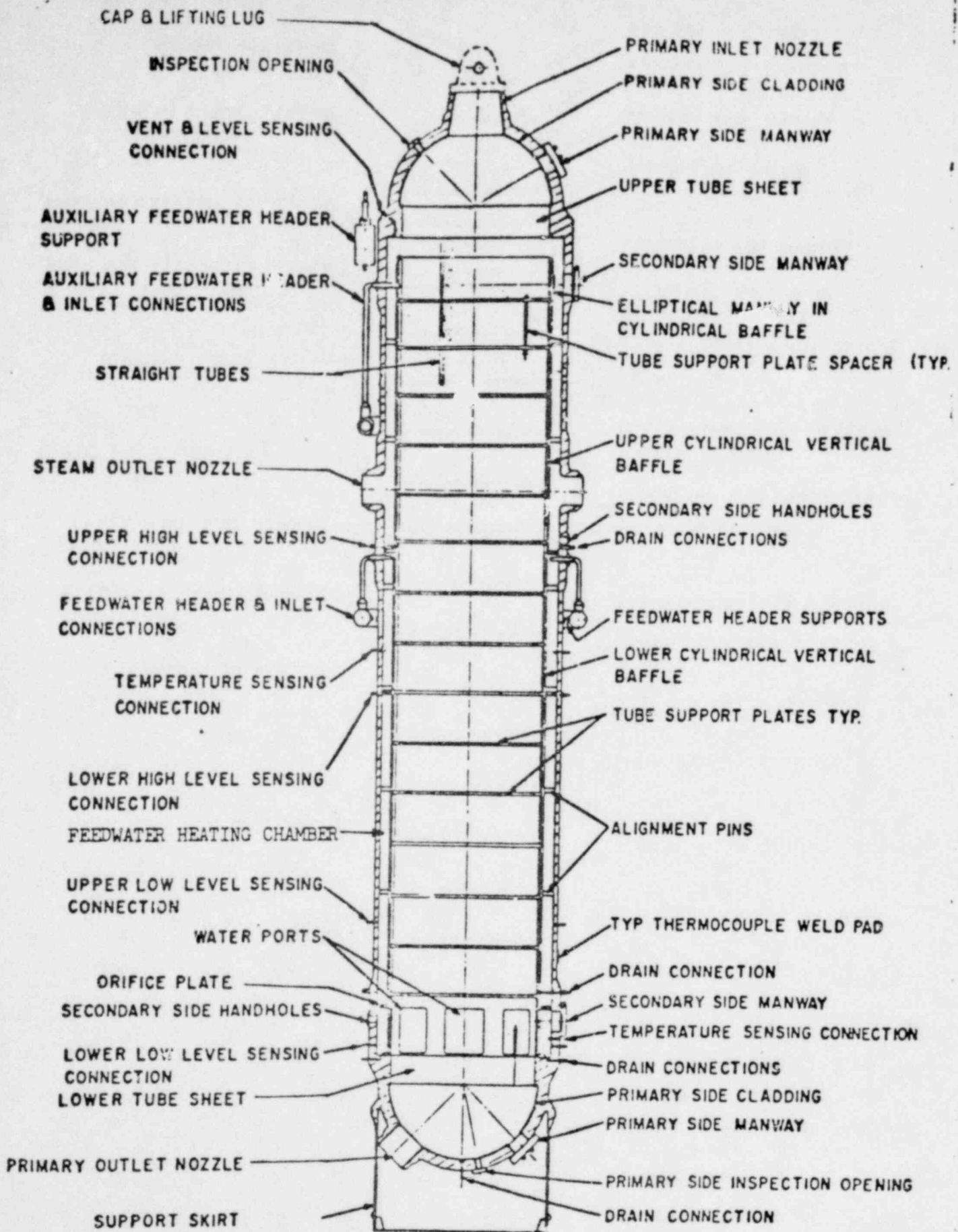
PROPOSED PROGRAM

DISCUSSION

IMPLI TATION

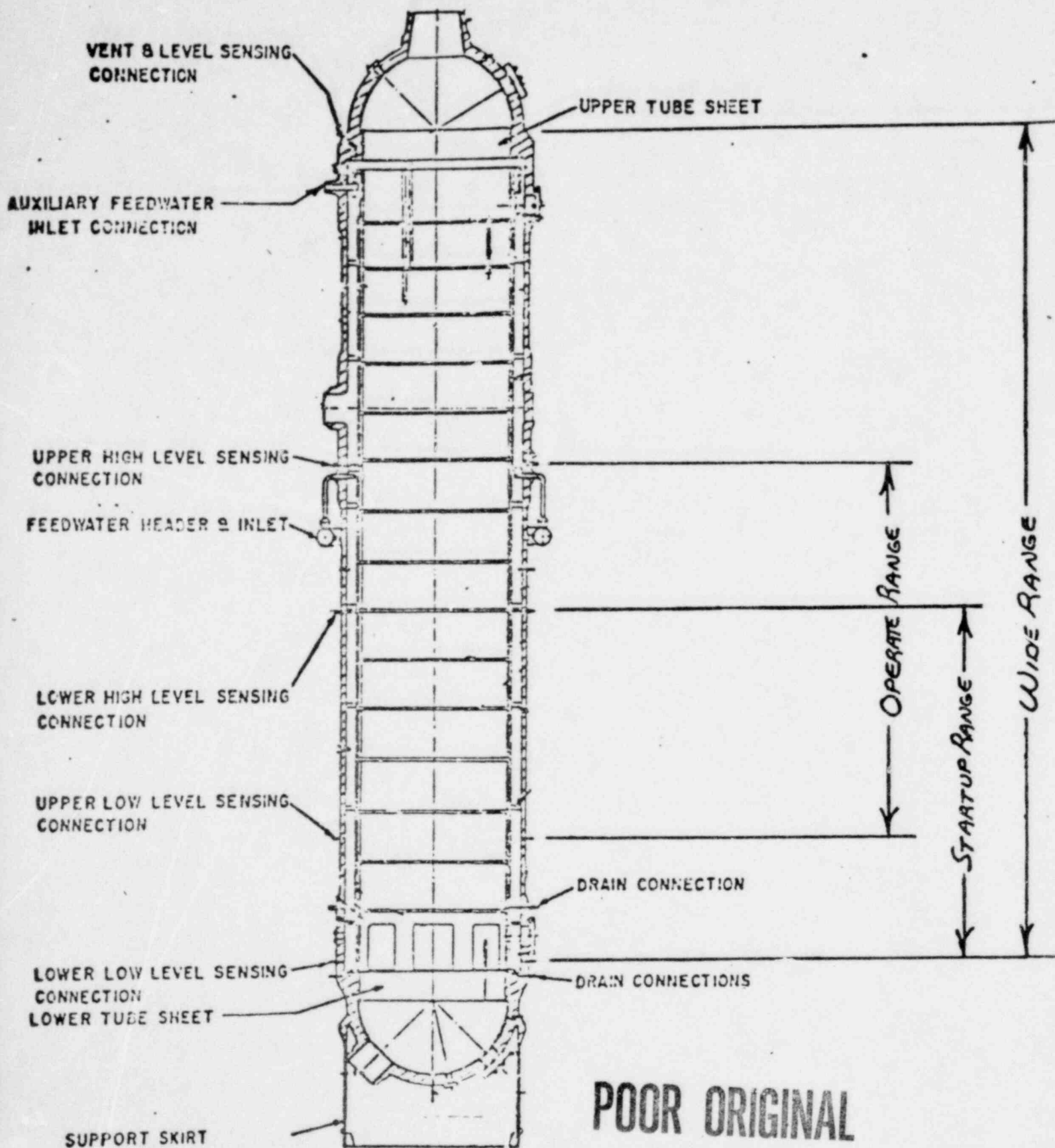
SUMMARY

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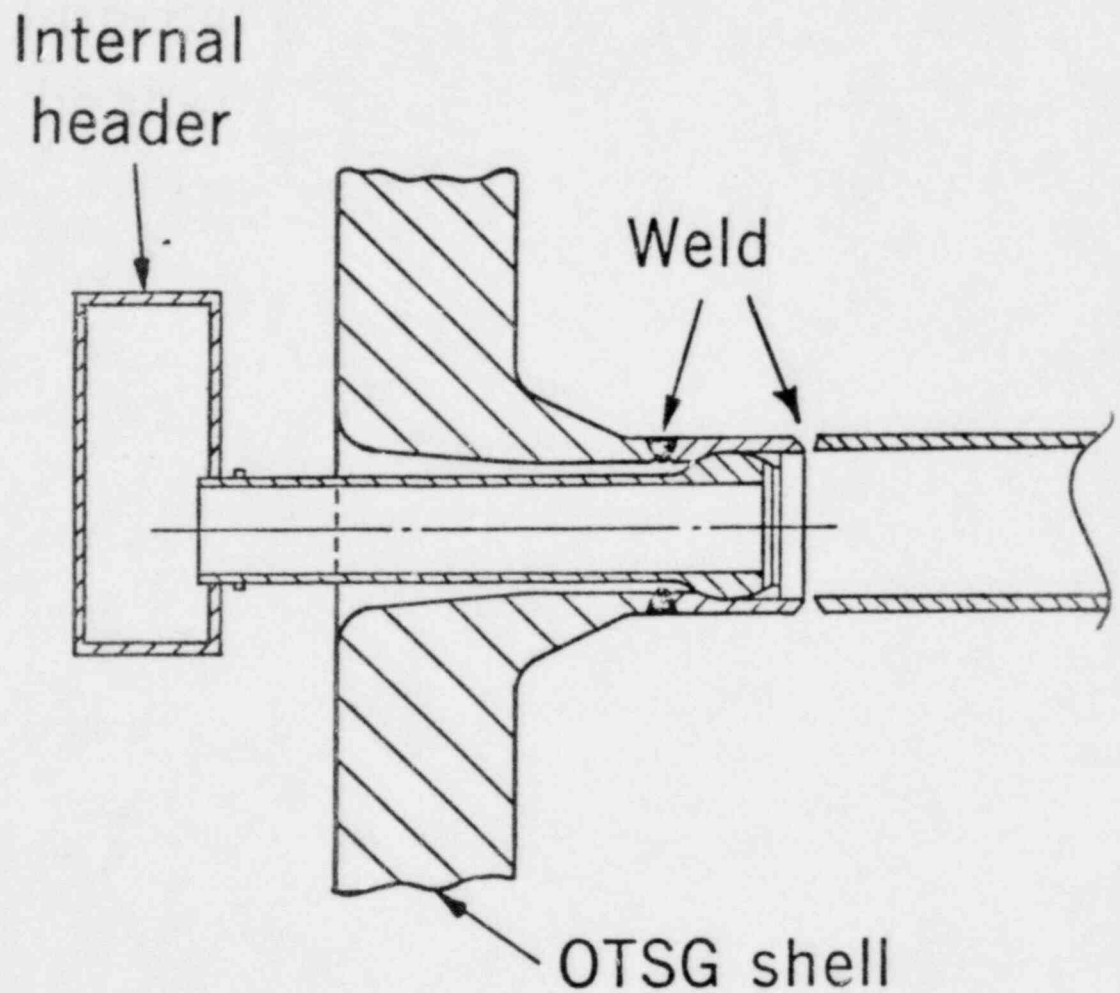
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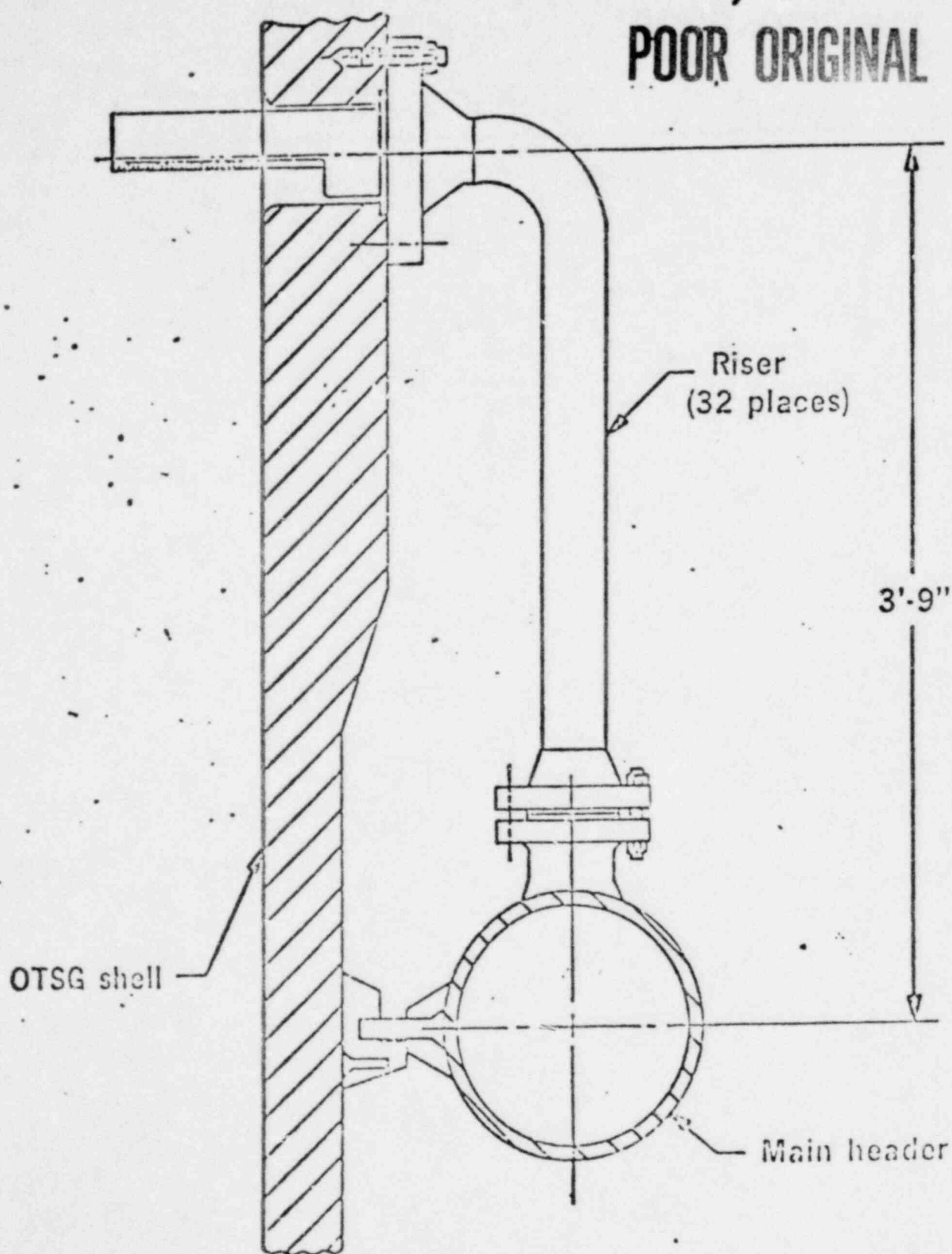
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177 FA OTSG auxiliary feedwater Welded nozzle assembly



177 FA OTSG feedwater nozzle assembly

POOR ORIGINAL



- FIGURE 1 -

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ISI AND SUPPLEMENTAL MAIN AND AUX. FEEDWATER WELD EXAMS

SYS./LOOP	SIZE/SCHED.	#WELDS	#EXAMS		TYPES OF WELDS EXAMINED	#REPORTABLE/PLANT	COMMENT
			RT	UT			
IN 'A'	24" S/80	4	4	Ø	PF	(All found by RT)	
	20" S/80	13	4	11	P-Pen (2) PF(7) FV(1) FF(1)		
	18" S/80	3	3	Ø	PF (2) PV (1)		
	14" S/80	11	10	1	PF		
	10" S/80	Ø	Ø	Ø			
	6.75" .80 wall	1	Ø	1	PF		
	6" S/80	8	8	Ø	PF(4) FF(2) PN(1) PV(1)		
	3" S/80	Ø	Ø	Ø		11 Rec OCO 1,2,3 6 Rec OCO 1,3 4 Rec CR-3 20 Rec OCO 1,2,3 & CR-3	
IN 'B'	24" S/80	1	1	Ø	PF	7 Rec OCO 3 12 Rec CR-3 14 Rec, 1 Rep OCO 2,3 & CR-3 3 Rec OCO 1,3 8 Rec, 3 Rep CR-3	Reportable were fabrication defects
	20" S/80	11	2	11	P-Pen(2) PF(7) FV(1) FF(1)		
	18" S/80	3	3	Ø	PF(2) PV(1)		
	14" S/80	13	11	2	PF(11) FF(2)		
	10" S/60	1	1	Ø			
	6" S/80	2	Ø	Ø	PF(1) PV(1)		
	3" S/80	3	3	Ø	PF(2) FF(1)		
K 'A'	6" S/80	7	6	1	PF(6) P-Pen (1)	7 Rec OCO 1,2,3 2 Rec OCO 3	
	6" S/120	1	1	Ø	PV		
	3" S/80	Ø	Ø	Ø			
K 'B'	6" S/80	8	8	Ø	PV(2) PF(5) PP(1)	12 Rec, 2 Rep OCO 1,2,3 & CR-3 4 Rec OCO 2 6 Rec CR-3	Reportable were fabrication defects
	6" S/120	1	1	Ø	PF		
	6" S/140	1	1	Ø	PF		
	3" S/80	3	3	Ø	PF(2) FF(1)		
TOTALS:		95	72	27		116 Rec 6 Rep	

P-PIPE
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N-NOZZLE
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NOTE: Total number of welds disagrees with total number of exams due to the fact that the P-Pen welds were tested by both methods (R.S.).
All reportable flaws are fabrication defects.

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MEETING SUMMARY DISTRIBUTION

ORB#4

~~50-269~~

~~APR 1979~~

TERA

cc: Mr. William O. Parker, Jr. - Duke Power Company
Mr. R. C. Arnold - Metropolitan Edison Company
Mr. W. P. Stewart - Florida Power Corporation
Mr. J. J. Mattimoe - Sacramento Municipal Utility District
Mr. William Cavanaugh, III - Arkansas Power & Light Company
Mr. Lowell E. Roe - Toledo Edison Company

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