

YARFELA MADE THIS OBSERVATION AND PHOTOGRAPHED THE SEQUENCE. THE DRY CONCRETE WAS VIBRATED. INTO PREVIOUS POUR - only when the 78 man crew saw. H<sub>15</sub> Kucela taking pictures of the dry concrete above the steel

This is [redacted] report

December 23, 1969

[redacted] Senior Reactor Inspector  
Region II, Division of Compliance

INSPECTOR'S EVALUATION AND OPINION - GEORGIA POWER COMPANY (EDWIN I. HATCH NO. I), LICENSE NO. CPPR-65, DOCKET NO. 50-321

This memorandum refers to Compliance Report No. 50-321/69-6.

1. Quality Assurance (Vendor Inspection)

GPC/SSI monitoring of the Bechtel Vendor Inspection Program is continuing to be an active program. Several inspection reports were reviewed from Bechtel from the CB&I shops in Birmingham and Chicago, CE shops at Chattanooga and the G-E shops at Wilmington, North Carolina. The reports were thorough and followup actions were completed. NDT tests were witnessed, records reviewed and final inspections performed.

2. Concreting

This inspection finalizes the QA/QC detailed inspections and reviews of concrete. Future concrete reviews will be performed in accordance with 3800/2, paragraph B.5.f.

The inspectors witnessed an example of machinery malfunction and QC system failure to provide pickup of the malfunction. I believe that the incident was an isolated incident and serves as a lesson well learned for GPC. The materials were wasted and GPC and Standard Construction Company did recognize that a laxity of personal attention permitted the concrete to be placed.

Drvwell and Torus

The major area of concern is that GPC and CB&I did not have a desirable working relationship. CB&I is an old proud organization and is producing a quality product; however, their record

IF THIS ISNT A WRONG CONCLUSION AND NAUSEATING - I've wasted 35 yrs in engineering and construction. PHOTOS IN REPORT SHOW THE OPPOSITE!

NOT ONLY WAS THE CONCRETE DRY BUT THE CREW WAS EITHER STUPID UNQUALIFIED OR DISHONEST SEE PAGE 17

*Draft  
11/19/69  
kw*

DRAFT: 11/7/69  
Varela:wb

REACTOR COOLANT PIPING  
VEPCO October 27-31, 1969

Feeder Report

SCOPE

The inspection effort was limited to the reactor coolant system piping (RCSP). Fifteen spool pieces for three of the loops which were fabricated by the Southwest Welding Company of <sup>HOUSTON</sup> Houston, Texas, were received at Surry on 8-13-69. No site fabrication of the RCSP is anticipated for a considerable time. Piping on site was examined for compliance and the applicable contract documents. 3800/2 was utilized for guidance in the above performance.

SUMMARY

1. RECEIVING INSPECTION

VEPCO GC and Stone and Webster depended on the integrity of the Westinghouse and Stone and Webster source inspection, with no further inspection planned other than receiving inspection for identity and damage (see attached Exhibit #

A10  
J

An announced inspection was performed of the Surry Power Station reactor site at Gravel Neck, south, across the James River from Williamsburg, Virginia.

The inspection was for the purpose of resolving outstanding problems with the primary coolant piping previously reported.

In order to assess the impact of previous inspections by CO which disclosed inadequate or incompetent supplier surveillance and falsity in reporting, two additional supplier furnished items were inspected

SUMMARY

Safety Items - None

Nonconformance Items Two

Unusual Occurrences - None

Status of Previously Reported Problems -

- 1- REACTOR COOLANT PRESSURE BOUNDARY PIPING
  - a- OUTSTANDING PROBLEMS
    - 1- Lead Engineer P.J. Rapone of Westinghouse (W) stated that six (6) of the coolant piping discrepancies previously reported would be corrected at the site. Three other discrepancies are still unresolved.
  - b- BUTT WELDING DESIGN CHANGE
    - 1- Rapone stated that the fabricator of the coolant piping, Southwest Welding and Fabricating Co., did not use consumable inserts for the butt welding but that the alternate method was approved by W.
  - c- GRINDING OF WELD RIPPLES
    - 1- R.P. Williams, VEPCO Resident Engineer stated that the discrepancy reported on failure to grind weld ripples for radiographic interpretation



OBSERVATION OF WORK PERFORMANCE (4305.06)  
(NO IN-PROCESS INSPECTION PERFORMED)

Reactor Coolant Piping received at Surry was rejected on 8-13-69 for superficial defects. In depth inspection by CO:II disclosed the following additional defects:-

- (a) 4805.06.a. 1.4.(e)
- (b) 4805.06.a 1.4.(e)
- (c) 5005.06.b. 1.(b) IFE
- (d) 4805.06.4. (e)
- (e) 4806.06 a.1.(f)
- (f) 5005.06 OTHER ITEM
- (g) 5005.06.b. 1.(a)
- (h) 5005.06 b.1.(b)
- (i) 5006.06 OTHER ITEM
- (j) 5005.06 OTHER ITEM

- The weld surfaces were not ground and showed prominent weld ripples (see exhibit No 1).

- The weld reinforcement was in excess of that specified by applicable specifications

- The inside of the pipe was not clean

- The butt weld on the inside of the pipe had been ground out excessively

- Many arc strikes were observed on the inside of the piping

- Grinding and machining finishes exceeded the RMS specified

- Metal stamping was performed in conflict with the applicable specifications

- A penetrometer was found on the inside of the pipe

- Grinding <sup>of parent metal</sup> was not performed in a workman-like manner.

- Grinding equipment used <sup>on for removal of defects</sup> was in conflict with the applicable specifications.

(K)  
4805,06:a(1)

0

3

0

The welding of unequal pipe and or fitting thicknesses is not in conformance with the applicable specifications (see Exhibit No 2)

3- The inspectors observations were confirmed by Wainwright and Stone and Webster and resulted in immediate corrective action by the contractors and the Licensee.

4- 3800/2. The Licensee thru its constructors generally comply with the QA and QC requirements but have failed in practice as indicated.

4  
DETAILS

PERSONS CONTACTED

Name	Title	Affiliation
W. McNaughton	Site QC Welding Engr.	Stone & Webster
R.T. Pursell	Welding & NDT	Boston Mass. " " "
G.L. Jewett	Piping Engr.	" " " " "
* P.S. Rapane	Site-Lead Engr.	Westinghouse
* R.J. Sawyer	Supr. Ser. Engr.	"
J.L. Perkins	Q.C. Engr.	VEPCO-Richmond

\* The Westinghouse personnel were only involved in the off-site purchased hardware under

#BDF-05



During an early discussion with W. McNaughton, QC's Welding Engineer and R. T. Pursell, Welding and NDT of Stone and Webster, Boston, and J. L. Perkins, VEPCO QC Engineer, the inspector questioned the policy on receiving inspection at the site. Pursell stated "We are paying the fabricator and Westinghouse to inspect the product <sup>to</sup> and assure compliance to the drawings and specifications, besides we are paying for Stone and Webster to provide surveillance on the shop fabrication and we consider this to be sufficient - we don't intend to reinspect at the site except for accountability and damage."

The inspector asked to see the Reactor Coolant piping which was manufactured by Southwest Welding for the purpose of verifying the applicants confidence.

2 **OBSERVATION OF WORK PERFORMANCE 4805.06 (NO IN-PROCESS INSPECTION WAS PERFORMED)**

Visual Inspection of Stored Piping

There were 15 spool pieces Nos. 1, 2, 3, 6 and 7 comprising three loops. The applicable specifications requires the piping to be ASTM A376, TP316, Schedule 140, etc., and fabricated to ASA B31.1 CC N-7 and ASME Section III, etc. After removing the heavy vinyl protective covering, the inspector observed the following deficiencies which were common to each of the four of the longest spools inspected:

- (a)  
4805.06  
1.4.(e)
- ↔ The weld surfaces were as welded - with prominent weld ripples. (exhibit No 1)
  - ~~↔ The reinforcement is 1/4 inch maximum (250 inch).~~
  - ↔ USAS B31.1.0 paragraph 127.4.2 (d) and ASME Section VIII - YW51 (essentially the same). Stated in ASME Section III IX-333 (a) Welds to be radiographed shall be prepared as follows: The weld ripples or weld surface irregularities, on both the inside and outside, shall be removed by any suitable mechanical process to such a degree that the resulting radiographic contrast due to any irregularities cannot mask or be confused with the image of any unacceptable discontinuity. Also the weld surface shall merge
- UW51

SA 127.4.2

(b) 4805.06 1.4.(e)

USAS R311 PA  
STATES

smoothly into the plate surface

~~(b)~~ THE REINFORCEMENT IS  $\frac{1}{4}$ " INCH MAX (.250 IN.)

~~(c)~~ The finished surface of the reinforcement of all butt welded joints may be flush with the plate or may have a reasonably uniform crown not to exceed  $\frac{5}{32}$ -inch (.156-inch) on plate over 2 inches (min wall specified is 2.215 inches).



(c) 8  
5005.06  
b.1. (E)

The inside of the pipe was not cleaned and contained grit, dye penetrant developer, rust spots and one spool (PC.1) contained approximately 1/3 cup of discolored water. - *The piping was to be installed as is*

The Westinghouse Specification for shop fabrication of the reactor coolant piping G-676343 states, "The shop fabricator shall clean the outside and inside surfaces of all finished piping subassemblies in accordance with WPS 292722-1.

(d) \*  
4805.06.4  
(e)

The inside of the butt weld of the straight pipe sections piece 7 loop 1 was ground out 2-1/2 inches wide and 1/4-inch deep. Three other similar spools were also ground out to approximately the same concavity. Exhibit No. 1 shows the concavity and the specified weld preparation. The extent of the grinding indicates that the grinding included ~~in~~ the removal of the consumable insert and indicates a defective TIG root pass which had to be removed. No repair was made and no deviation or ~~change~~ change request was noted on the source inspection report. Specification G676343 paragraph 1.1.2 "There shall be no deviation from this specification or its references without prior written approval of WAPD.

*THE WELD AREA DOES NOT CONFORM TO W DRWG 498B932 AS SHOWN ON EXHIBIT NO 2*

ASAS B31.1.0 paragraph 127.4.2 (e) Sections of welds that are shown by radiography or other examination to have any of the following types of imperfections shall be judged unacceptable and shall be repaired as provided in paragraph 127.4.7 - 4. Concavity on the root side of full penetration girth butt welds where the resulting weld thickness is less than the minimum pipe wall thickness required by this Code. Weld reinforcement up to a maximum of 1/32-inch thickness (the weld in question has 1/4-inch reinforcement) may be considered as pipe wall thickness in such cases.

Piping  
Survey

final  
report

Rapone asked the Compliance inspector what he had observed and after detailing observations, Rapone stated that the findings were in accord with Sawyers' report and added that he would telephone his home office and report the situation. On the last day of the inspection, Perkins stated that WECO had authorized S&W to increase its source inspection personnel.

## 2. Visual Inspection

- a. The inside of the pipe was not cleaned and contained grit, dye penetrant developer and rust spots. One spool (FC.1) contained approximately one-third cup of discolored water.

The Westinghouse specification for shop fabrication of the reactor coolant piping, G-676343, states, "The shop fabricator shall clean the outside and inside surfaces of all finished piping subassemblies in accordance with WPS 292722-1."

- b. Finish machined weld end preparations and ground out deficiencies were 250 RMS as measured with a Surf-Chek roughness standard conforming to ASA-B46, SAE-MIL STD-10. W Drawing Specification 498B932 states, "Finish machined weld end preparations shall have surface finished not in excess of 125 RMS." ✓
- c. Identification was metal stamped on the pipe and fittings, in conflict with Specification G-676343, paragraph 5.7.2, which states, "Mechanical stamping is prohibited." ASTM A376, paragraph 11.2, states, "No steel indentation stamping shall be done without the purchaser's consent." ✓
- d. An .040 thickness penetrometer was found taped to the inside of spool piece No. 7. The pipe was sealed. Such a "missile" constitutes a potential valve malfunction. ✓
- e. Grinding of defects was performed in a manner which "burnished" the metal.
- f. Some of the grinding was performed with carbon steel charged grinding sheets or discs which resulted in rust spots. The applicable fabrication specification does not address itself to this deficiency nor does it instruct the fabricator not to use carbon steel wire brushes except by inference in Section 1.1.3 of Specification G-676343. "...workmanship shall be satisfactory for the design conditions specified or as may be required by common usage of good practice."

(e) Arc strikes were observed on the pipe ID and on the inside of the 6-inch diameter attachment to the 27-1/2-inch pipe section.

48005.06  
a. 1. (f)

The Westinghouse fabrication specification does not address itself to this deficiency.

Volume 2 page 190

*Welding Metallurgy by AWS states "Arc strikes often harbor minute cracks, porosity, hard zones, and chemical heterogeneity. Despite their small scale, these conditions can trigger a major failure when they are located in an important stress field. Tests have shown that it is safer to deposit a smooth weld bead over an earlier accidental arc strike than to leave the strike and its minute defects in place. Of course, removal of the surface metal by grinding or machining also is an effective remedy for arc strikes."*

(f) Finish machined weld end preparations and ground out deficiencies were 250 RMS. As measured with a Surf-Chek roughness standard conforming to ASA-B46, SAE-MIL STD-10. W. drawing specification 498B932 states, "Finish machined weld end preparations shall have surface finished not in excess of 125 RMS."

5005.06  
OTHER ITEM

(g) Identification was metal stamped on the pipe and fittings in conflict with Specification G676343 paragraph 5.7.2 which states "Mechanical stamping is prohibited." ASTM A376 paragraph 11.2 "No steel indentation stamping shall be done without the purchaser's consent."

5006.06  
1. (a)

(h) An .040 thickness penetrometer was found taped to the inside of spool piece No. 7.

5006.06  
(b)



b.1  
Regardless of the time or place when such a "missile" was inserted, it constitutes a potential valve malfunction, and the piping was sealed.

(i) ~~g~~. Grinding of defects was performed in a manner which "b<sup>u</sup>rnished" the metal - It is difficult to evaluate this <sup>un-</sup>workmanlike process.

5005.01  
OTHER ITEM

(j) Some of the grinding was performed with carbon steel charged grinding wheels or discs which resulted in rust spots.

5006.01  
OTHER ITEM

The Westinghouse applicable fabrication specification does not address itself to this deficiency nor does it instruct the fabricator not to

PC

As a result of the deficiencies noted on the reactor coolant piping by CO:11, Pat Rapone, the Westinghouse site lead engineer initiated an investigation which brought to the site personnel from the home offices. The following day Rapone stated that the subject piping would be returned to the vendor.

J. Perkins of VEPCO advised CO:11 personnel that they (VEPCO) had instructed Stone and Webster to increase the vendor QC forces.

use carbon steel wire brushes except by inference in 1.1.3 of Spec G676343  
"... workmanship are satisfactory for the design conditions specified or  
as maybe required by common usage of good practice.

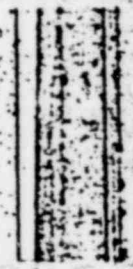
~~As a result of the deficiencies noted on the reactor coolant piping by CO:II,  
Pat Rabone, the Westinghouse site head engineer initiated an investigation  
which brought to the site personnel from the home offices of Westinghouse  
and Stone and Webster, and before the inspectors departure on the last  
day J. Perkins of VEPCO advised CO:II that they (VEPCO) had instructed  
Stone and Webster to increase the vendor QC force.~~

(K)  
4805.01  
a. (1)

THE STRAIGHT SECTIONS OF PIPING WERE INCORRECTLY  
WELDED TO THE ELBOWS AS INDICATED BY THE COVER  
PASS WHICH WAS "STEPPED" AS SHOWN ON EXHIBIT  
2 AND PHOTOGRAPHY

SPEC: STD-HP-401-C-2 FOR WELDE JOINT DETAILS  
REQUIRES THE FOLLOWING:

IN NO CASE SHALL THE THICKNESS OF WELDING ENDS BE  
LESS, NOR MORE THAN 15 PER CENT GREATER, THAN THE  
NOMINAL WALL THICKNESS OF THE ADJOINING PIPE. THE  
MACHINED ENDS OF VALVES OR FITTING BODIES SHALL  
BE EXTENDED BACK IN ANY MANNER, WITH THE PRINCIPAL  
TAPER EITHER INSIDE OR OUTSIDE WITH REFERENCE TO  
THE PIPE WALL, PROVIDED THE TOTAL TAPER COMES  
WITHIN THE MAXIMUM SLOPE LINE INDICATED HEREIN.





3- The inspector was accompanied <sup>to the pipe storage area</sup> by R. Sawyers the Westinghouse Site Inspector and W. McNaughton the Stone and Webster Welding Engineer.

All discrepancies were observed by the three inspectors and recorded. J. Perkins, <sup>VEPCO QC</sup> was apprised of the findings thru McNaughton, and P. Rapone (W) was informed by Sawyers.

Rapone <sup>asked</sup> the CO:11 inspector what he had observed and after detailing observations, Rapone stated that the findings were in accord with Sayers report and added "I'm going to telephone my home office and report this sad situation. On the last day of the inspection J. Perkins stated "VEPCO has authorized Stone and Webster to increase its source inspection personnel"

4- The attached 3800/2 check off list indicates a sound approach for fabrication compliance. The intent fullfills the requirements but the noted deficiencies destroys confidence in the plan of action

OCT. 28, 1969  
 SURRY, VIRGINIA

AEC-DIV. OF COMPLIANCE SITE AUDIT

<u>PERSONNEL</u>	<u>ORGANIZATION</u>	<u>AREA OF INTEREST</u>
	AEC-DIV. OF COMPLIANCE	STM GEN'S/PRESS
	" " " "	VALVES
E.M. HOWARD	" " " "	ELECT - I&C
	" " " "	VISITOR
<del>S.M. VALENTA</del>	<del>WESTINGHOUSE-SITE</del>	<del>PIPING</del>
W.O. ANDERSEN	S&W SITE	CHIEF QC ENG'R
R.E. BOWKER	S&W BOSTON	ENGINEERING
G.L. SEWETT	S&W BOSTON	ENG'R PIPING
H.V. REDGATE	S&W BOSTON	ENG'R ELECT
R.T. PURSELL	S&W BOSTON	WELDING & N
P.J. RAPONE	WESTINGHOUSE-SITE	LEAD ENG'R
J.L. PERKINS	VEPCO - RICHMOND	QC ENG'R
W.C. SPENCER	VEPCO - RICHMOND	ELECT - I&C
R.P. WILLIAMS	VEPCO - SITE	RESIDENT EN

11/11

DETAILS (CT B)

Survey  
draft report?

REACTOR COOLANT ~~PIPE~~ PRESSURE BOUNDARY  
PER 3800/2

WELDING 9800

REVIEW of QUALITY CONTROL SYSTEM (9805.04)  
Qualifications

04.a.1 Weld procedures

PROCEDURE # W-68 - This specification has been prepared and qualified in accordance with Section IX of the ASME Code for the purpose of fabrication and erection of Atomic Power Piping Systems by Stone & Webster Engineering Corporation.

BASE METAL

The base metals covered by this specification shall be in accordance with those listed herein, or substantial equivalent specifications.

- ASTM-A-182 - Austenitic Stainless Steel Forgings, Grades F304 and F316
- ASTM-A-312 - Seamless and Welded Austenitic Stainless Steel Pipe and Fittings, Grades 304 and 316
- ASTM-A-351 - Austenitic Stainless Steel Castings, Grades CF8 and CF8M
- ASTM-A-362 - Austenitic Stainless Steel Centrifugally Cast Pipe and Tubing, Grades CF8 and CF8M, in Accordance with A296 Requirements
- ASTM-A-376 - Seamless Austenitic Stainless Steel Pipe, Grades 304 and 316
- ASTM-A-403 - Wrought Austenitic Stainless Steel Welding Fittings, Grades WP304 and WP316
- ASTM-A-451 - Centrifugally Cast Austenitic Steel Pipe for High Temperature Service

W-68, details the following: Process, Filler Metal, Joint Details, Shielding, Current used, Position, Preheat & Interpass Temp, Cleaning, Fit-up & Purging, Weld Technique, Welding Technique, Inspection. The ASME Section IX includes welding Qualification W-68 Sheet 10. Welding Qualification adds, also refer to Section III of Stone & Webster's



Welding Procedure Specification Book, 1918

to the process and procedure

04. a. 2

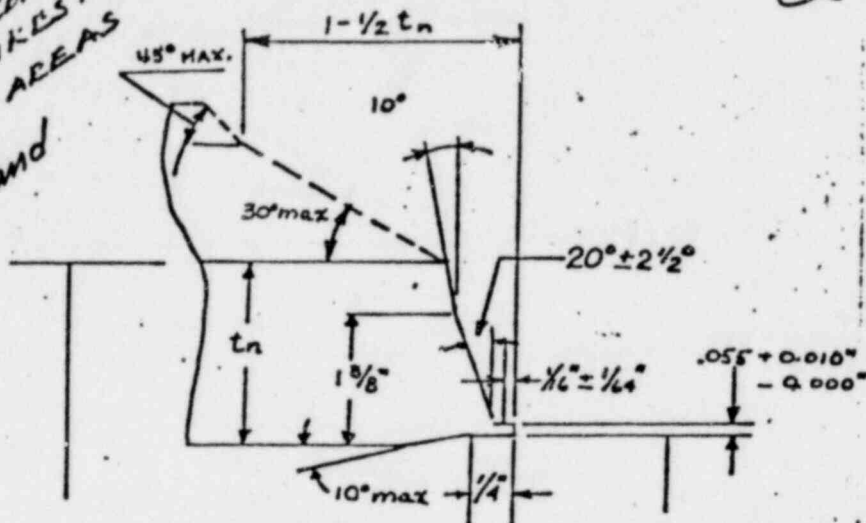
Welding is incorporated in the foregoing procedure

Weld Repair Stone and Webster does not address itself

to weld Repair <sup>Indirectly</sup> except thru Sect IV of ASME N-528

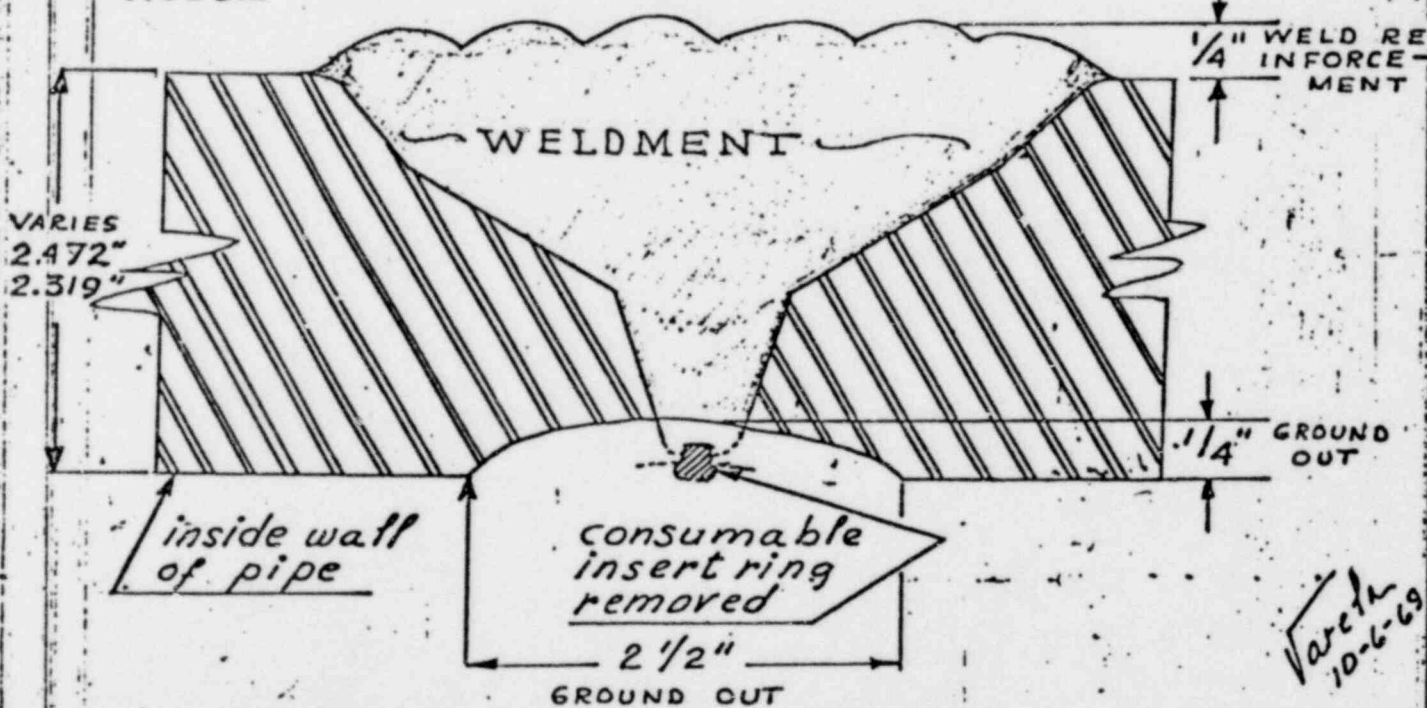
**EXHIBIT NO 6**  
 \* THE INSPECTION REPORT  
 SHOWED 100% INSPECTION AND  
 CLEANLINESS - HOWEVER IF DE  
 WAS FOUND DIRTY AND CONTAIN'D  
 DEVELOPER ALL STRIKES AND COURSE  
 (250RMS) GROUND OUT AREAS  
 REPORT BY S&W, SW AND  
 (W)

Exh. G  
 2-of-2



WELD PREPARATION FOR STAINLESS STEEL PIPE  
 WITH CONSUMABLE INSERT, FROM WESTINGHOUSE  
 DRAWING 498 B 932

BELOW IS 'AS-BUILT' OF LOOP NO.3, PIECE NO.7  
 MEASUREMENTS MADE WITH VERNIER CALIPER AND  
 DEPTH GAGE AND WITNESSED BY R. SAWYER OF WESTING-  
 HOUSE

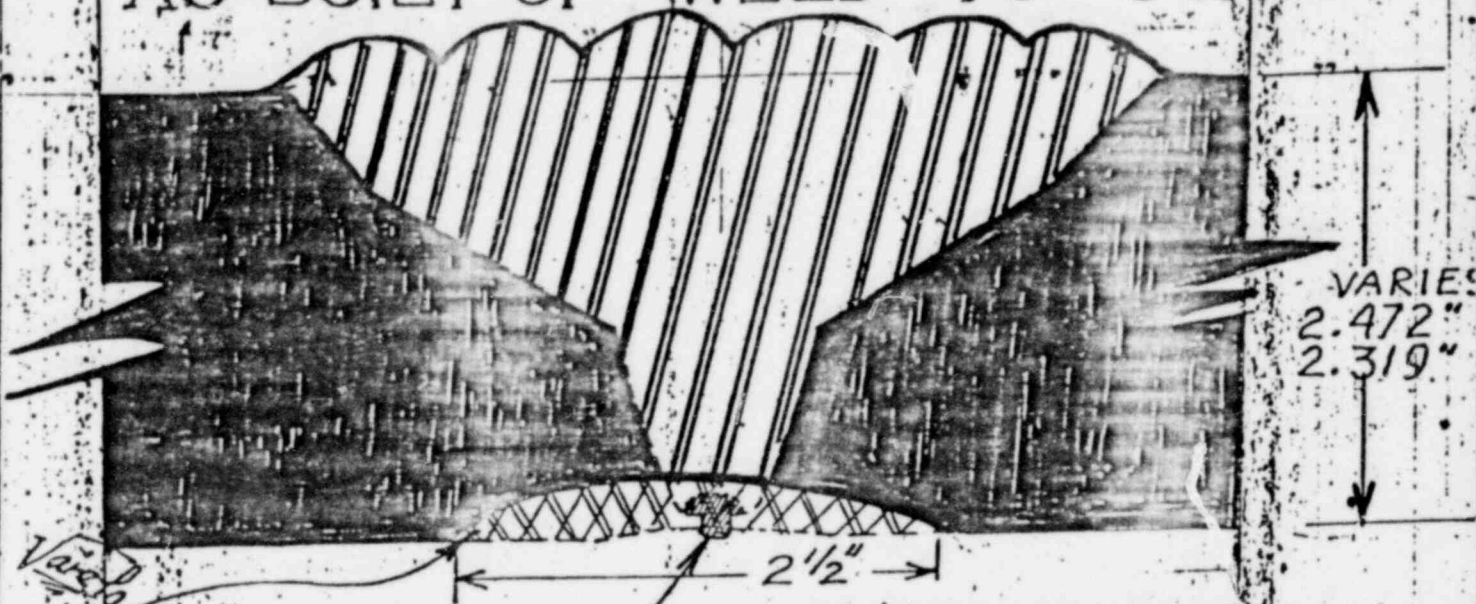


MEASUREMENTS MADE OF WALL THICKNESS

LOOP #	PIECE #	1	2	3	4
3	1	2.580"	2.580"	2.590"	2.632"
3	7	2.459"	2.472"	2.319"	2.321"
1	7	2.395"	2.390"	2.382"	2.375"
					2.320"-2.365"
					2.390"-2.414"

A.10  
 K

# AS-BUILT OF WELD TO SCALE.



LOWER SHADED AREA (2 1/2" LONG - 1/4" DEEP) WAS GROUND OUT

USE THE "GRINDEL" OR THE "EB" CONSUMABLE WELDING "Y" CONSUMABLE INSERT RING. 45° MAX. NECESSARY TO SATISFY THE FIT-UP MATCHED ENDS SATISFY THE FIT-UP TESTS IS NOT NECESSARY.

\* SCHEDULE 10S, 40S, & 80S APPLY TO PIPE UP TO AND INCLUDING 12" PIPE (USASB36.19). BEYOND THIS, CARBON STEEL SCHEDULES APPLY (USASB36.10).

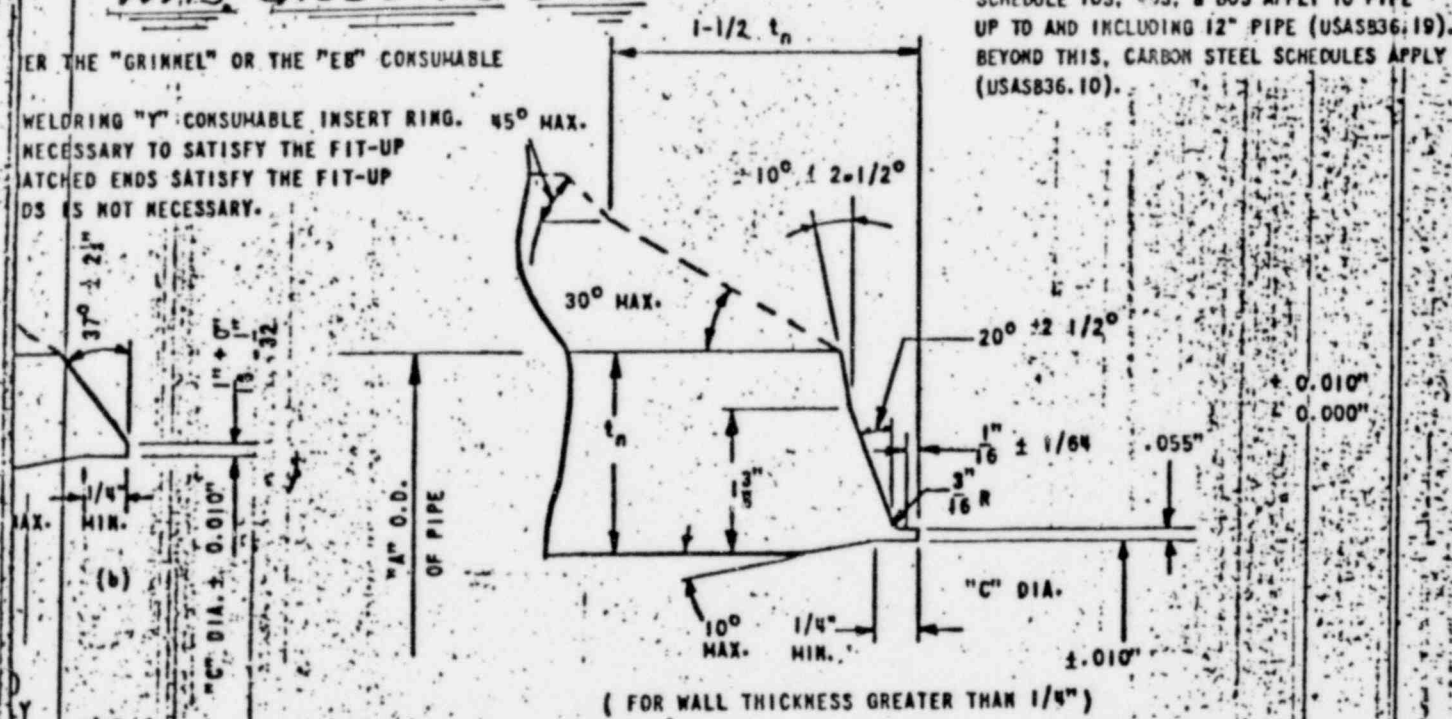


FIGURE C

SEE BACKGROUND OF PRINTS  
INDICATES PRELIMINARY DRAWING  
APPROVED FOR WELDING OR DRAWING  
APPROVED FOR CONSTRUCTION

DESIGNER	
CHECKER	
DESIGN ENGINEER	
MANUFACTURING ENGINEER	
MATERIALS ENGINEER	
APPROVED	
APPROVED	

Westinghouse Electric Corporation   
ATOMIC POWER DIV., PITTSBURGH, PA., U.S.A.

TITLE: WELD PREPARATION FOR STAINLESS STEEL PIPE WITH CONSUMABLE INSERT

498 B 932

SCALE