

VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

February 7, 1996

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Serial No. 96-032  
NL&OS/EJW  
Docket No. 50-338  
50-339  
License No. NPF-4  
NPF-7

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**NORTH ANNA POWER STATION UNITS 1 AND 2**  
**INSERVICE INSPECTION REQUEST FOR RELIEF**

By letter Serial No. 93-018, dated February 16, 1993, we submitted Relief Request NDE-18 for North Anna Unit 1 and Unit 2 inservice inspection (ISI) examinations. Relief Request NDE-18 was conditionally granted by letters dated August 7, 1995, "Evaluation of the Second Ten-Year Interval Inspection program Plan, Revision 4 and Associated Requests for Relief/North Anna Power Station, Unit No. 1 (NA-1) (TAC No. M89620)," and August 8, 1995, "Evaluation of the Second Ten-Year Interval Inspection program Plan, Revision 3 and Associated Requests for Relief/North Anna Power Station, Unit No. 2 (NA-2) (TAC No. M89740)." Due to the omission of certain terminal end piping welds connected to each unit's regenerative heat exchanger, we are submitting revised relief requests (Attachments 1 and 2) to include these welds.

The alternative requirements proposed for these welds are similar to the guidelines established by your previous evaluation of the regenerative heat exchanger. The revised relief requests are submitted pursuant to 10 CFR 50.55a(g)(5) and have been approved by the North Anna Station Nuclear Safety and Operating Committee.

North Anna Power Station Unit 1 is currently in the second period of its second ten year interval. The interval is scheduled to end December 24, 1998. The Code of reference for North Anna Unit 1 is the 1983 Edition, Summer 1983 Addendum of ASME Section XI.

North Anna Unit 2 is presently in the second period of the second ten-year interval. Examinations are being conducted in accordance with the requirements of Section XI of the 1986 Edition of the ASME Boiler and Pressure Vessel Code.

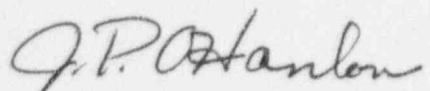
120056

9602120226 960207  
PDR ADDCK 05000338  
G PDR

A047  
1/1

If you have any further questions, please contact us.

Very truly yours,

A handwritten signature in cursive script that reads "J. P. O'Hanlon".

J. P. O'Hanlon  
Senior Vice President - Nuclear

Attachments

cc: U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street, N.W.  
Suite 2900  
Atlanta, Georgia 30323

R. D. McWhorter  
NRC Senior Resident Inspector  
North Anna Power Station

**ATTACHMENT 1**

**NORTH ANNA UNIT 1  
RELIEF REQUEST NDE-18 (REVISED)**

**NORTH ANNA UNIT 1  
RELIEF REQUEST NDE-18 (REVISED)**

**I. IDENTIFICATION OF COMPONENTS**

System: Chemical and Volume Control (CH)  
Component: Regenerative Heat Exchanger (1-CH-E-3)  
Connecting Circumferential Piping Welds

<u>Welds/Components</u>	<u>Description</u>	<u>Code Item#</u>	<u>Class</u>
3	tubesheet-to-head	B2.60	1
7	tubesheet-to-head	B2.60	1
11	tubesheet-to-head	B2.60	1
4	circumferential head	B2.51	1
8	circumferential head	B2.51	1
12	circumferential head	B2.51	1
13	nozzle-to-vessel	B3.150	1
14	nozzle-to-vessel	B3.150	1
15	nozzle-to-vessel	B3.150	1
16	nozzle-to-vessel	B3.150	1
17	nozzle-to-vessel	B3.150	1
18	nozzle-to-vessel	B3.150	1
13NIR	nozzle inside radius	B3.160	1
14NIR	nozzle inside radius	B3.160	1
15NIR	nozzle inside radius	B3.160	1
16NIR	nozzle inside radius	B3.160	1
17NIR	nozzle inside radius	B3.160	1
18NIR	nozzle inside radius	B3.160	1
19	terminal end weld	B9.21	1
20	terminal end weld	B9.21	1
21	terminal end weld	B9.21	1
22	terminal end weld	B9.21	1
WS-1	welded attachment	B8.40	1
WS-2	welded attachment	B8.40	1
WS-3	welded attachment	B8.40	1
WS-4	welded attachment	B8.40	1
WS-5	welded attachment	B8.40	1
WS-6	welded attachment	B8.40	1
1	circumferential head	C1.20	2
5	circumferential head	C1.20	2
9	circumferential head	C1.20	2
2	tubesheet-to-shell	C1.30	2
6	tubesheet-to-shell	C1.30	2
10	tubesheet-to-shell	C1.30	2

## I. IDENTIFICATION OF COMPONENTS (Continued):

<u>Welds/Components</u>	<u>Description</u>	<u>Code Item#</u>	<u>Class</u>
	(Drawing 11715-WMKS-0103CD)		
21A	terminal end weld	B9.21	1
	(Drawing 11715-WMKS-0111H)		
32	terminal end weld	B9.21	1

## II. IMPRACTICAL CODE REQUIREMENTS

Examination Categories B-B, B-D (Inspection Program B), B-H, B-J, and C-A require that volumetric and surface examinations be performed as indicated by the Code item numbers above.

## III. BASIS FOR RELIEF

The regenerative heat exchanger (1-CH-E-3) provides preheat for the normal charging water going into the reactor coolant system (RCS). The preheat is derived from normal letdown water coming from the RCS. Charging and letdown constitute the normal chemical and volume control within the RCS. The heat exchanger itself is actually three heat exchangers in series, interconnected with piping. This fact was previously utilized in limiting examinations to one of the heat exchangers as allowed by the Code. The heat exchanger has an outside shell diameter of 9.55 inches. The shells were manufactured with ASTM A351 CF8 type material. The heads were manufactured with ASTM A240 TP304 material. The 3 inch nozzle necks were manufactured with ASTM A182 F304 material. Until very recently the regenerative heat exchanger was entirely classified ASME Class 2 for inservice inspection activities. However, a reanalysis changed the classification of the letdown side of the heat exchanger to ASME Class 1. This action significantly increases the examination requirements associated with this heat exchanger. Nozzles, which were previously exempt under Class 2 requirements are now required to be examined. Additionally, all Class 1 nozzles are required to be examined, and the examinations are not limited to one heat exchanger.

The nozzle-to-vessel welds and nozzle inside radius sections for this vessel were not designed for ultrasonic examination from the outside diameter of the vessel. The small diameter of the vessel and nozzles along with the cast stainless steel vessel shell prevents a meaningful ultrasonic examination of these components.

### III. BASIS FOR RELIEF (Continued):

The Code required volumetric examination on the vessel head circumferential welds is limited due to the weld crown, radius of the closure caps, and the nozzles. The Code required volumetric examination of the tubesheet welds is limited by the weld crown and is obstructed by a support clamp. This clamp must be mechanically removed prior to the welds' examination. Additionally weld 11 is partially obscured by the six integral attachments, which are themselves butted up against a clamp. It is estimated that between 21 and 42 percent of the circumferential welds could be examined, and 42 percent of the tubesheet welds could be examined, if the clamps are removed. Weld 11 would be significantly less due to the integral attachment location. Previous partial examinations completed on these welds have identified no problems.

An ALARA evaluation has been conducted on each activity associated with these examinations. A table is provided documenting these results. It is estimated that more than 26 man-rem will be required to complete these examinations over the interval. This estimate assumes optimum inspection and preparation times. If difficulties are encountered, a corresponding increase in dose would be expected. Shielding is not considered practical since the source of radiation is the component receiving the examinations. Considering the examination limitations previously discussed, expending this much dose is deemed impractical.

This relief request was originally submitted by letter Serial No. 93-018, dated February 16, 1993. The relief was granted ("provided that the lower regenerative heat exchanger receives the Code-required examinations to the extent possible") by letter dated August 7, 1995, and its associated safety evaluation report. This request is being revised to add four of six terminal end piping-to-vessel welds which are required to be selected for examination under Category B-J note 1(a) under item B9.21. These welds were omitted from the original request and need to be addressed in this relief request in addition to those already evaluated. New survey maps of the regenerative heat exchanger indicate higher dose rates than previously estimated (survey attached). Performing these surface examinations would result in approximately 10.5 man-rem of exposure and would negate, to a large degree, the exposure reduction of the original relief request. This is due to the close proximity of the regenerative heat exchanger to these welds and the need for scaffolding and insulation removal, which were previously eliminated for the regenerative heat exchanger in our original relief request.

#### IV. ALTERNATE REQUIREMENTS

Technical Specifications require that the RCS Leak Rate be limited to 1 gallon per minute unidentified leakage. This value is calculated every 72 hours in accordance with Technical Specification requirements. Additionally, the containment atmosphere particulate radioactivity is monitored every 12 hours per Technical Specification requirements. As a result, new leakage is rapidly identified and located during operation. Leakage identified from these components can be easily isolated by two upstream valves with manual operation from within the control room. The valves also receive an automatic control signal to close on inventory loss based on pressurizer level. However, these valves could not be used as the Class 1 boundary valves due to their nonsafety-related actuation. Correspondingly, as a result of the reclassification to Class 1, these components will receive a system leakage test prior to start up after each refueling outage. During this system leakage test the components will receive a visual (VT-2) examination. The support structures will receive a visual (VT-3) examination to the extent required by the Code without insulation removal.

Your evaluation of our original relief request, dated August 7, 1995, added alternative requirements. The appropriate portion of the Technical Evaluation Report follows:

Based on the statement by the licensee that previous partial examinations have been completed on these welds, it is concluded that a best effort volumetric examination of the lower RHX, in addition to system radiation monitoring and the Code required visual examinations, would provide a reasonable assurance of the system's inservice structural integrity. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted provided the lower RHX vessel receives Code-required volumetric examinations to the extent possible.

We would also request that this philosophy of inspection be extended to the vessel-to-piping terminal end welds on the regenerative heat exchanger. The two lower RHX vessel-to-piping terminal end welds (22 & 21A) will be examined by the surface method as required by the Code.

**NORTH ANNA UNIT 1  
1-CH-E-3 EXAMINATIONS  
MAN-REM ESTIMATE**

<u>Work Task</u>	<u>Man-Hours (hrs)</u>	<u>Dose Rate (R/hr)</u>	<u>Man-Rem</u>
Insulation Remove/Install	5.3	0.500	2.650
Scaffolding Install/Remove	1.0	0.350	0.350
Clamp Remove/Install	2.0	1.000	2.000
Weld Prep.	3.5	1.000	3.500
HP Coverage	31.0	0.010	0.310
Nozzle-to-Vessel Inspection (UT)	6.0	1.000	6.000
Nozzle Inside Radius Inspection (UT)	4.5	1.000	4.500
Circumferential/Tubesheet Inspection (UT)	4.0	1.000	4.000
Welded Attachment Inspection (PT)	3.0	1.000	<u>3.000</u>
<b>Total Estimate</b>			<b>= 26.310</b>



NORTH ANNA UNIT 1  
1-CH-E-3 PIPING TERMINAL ENDS  
EXAMINATIONS MAN-REM ESTIMATE

6 Terminal End Welds

<u>Work Task</u>	<u>Man-Hours (hrs)</u>	<u>Dose Rate (R/hr)</u>	<u>Man-Rem</u>
Insulation Remove/Install	2.0	2.000	4.0
Scaffolding Install/Remove	1.0	1.500	1.5
Weld Prep.	1.0	2.000	2.0
PT Exam 6 Welds	1.5	2.000	<u>3.0</u>
<b>Total Estimate</b>			<b>= 10.5</b>

# RADIOLOGICAL SURVEY MAP AND RECORD

Form RR-8.U.1.-1  
(Rev 0)

Location Regenerative Heat Exchanger Cube Containment 241' Date 5/20/89 Time 0230

PURPOSE:  Routine  Non-Routine  RWP, RWP # 89-2027 Reactor Power: #1 0 %

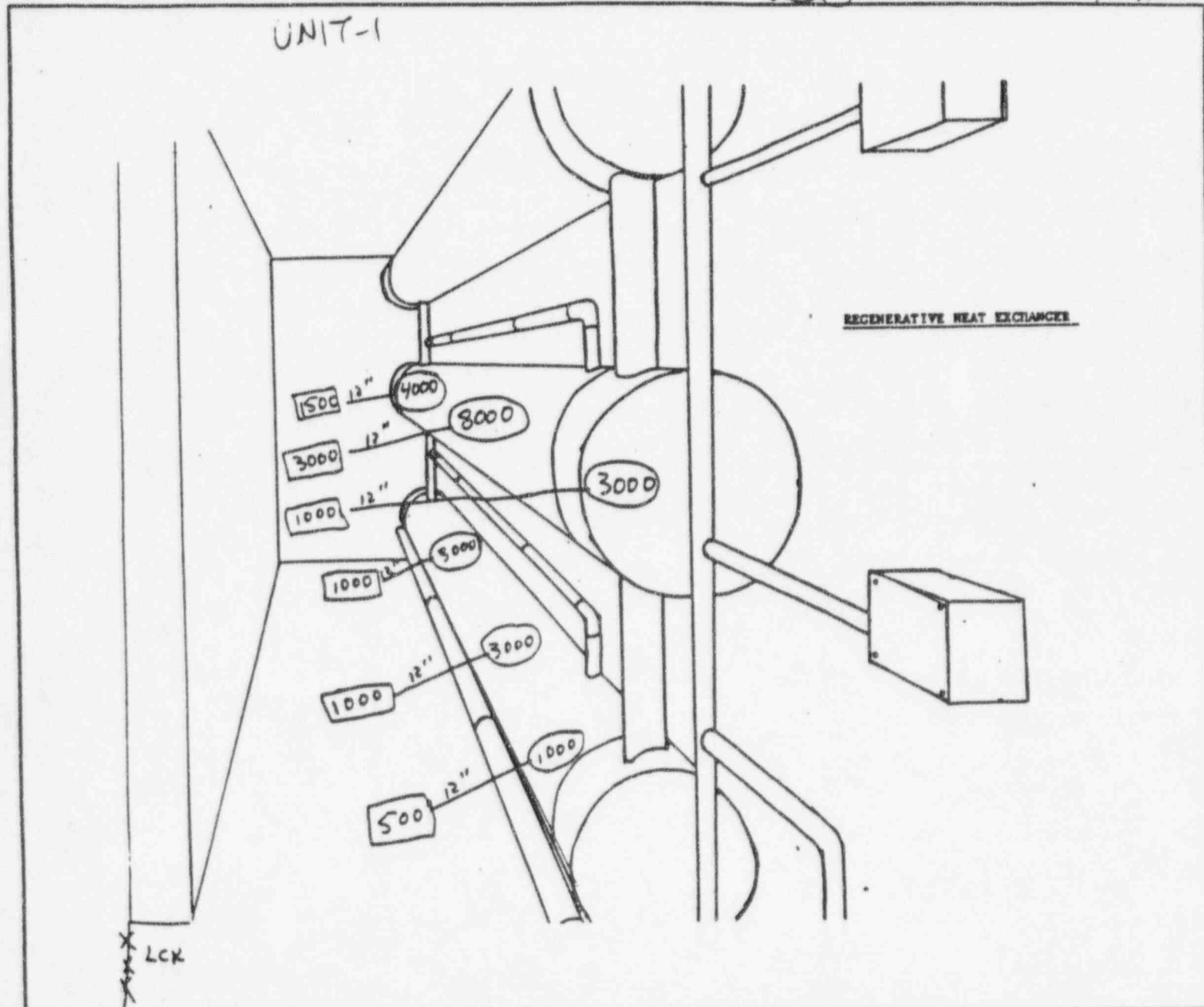
TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  \_\_\_\_\_ #2 100 %

Instrument Model	Serial #
RU-2A	3114

- All smears < 1000 DPM/100 cm<sup>2</sup> except as noted on map or smear worksheet
- All smears < 1000 DPM/100 cm<sup>2</sup>  All Gamma readings in mR/hr
- Air particulate + I<sub>2</sub> < 25% MPC  All Beta readings in mrad/hr
- \_\_\_\_\_  All Neutron readings in mrem/hr
- \_\_\_\_\_  \_\_\_\_\_

Comments: SURVEY TAKEN AFTER REMOVAL OF INSULATION FROM BOTTOM ELEMENT

Survey Team Dose (SRD and/or calculated after survey): 0.080 man-rem RWP # Survey Performed Under: 89-2027  
 Survey Performed By Ron Keata Reviewed By [Signature] Date 5/20/89



Gen. Area  
  Contact  
  Smear  
 \*AS Air Sample Location  
 LCK Locked Gate  
 \*\*\* Barrier  
 (F) Frisking Station

# RADIOLOGICAL SURVEY MAP AND RECORD

Form HP-8.0.12-1  
(Rev 0)

Location Regenerative Heat Exchanger Cube Containment 241' Date 5/28/89 Time 1115

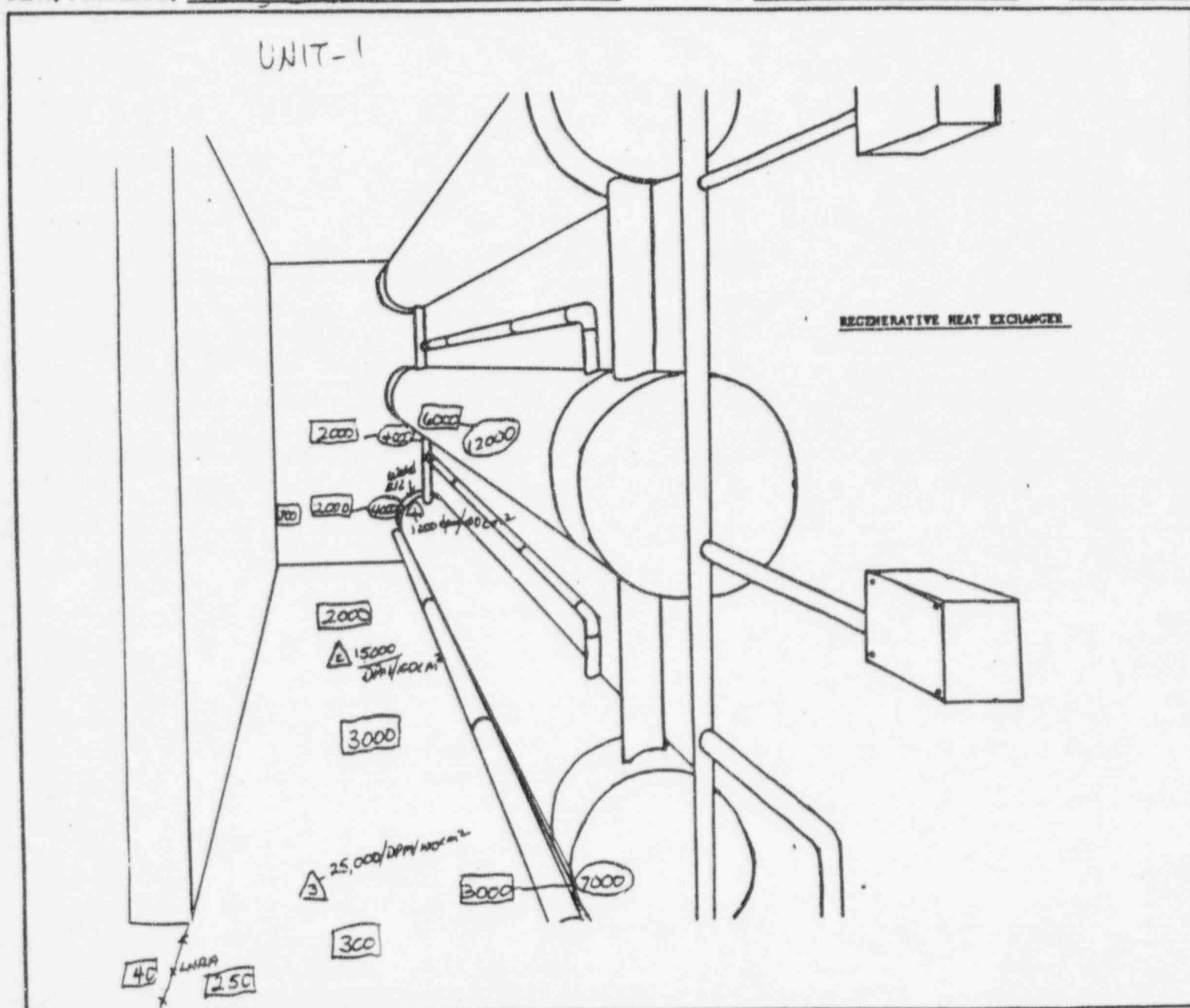
PURPOSE:  Routine  Non-Routine  RWP, RWP # E9-2027 Reactor Power: #1 0 %  
 TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  #2 100 %

Instrument Model	Serial #
tele	31497
Rm-14	2017

- All smears < 1000 DPM/100 cm<sup>2</sup> except as noted on map or smear worksheet
- All smears < 1000 DPM/100 cm<sup>2</sup>  All Gamma readings in mR/hr
- Air particulate + I<sub>2</sub> < 35% MPC  All Beta readings in mrad/hr
- \_\_\_\_\_  All Neutron readings in mrem/hr
- \_\_\_\_\_  \_\_\_\_\_

Comments: UT ON Regen Hx weld #12

Survey Team Dose (SRD and/or calculated after survey): .070 man-rem RWP # Survey Performed Under: E9-2027  
 Survey Performed By Jerry Cottrell Reviewed By \_\_\_\_\_ Date \_\_\_\_\_



RADIOLOGICAL SURVEY MAP AND RECORD

UNIT I

Location Regenerative Heat Exchanger Cube Containment 241' Date 5-10-89 Time 1015

PURPOSE:  Routine  Non-Routine  RWP, RWP # 89-2027 Reactor Power: #1 0 %

TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  #2 30 %

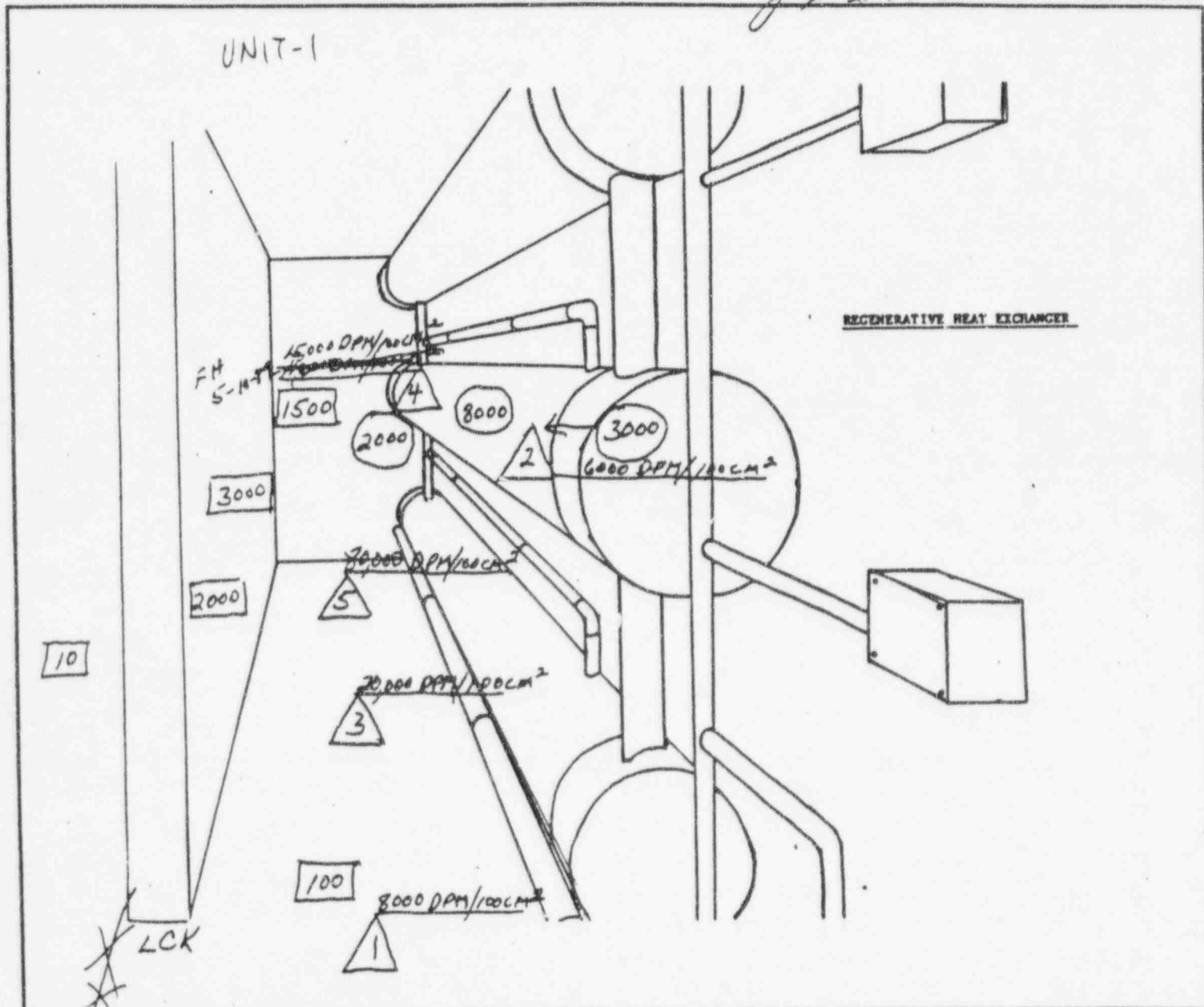
Instrument Model	Serial #
RO-2A	3114
RM-14	2683

- All smears < 1000 DPM/100 cm<sup>2</sup> except as noted on map or smear worksheet
- All smears < 1000 DPM/100 cm<sup>2</sup>  All Gamma readings in mR/hr
- Air particulate + I<sub>2</sub> < 25% MPC  All Beta readings in mrad/hr
- \_\_\_\_\_  All Neutron readings in mrem/hr
- \_\_\_\_\_  \_\_\_\_\_

Comments: G/A Readings are @ 12" from "Hot Spots or contact"  
Readings — Dose rates about the same at Head, waist  
and knee areas

Survey Team Dose (SRD and/or calculated after survey): 0.090 man-rem RWP # Survey Performed Under: 89-2027

Survey Performed By Paul Hardison Reviewed By John P. Hill Date 5-10-89



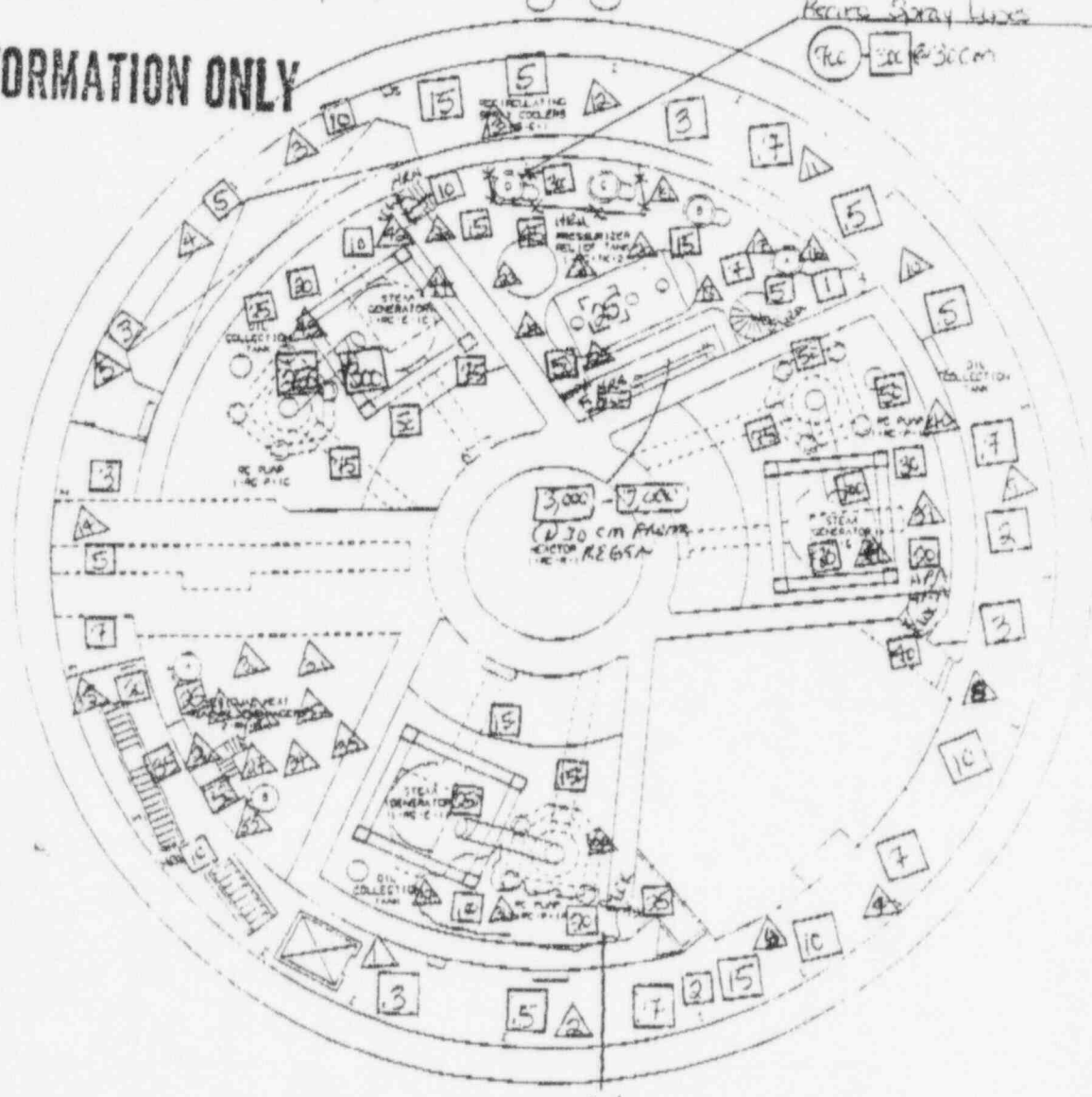
# NORTH ANNA POWER STATION RADILOGICAL SURVEY MAP AND RECORD

Unit 1 Containment, 24' Elevation		Date: 9-10-94	Time: 0900
<input checked="" type="checkbox"/> Routine <input checked="" type="checkbox"/> Non-Routine <input checked="" type="checkbox"/> RWP Prep. for RWP No. 94-2-2024		Unit 1 Reactor % Power: 7	Unit 2 Reactor % Power: 100
<input checked="" type="checkbox"/> Gamma <input type="checkbox"/> Beta <input type="checkbox"/> Neutron    Smear: <input type="checkbox"/> GA <input type="checkbox"/> LA <input type="checkbox"/> HP <input type="checkbox"/> Air Sample			
Instrument Model	Serial or ID No.	<input checked="" type="checkbox"/> All GA smears <1000 dpm/100 cm <sup>2</sup> except as noted on map or smear worksheet <input type="checkbox"/> All GA smears <1000 dpm/100 cm <sup>2</sup> <input type="checkbox"/> All LA smears <1000 dpm/ft <sup>2</sup> <input type="checkbox"/> All HP smears <1 HP/smear <input type="checkbox"/> Air particulate + I <sub>2</sub> <10% DAC <input type="checkbox"/> All GA smears counted on the BC-4 <LLD <input type="checkbox"/>	
Ro2A	1330	<input checked="" type="checkbox"/> All GA smears in dpm/100 cm <sup>2</sup> <input type="checkbox"/> All HP smears in HP's/smear <input checked="" type="checkbox"/> All gamma readings in mrem/hr <input type="checkbox"/> All neutron readings in mrem/hr <input type="checkbox"/> All beta readings in mrad/hr <input type="checkbox"/>	
Tele	31510		
Ro14	2043		
Ro2	2610		

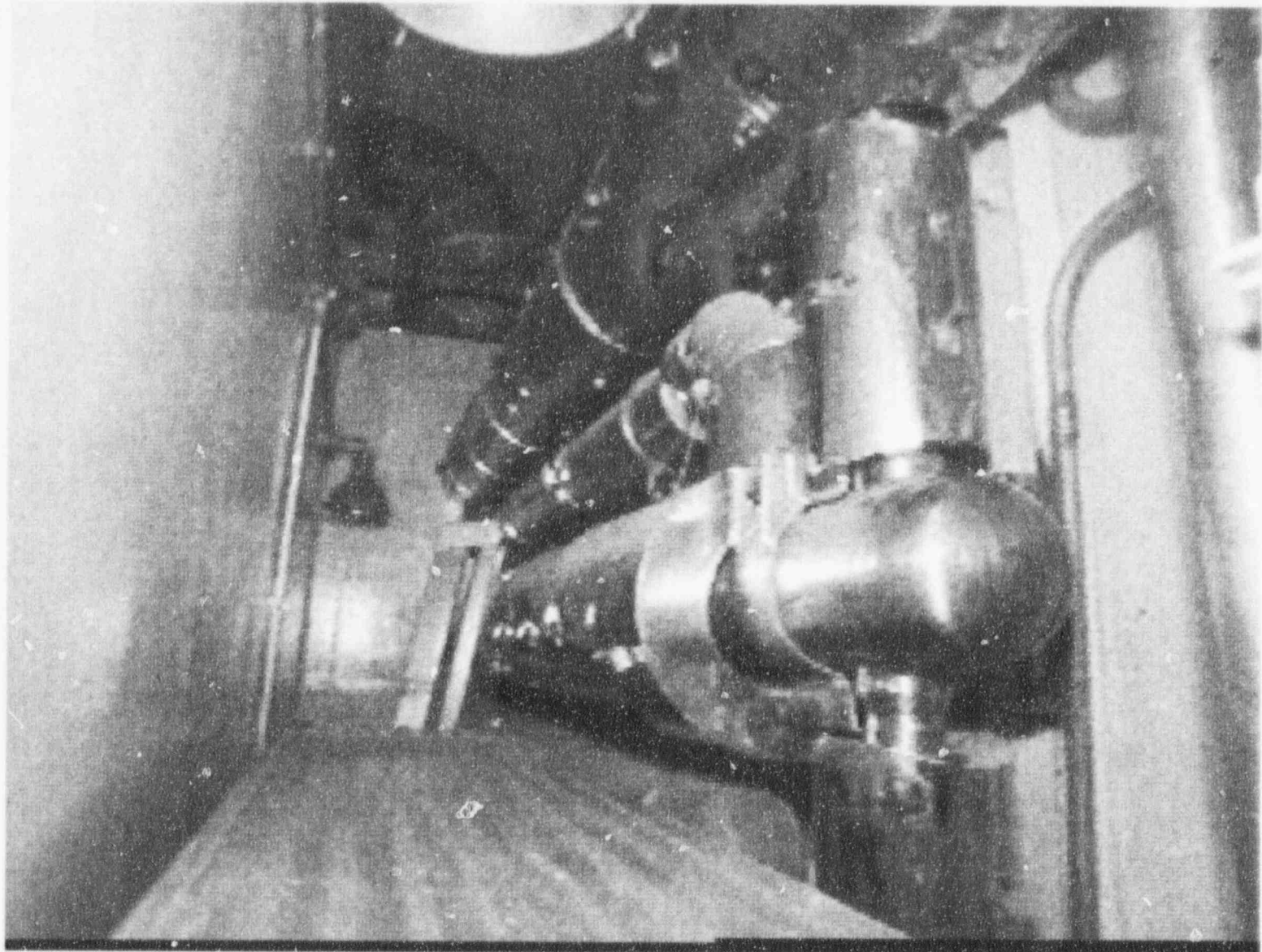
Comments: Please see attached Contamination Data Worksheets      Survey RWP 94-2-2024

Survey Team Dose, mrem (SRD/DAD or Calculated) 9	Submitted By (Printed Name, Signature) Tracey Peyton	Reviewed By (Printed Name, Signature) [Signature]	Date 9-10-94
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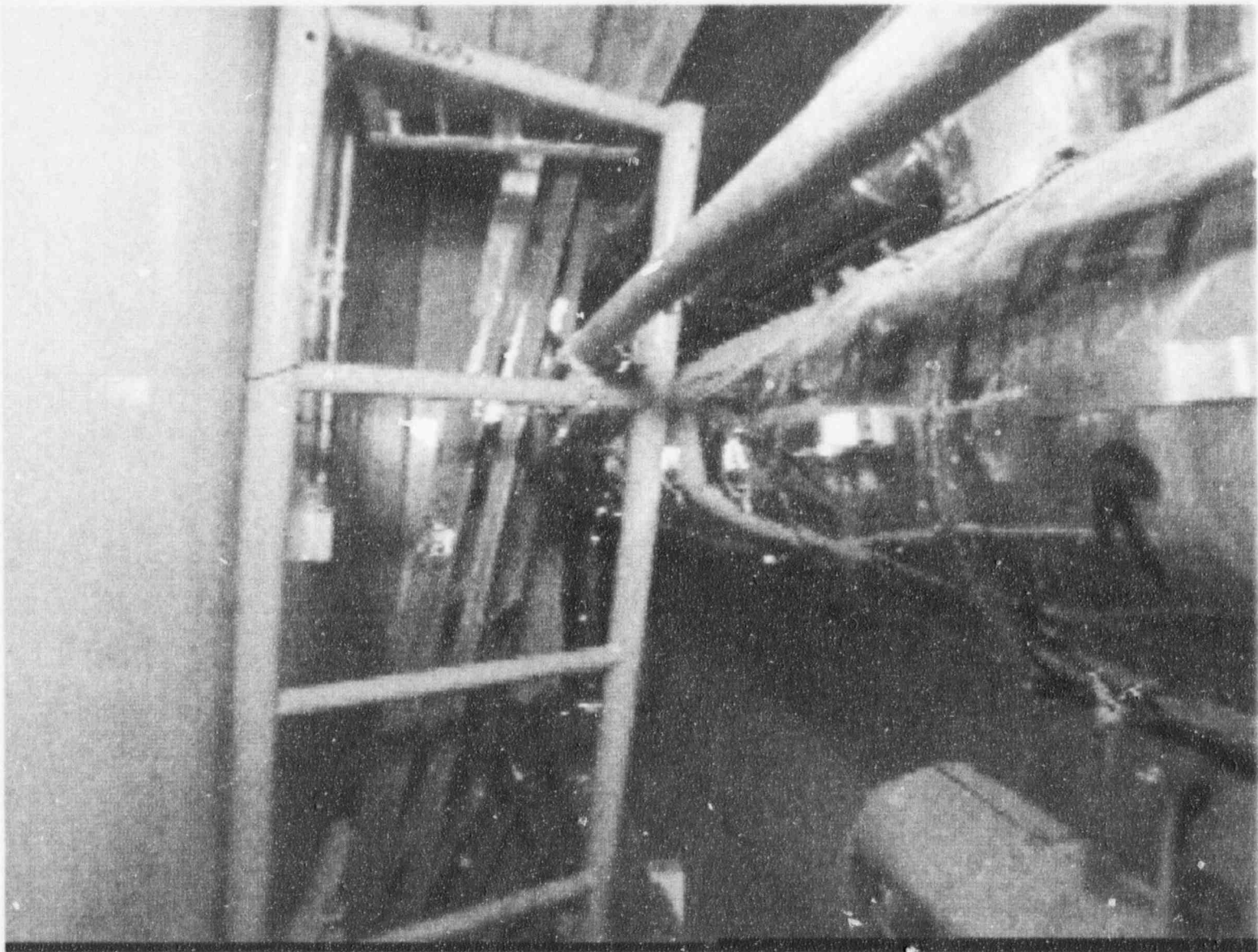
## INFORMATION ONLY



Cont. Area     Barrier     GA Smear     LA Smear     HP Smear    AS Air Sample Location    LCK Locked Door    \*\*\* Barrier    [Symbol] Flange Station



North Anna Unit 1 Regenerative Heat Exchanger  
middle and upper shell



North Anna Unit 1 Regenerative Heat Exchanger  
lower shell

F

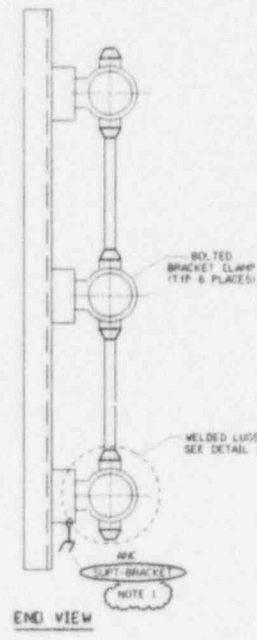
E

D

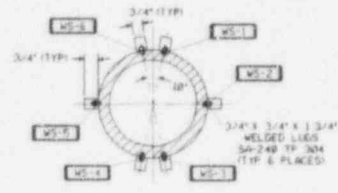
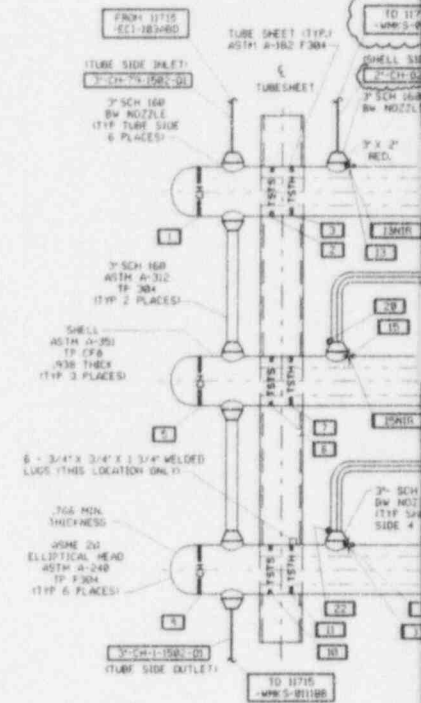
C

B

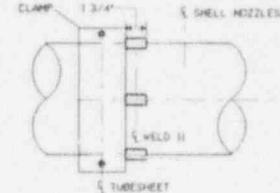
A



END VIEW



END VIEW

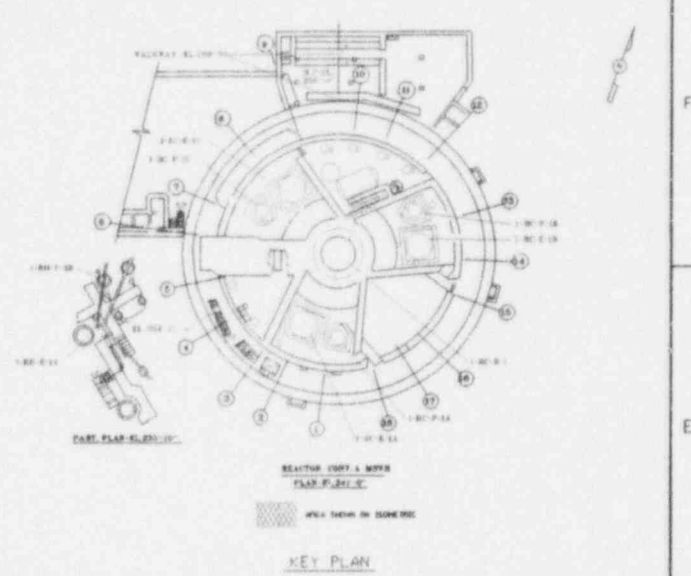
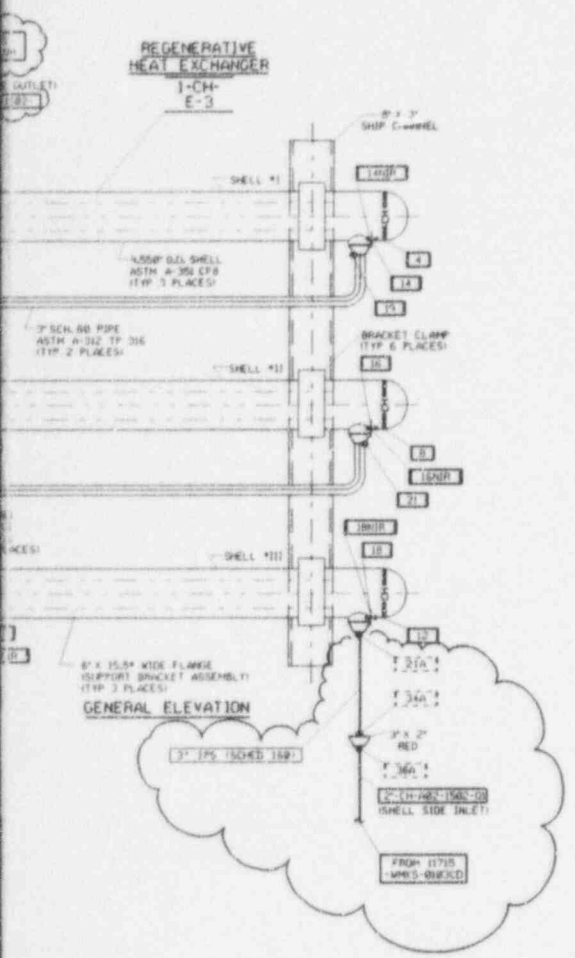


SIDE VIEW

DETAIL 1

REV	DATE	DESIGN	DRW	CHKD	ISSUED	BY	DATE	DESIGN	DRW	CHKD	ISSUED	BY	DATE	DESIGN	DRW	CHKD	ISSUED	BY	DATE	DESIGN	DRW	CHKD	ISSUED	BY





**ANSTEC  
APERTURE  
CARD**

Also Available on  
Aperture Card

**NOTES:**

1. SUPP-BRACKET INCLUDES ALL WIDE FLANGE, TUBE STEEL SHIP CHANNEL AND CLAMPS, ETC. ASSOCIATED WITH THE WALL MOUNTING OF 1-CH-E-3 THAT IS WITHIN THE 1WF SUPPORT EXAMINATION BOUNDARY.

- REFERENCE DRAWINGS:**
- 11715-CAN-890C-2 SHEET 1
  - 11715-4-14-6A
  - 11715-4-14-6B
  - 11715-4-14-6A
  - 11715-4-14-6A
  - VM-206
  - VM-2-1150
  - ISI CLASSIFICATION BOUNDARY DRAWING INTERVAL-2
  - REGENERATIVE HEAT EXCHANGER - OUTLINE DRAWING
  - REGENERATIVE HEAT EXCHANGER - SUPPORT BRACKET
  - REGENERATIVE HEAT EXCHANGER - UNIT ASSEMBLY
  - REGENERATIVE HEAT EXCHANGER - SUBASSEMBLY & DETAILS
  - WESTINGHOUSE ISI COMPONENT SKETCH
  - WESTINGHOUSE ISI COMPONENT SKETCH

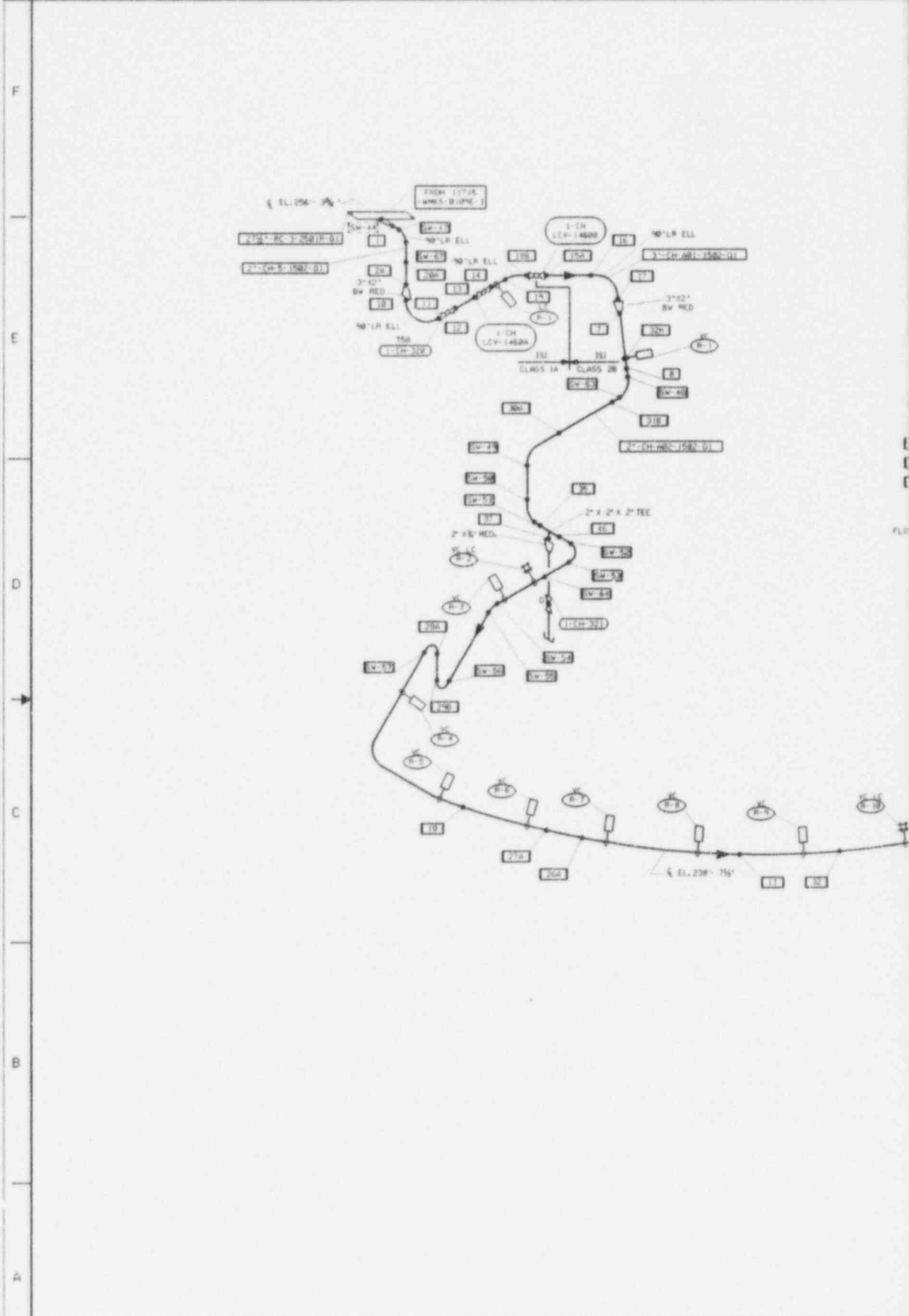
9602120226-01

**VIRGINIA POWER  
NORTH CAROLINA POWER**

NUCLEAR ENGINEERING SERVICES  
RICHMOND VIRGINIA

INSERVICE INSPECTION DETAIL DRAWING  
REGENERATIVE HEAT EXCHANGER: 1-CH-E-3  
NORTH ANNA POWER STATION UNIT 1  
VIRGINIA POWER

REFORMATED PER ISI REVIEW	REVISED PER ISI REVIEW	INITIAL ISSUE	DESIGN	DESIGN SUPV	CAD NO.
DRWN	HES/DAC	ENGR SUPV	DRAWING NO.	11715-WMKS-CH-E-3	REV.
DRWN	NEW/HEL	SCALE	N/A	UNLESS OTHERWISE NOTED	SH 1 OF 1

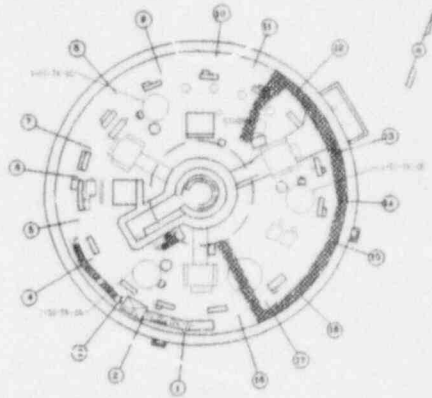


REV	DATE	DESCRIPTION	DESIGNED BY	CHECKED BY	DATE	DESCRIPTION	DESIGNED BY	CHECKED BY	DATE	DESCRIPTION	DESIGNED BY	CHECKED BY	DATE	DESCRIPTION	DESIGNED BY	CHECKED BY	DATE	DESCRIPTION	

(WILMFG)  
 11-30-1948 11:44  
 Job / Agn / 355111 / 10008115001

REVISED PER  
 THIS DWG. SH.  
 82  
 CHM

F  
E  
D  
C  
B  
A

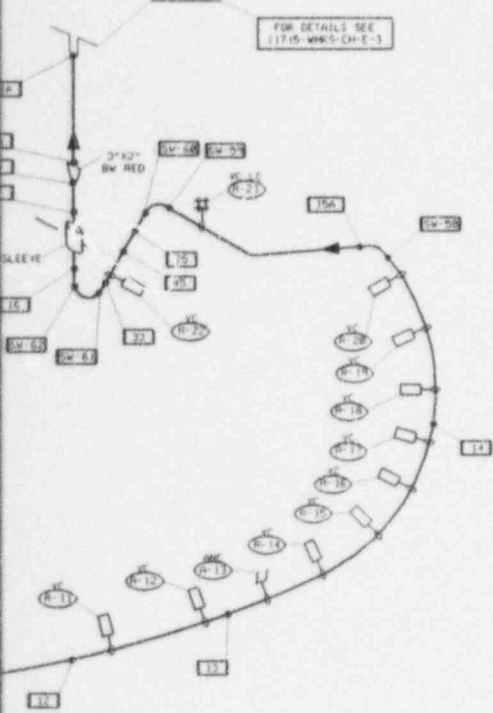


REACTOR CONTAINMENT  
PLAN  
KEY PLAN

REGENERATIVE  
HEAT EXCHANGER

I-CH-  
E-3

FOR DETAILS SEE  
11715-WKS-CH-E-3



NOTES:

- 1. ALL PIPING ON THIS DRAWING IS ISI CLASS 3A
- 2. REFER TO STRESS CALCULATION 11715-E-1473-4

**ANSTEC  
APERTURE  
CARD**

Also Available on  
Aperture Card

REFERENCE DRAWINGS:

- 11715-ECI-103CD DOCUMENT UPDATE PROGRAM
- 11715-COM-073A-2 SHEET 1 ISI CLASSIFICATION BOUNDARY DRAWING INTERVAL 2
- 11715-COM-073C-2 SHEET 1 ISI CLASSIFICATION BOUNDARY DRAWING INTERVAL 2
- 11715-FC-10F CONCRETE DRAWING
- 11715-PP-3J PIPING DRAWING
- 11715-PP-3K PIPING DRAWING
- 11715-PP-13H PIPING DRAWING
- 11715-FS-14L STEEL DRAWING
- 11715-FV-167N VESSEL DRAWING
- SPN-CH-481 PIPE SUPPORT LOCATION ISOMETRIC
- SPN-CH-482 SHEETS L2,3 PIPE SUPPORT LOCATION ISOMETRIC
- 11715-CH-43A SHEETS L2 ERECTION CONTROL ISOMETRIC
- 11715-CH-43B ERECTION CONTROL ISOMETRIC
- 11715-CH-43C ERECTION CONTROL ISOMETRIC
- WKS-1-4180 WESTINGHOUSE ISI ISOMETRIC

9602120226-02

<b>VIRGINIA POWER</b> <b>NORTH CAROLINA POWER</b>	
NUCLEAR ENGINEERING SERVICES RICHMOND, VIRGINIA	
INSERVICE INSPECTION ISOMETRIC RC&CH SYS:3\"/>	
DSGN _____ ENGR SUPV _____ CHRD _____ ENGR	CAD NO. 11715-WKS-0183CD DRAWING NO. 11715-WKS-0183CD SCALE NONE UNLESS OTHERWISE NOTED

REDRAWN TO SUI1 SINGLE SHEET FORMAT PER REVISED PER ISI REVIEW & DC 72-004-3		INITIAL ISSUE	
DATE: 08/04/82 DESIGNED BY: JMK CHECKED BY: JMK DRAWN BY: JMK	DATE: 08/04/82 DESIGNED BY: JMK CHECKED BY: JMK DRAWN BY: JMK	DATE: 08/04/82 DESIGNED BY: JMK CHECKED BY: JMK DRAWN BY: JMK	DATE: 08/04/82 DESIGNED BY: JMK CHECKED BY: JMK DRAWN BY: JMK

TITLE SHEET  
H110-S-1111-5111  
BY (11111111)

8

7

6

F

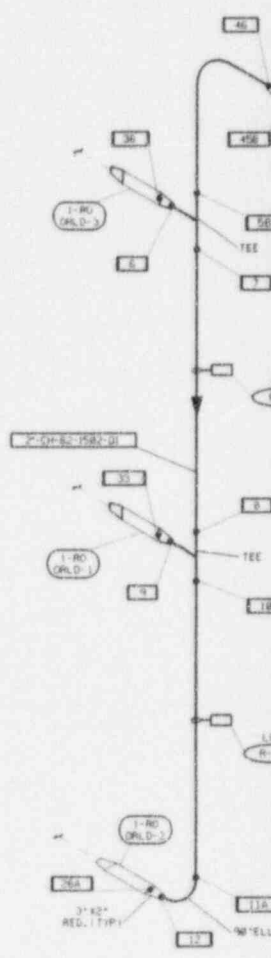
E

D

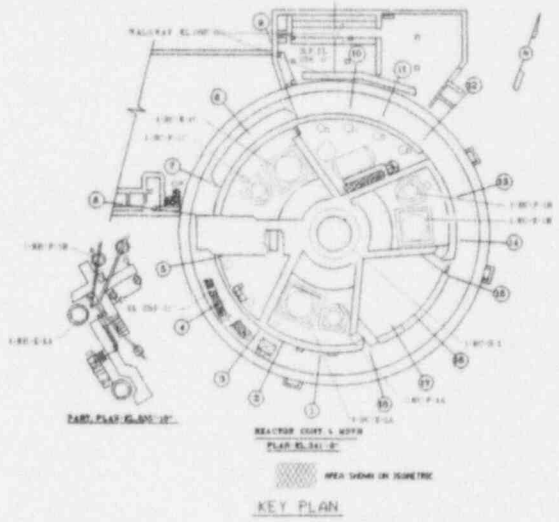
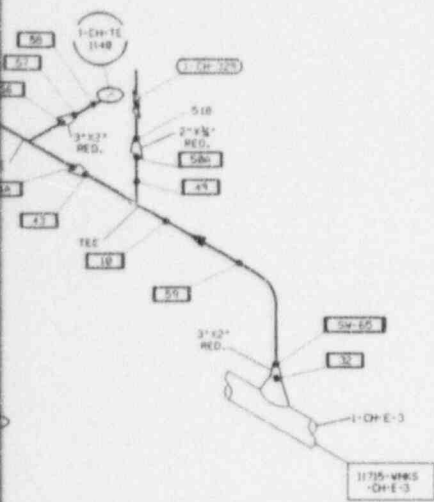
C

B

A



REV	DATE	DESIGN	ISSUED	BY	CHECKED	DATE	DESIGN	ISSUED	BY	CHECKED	DATE	DESIGN	ISSUED	BY	CHECKED



NOTES:  
 1. ALL PIPING IS 301 CLASS 1A

# ANSTEC APERTURE CARD

Also Available on  
 Aperture Card

REFERENCE DRAWINGS:  
 11715-CH-100 "ERECTION CONTROL ISOMETRIC PIPING DRAWING"  
 11715-FF-100 "1ST CLASSIFICATION BOUNDARY DRAWING"  
 11715-COM-0100C "DOCUMENT UPDATE PROGRAM"

9602120226-03

<b>VIRGINIA POWER</b> <b>NORTH CAROLINA POWER</b>	
<b>NUCLEAR ENGINEERING SERVICES</b> RICHMOND, VIRGINIA	
<b>INSERVICE INSPECTION ISOMETRIC</b> <b>CH SYSTEM: CHEMICAL &amp; VOLUME CONTROL SYSTEM</b> <b>NORTH ANNA POWER STATION UNIT 1</b> <b>VIRGINIA POWER</b>	
DSGN _____ DRWN CLR _____	DSGN SUPV _____ ENGR SUPV _____
CAD NO. _____ DRAWING NO. 11715-VNKS-0111H	REV. _____ 0

INITIAL ISSUE DC 92-009-3										SCALE NERE		UNLESS OTHERWISE NOTED SH 1 OF 1	
DESIGN	ENGR	CHK	APP	DATE	DESIGN	ENGR	CHK	APP	DATE	SCALE	NERE	UNLESS OTHERWISE NOTED	SH 1 OF 1

**ATTACHMENT 2**

**NORTH ANNA UNIT 2  
RELIEF REQUEST NDE-18 (REVISED)**

**NORTH ANNA UNIT 2  
RELIEF REQUEST NDE-18 (REVISED)**

**I. IDENTIFICATION OF COMPONENTS**

System: Chemical and Volume Control (CH)  
Component: Regenerative Heat Exchanger (1-CH-E-3)  
Connecting Circumferential Piping Welds

(Drawing 12050-WMKS-CH-E-3)

<u>Welds/Components</u>	<u>Description</u>	<u>Code Item#</u>	<u>Class</u>
8	tubesheet-to-head	B2.60	1
10	tubesheet-to-head	B2.60	1
12	tubesheet-to-head	B2.60	1
2	circumferential head	B2.51	1
4	circumferential head	B2.51	1
6	circumferential head	B2.51	1
13	nozzle-to-vessel	B3.150	1
14	nozzle-to-vessel	B3.150	1
15	nozzle-to-vessel	B3.150	1
16	nozzle-to-vessel	B3.150	1
17	nozzle-to-vessel	B3.150	1
18	nozzle-to-vessel	B3.150	1
13NIR	nozzle inside radius	B3.160	1
14NIR	nozzle inside radius	B3.160	1
15NIR	nozzle inside radius	B3.160	1
16NIR	nozzle inside radius	B3.160	1
17NIR	nozzle inside radius	B3.160	1
18NIR	nozzle inside radius	B3.160	1
19	terminal end weld	B9.21	1
20	terminal end weld	B9.21	1
21	terminal end weld	B9.21	1
22	terminal end weld	B9.21	1
WS-1	welded attachment	B8.40	1
WS-2	welded attachment	B8.40	1
WS-3	welded attachment	B8.40	1
WS-4	welded attachment	B8.40	1
WS-5	welded attachment	B8.40	1
WS-6	welded attachment	B8.40	1
1	circumferential head	C1.20	2
3	circumferential head	C1.20	2
5	circumferential head	C1.20	2
7	tubesheet-to-shell	C1.30	2
9	tubesheet-to-shell	C1.30	2
11	tubesheet-to-shell	C1.30	2

## I. IDENTIFICATION OF COMPONENTS (Continued):

<u>Welds/Components</u>	<u>Description</u>	<u>Code Item#</u>	<u>Class</u>
	(Drawing 12050-WMKS-0111ST)		
1A	terminal end weld	B9.21	1
	(Drawing 12050-WMKS-0111Z)		
46	terminal end weld	B9.21	1

## II. IMPRACTICAL CODE REQUIREMENTS

Examination Categories B-B, B-D (Inspection Program B), B-H, B-J, and C-A require that volumetric and surface examinations be performed as indicated by the Code item numbers above.

## UNIT 2 RELIEF REQUEST NDE-18 Continued:

### III. BASIS FOR RELIEF

The regenerative heat exchanger (2-CH-E-3) provides preheat for the normal charging water going into the Reactor Coolant System (RCS). The preheat is derived from normal letdown water coming from the RCS. Charging and letdown constitute the normal chemical and volume control within the RCS. The heat exchanger itself is actually three heat exchangers in series interconnected with piping. This fact was previously utilized in limiting examinations to one of the heat exchangers as allowed by the Code. The heat exchanger has an outside shell diameter of 9.55 inches. The shells were manufactured with ASTM A351 CF8 type material. The heads were manufactured with ASTM A240 TP304 material. The 3 inch nozzle necks were manufactured with ASTM A182 F304 material. Until very recently the regenerative heat exchanger was entirely classified ASME Class 2 for inservice inspection activities. However, a reanalysis changed the classification of the letdown side of the heat exchanger to ASME Class 1. This action significantly increases the examination requirements associated with this heat exchanger. Nozzles which were previously exempt under Class 2 requirements are now required to be examined. Additionally all Class 1 nozzles are required to be examined, and the examinations are not limited to one heat exchanger.

The nozzle-to-vessel welds and nozzle inside radius sections for this vessel were not designed for ultrasonic examination from the outside diameter of the vessel. The small diameter of the vessel and nozzles along with the cast stainless steel vessel shell prevents a meaningful ultrasonic examination of these components.



The volumetric examination on the vessel head circumferential welds as required by the Code is limited due to the weld crown, radius of the closure caps, and the nozzles. The Code required volumetric examination of the tubesheet welds is limited by the weld crown and is obstructed by a support clamp. This clamp must be mechanically removed prior to the welds' examination. Additionally weld 12 is partially obscured by the six integral attachments which are themselves butted up against a clamp. It is estimated that between 21 and 42 percent of the circumferential welds could be examined, and 42 percent of the tubesheet welds could be examined, if the clamps are removed. Weld 12 would be significantly less due to the integral attachment location. Previous partial examinations completed on these welds have identified no problems.

An ALARA evaluation has been conducted on each activity associated with these examinations. A table is provided documenting these results. It is estimated that more than 32 man-rem will be required to complete these examinations over the interval. This estimate assumes optimum inspection and preparation times. If difficulties are encountered, a corresponding increase in dose would be expected. Shielding is not considered practical since the source of radiation is the component receiving the examinations. Considering the examination limitations previously discussed, expending this much dose is deemed impractical.

This relief request was originally submitted by letter Serial No. 93-018, dated February 16, 1993. The relief was granted ("provided that the lower regenerative heat exchanger receives the Code-required examinations to the extent possible") by letter dated August 7, 1995, and its associated safety evaluation report. This request is being revised to add four of six terminal end piping-to-vessel welds which are required to be selected for examination under Category B-J note 1(a) under item B9.21. These welds were omitted from the original request and need to be addressed in this relief request in addition to those already evaluated. New survey maps of the regenerative heat exchanger indicate higher dose rates than previously estimated (survey attached). Performing these surface examinations would result in approximately 10.5 man-rem of exposure and would negate, to a large degree, the exposure reduction of the original relief request. This is due to the close proximity of the regenerative heat exchanger to these welds and the need for scaffolding and insulation removal, which were previously eliminated for the regenerative heat exchanger in our original relief request.

## UNIT 2 RELIEF REQUEST NDE-18 Continued:

### IV. ALTERNATE REQUIREMENTS

Technical Specifications require that the RCS Leak Rate be limited to 1 gallon per minute unidentified leakage. This value is calculated every 72 hours in accordance with Technical Specification requirements. Additionally, the containment atmosphere particulate radioactivity is monitored every 12 hours per Technical Specification requirements. As a result, new leakage is rapidly identified and located during operation. Leakage identified from these components can be easily isolated by two upstream valves with manual operation from within the control room. The valves also receive an automatic control signal to close on inventory loss based on pressurizer level. However, these valves could not be used as the Class 1 boundary valves due to their nonsafety-related actuation. Correspondingly, as a result of the reclassification to Class 1, these components will receive a system leakage test prior to start up after each refueling outage. During this system leakage test the components will receive a visual (VT-2) examination. The support structures will receive a visual (VT-3) examination to the extent required by the Code without insulation removal.

Your evaluation of our original relief request, dated August 7, 1995, added alternative requirements. The appropriate portion of the Technical Evaluation Report states:

The licensee stated that previous partial examinations have been completed on these welds. Consequently, it is concluded that a best-effort volumetric examination of the lower RHX, in addition to system radiation monitoring and the Code-required visual examinations, would provide reasonable assurance of the system's inservice structural integrity. Therefore, it is recommended that relief be granted, pursuant to 10 CFR 50.55a(g)(6)(i), provided the lower RHX vessel receives Code-required volumetric examinations to the extent possible.

We also request that this philosophy of inspection be extended to the vessel-to-piping terminal end welds on the regenerative heat exchanger (RHX). The two lower RHX vessel-to-piping terminal end welds (22 & 46) will be examined by the surface method as required by the Code.

**2-CH-E-3 EXAMINATIONS  
MAN-REM ESTIMATE**

<u>Work Task</u>	<u>Man-Hours (hrs)</u>	<u>Dose Rate (R/hr)</u>	<u>Man-Rem</u>
Insulation Remove/Install	5.3	0.500	2.650
Scaffolding Install/Remove	0.0	0.000	0.000
Clamp Remove/Install	2.0	1.000	2.000
Weld Prep.	3.5	1.000	3.500
HP Coverage	36.0	0.010	0.360
Nozzle-to-Vessel Inspection (UT)	8.1	1.000	8.100
Nozzle Inside Radius Inspection (UT)	6.6	1.000	6.600
Circumferential/Tubesheet Inspection (UT)	5.3	1.000	5.300
Welded Attachment Inspection (PT)	3.0	1.000	<u>3.000</u>
<b>Total Estimate</b>			<b>= 32.305</b>

NORTH ANNA UNIT 2  
 2-CH-E-3 PIPING TERMINAL ENDS  
 EXAMINATIONS MAN-REM ESTIMATE

6 Terminal End Welds

<u>Work Task</u>	<u>Man-Hours (hrs)</u>	<u>Dose Rate (R/hr)</u>	<u>Man-Rem</u>
Insulation Remove/Install	2.0	2.000	4.0
Scaffolding Install/Remove	1.0	1.500	1.5
Weld Prep.	1.0	2.000	2.0
PT Exam 6 Welds	1.5	2.000	<u>3.0</u>
<b>Total Estimate =</b>			<b>10.5</b>

Location Regenerative Heat Exchanger Cube Containment 241' Date 10-22-90 Time 1723

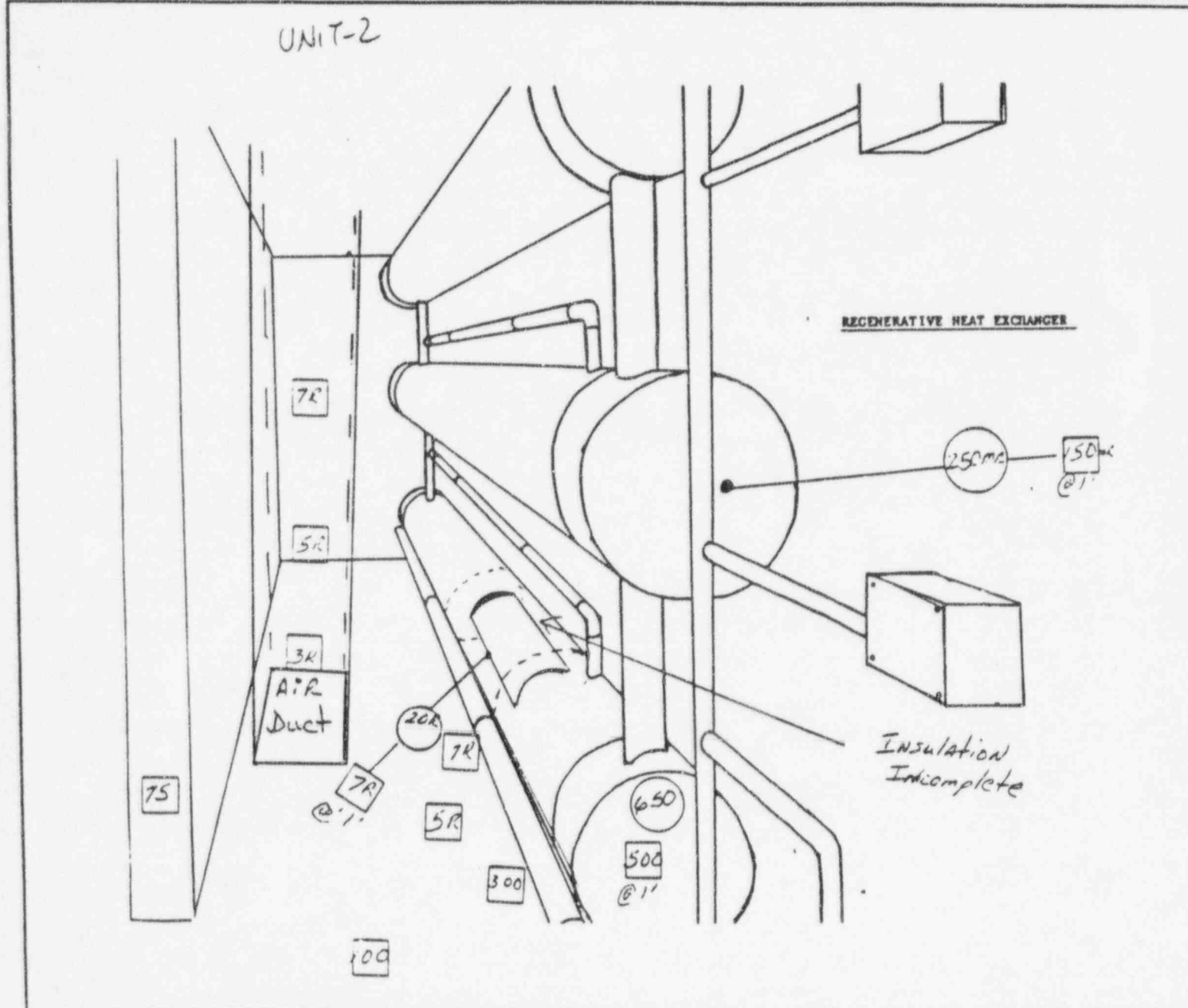
PURPOSE:  Routine  Non-Routine  RWP, RWP # 90-1874 Reactor Power: #1 79 #2 0

TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  \_\_\_\_\_

Instrument Model	Serial #	<input type="checkbox"/> All smears < 1000 DPM/100 cm <sup>2</sup> except as noted on map or smear worksheet <input type="checkbox"/> All smears < 1000 DPM/100 cm <sup>2</sup> <input checked="" type="checkbox"/> All Gamma readings in mR/hr unless AS NOTED <input type="checkbox"/> Air particulate + I <sub>2</sub> < 35% MPC <input type="checkbox"/> All Beta readings in mrad/hr <input type="checkbox"/> _____ <input type="checkbox"/> All Neutron readings in mrem/hr <input type="checkbox"/> _____ <input type="checkbox"/> _____	
Tele	41778		

Comments: \_\_\_\_\_

Survey Team Dose (SRD and/or calculated after survey): 0.015 man-rem RWP # Survey Performed Under: 90-1874  
 Survey Performed By Komalis Dorris, JR. Reviewed By R. K. [Signature] Date 10-22-90



Gen. Area   
  Contact   
  Smear   
 \*AS Air Sample Location   
 LCK Locked Gate   
 \*\*\* Barrier   
 (F) Frisking Station

Location Regenerative Heat Exchanger Cube Containment 241 Date 10-20-90 Time 1545

PURPOSE:  Routine  Non-Routine  RWP, RWP # 90-1874 Reactor Power: #1 80 %

TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  #2 0 %

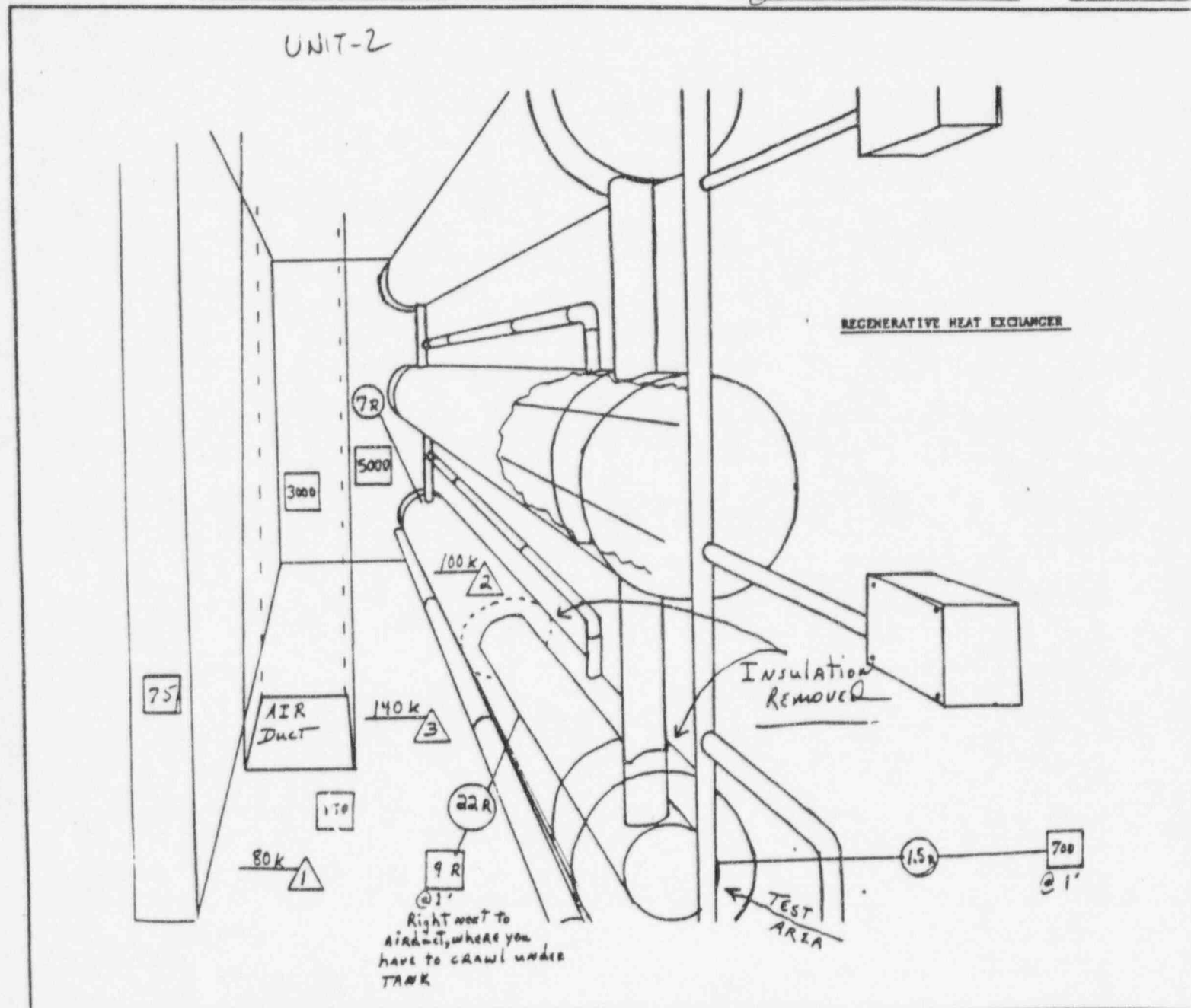
Instrument Model	Serial #
TELE	31495
RM 14	3168

- All smears < 1000 DPM/100 cm<sup>2</sup> except as noted on map or smear worksheet
- All smears < 1000 DPM/100 cm<sup>2</sup>  ~~All Gamma readings in mR/hr~~ <sup>DPM 10/20-90</sup>
- Air particulate + I<sub>2</sub> < 25% MPC  All Beta readings in mrad/hr
- \_\_\_\_\_  All Neutron readings in mrem/hr
- \_\_\_\_\_  All readings in mR unless not

Comments: K-1000 DPM/100cm<sup>2</sup>

Survey Team Dose (SRD and/or calculated after survey): 27 man-rem RWP # Survey Performed Under: 90-1874

Survey Performed By Tom Walters Reviewed By Tom Mullin Date 10-20-90



Gen. Area  
  Contact  
  Smear  
 \*AS Air Sample Location  
 LCK Locked Gate  
 \*\*\* Barrier  
 (F) Frisking Static

PURPOSE:  Routine  Non-Routine  RWP, RWP # \_\_\_\_\_ Reactor Power: #1 100

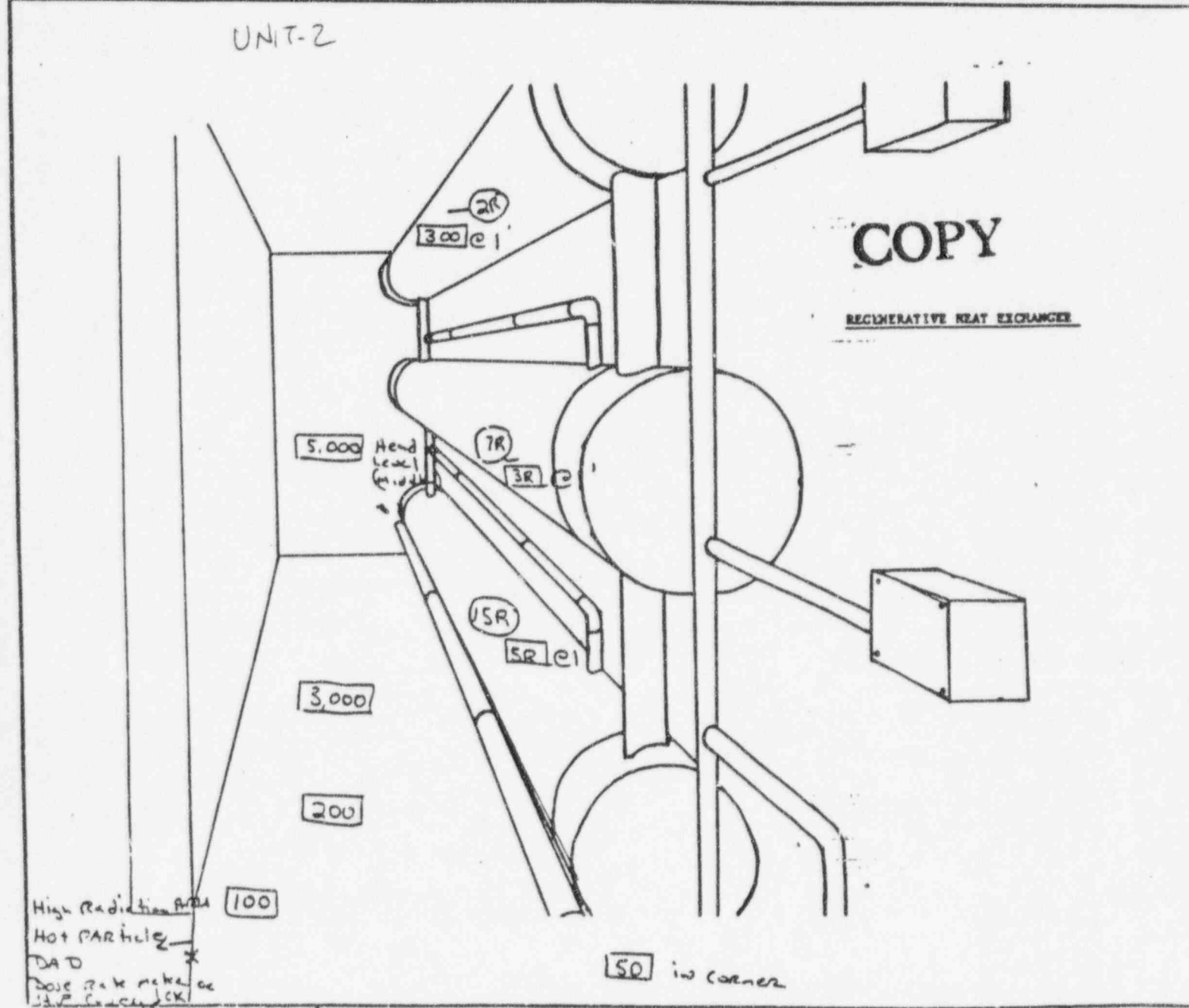
TYPE:  Gamma  Beta  Neutron  Smear  Air Sample  \_\_\_\_\_ #2 0

Instrument Model	Serial #
Teletector	14461
Teletector	5833

- All smears < 1000 DPM/100 cm<sup>2</sup> except as noted on map or smear worksheet
- All smears < 1000 DPM/100 cm<sup>2</sup>
- Air particulate + I<sub>2</sub> < 25% MPC
- \_\_\_\_\_
- \_\_\_\_\_
- All Gamma readings in mR/hr except as noted on map
- All Beta readings in mrad/hr
- All Neutron readings in mrem/hr
- \_\_\_\_\_
- \_\_\_\_\_

Comments: R=1000 mR/hr

Survey Team Dose (SRD and/or calculated after survey): 8.0 man-rem RWP # Survey Performed Under: 90-0051  
 Survey Performed By M. Davison / D. Mullins Reviewed By Mark Lane Date 9-11-90



# NORTH ANNA POWER STATION RADIOLOGICAL SURVEY MAP AND RECORD

HP-1032.010  
FORM HP-1032.010-1

Unit 2 Containment, 241' Elevation

Date: 3/25/95 Time: 0300

Routine  Non-Routine  RWP Prep. for RWP No. 95-2-2018  
 Gamma  Beta  Neutron Smear:  GA  LA  HP  Air Sample

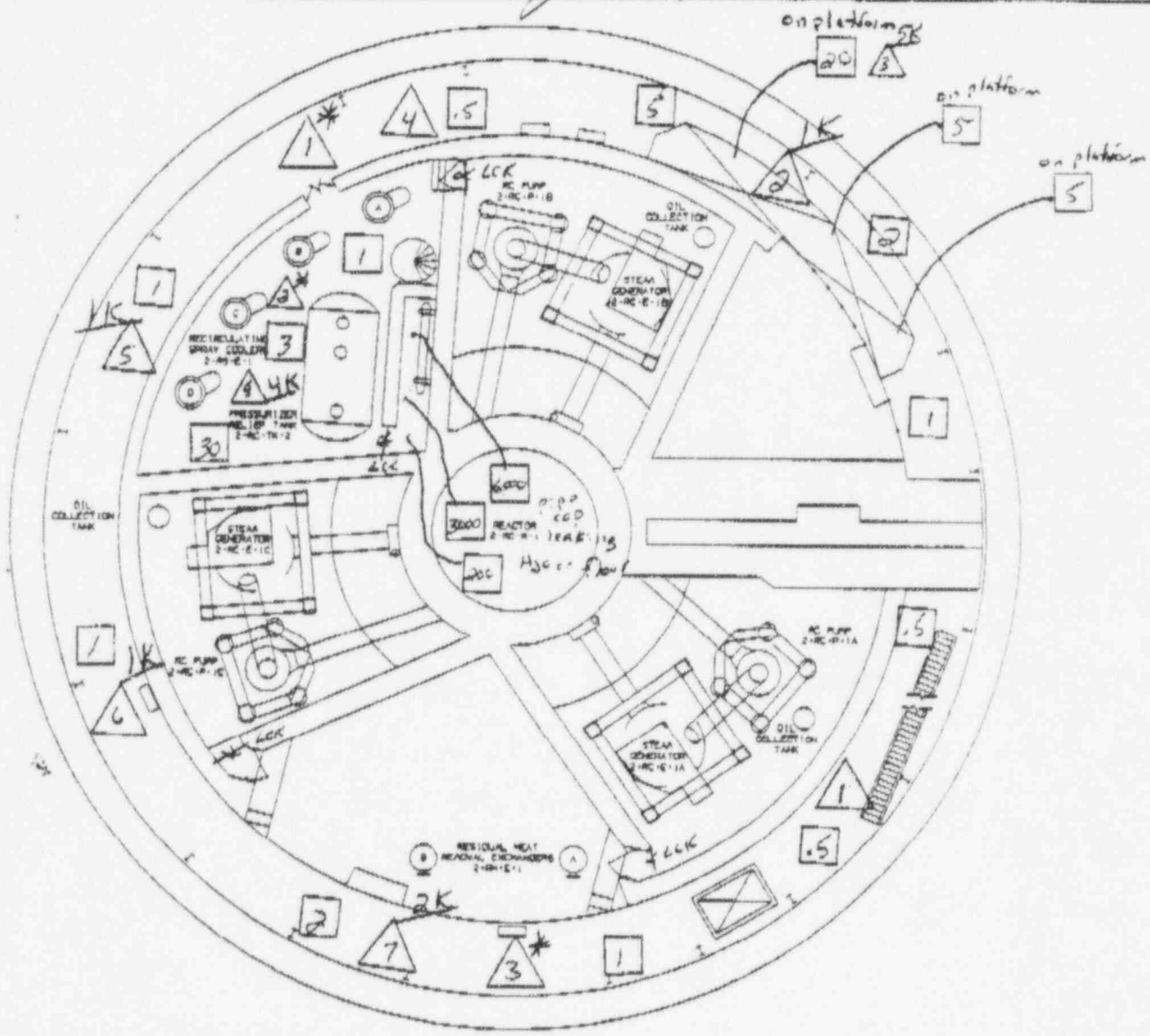
Unit 1 Reactor % Power Unit 2  
100 0

Instrument Model	Serial or ID No.	<input checked="" type="checkbox"/> All GA smears <1000 dpm/100 cm <sup>2</sup> except as noted on map or smear worksheet <input type="checkbox"/> All GA smears <1000 dpm/100 cm <sup>2</sup> <input type="checkbox"/> All LA smears <1000 dpm/ft <sup>2</sup> <input checked="" type="checkbox"/> All HP smears <1 HP/smear <input type="checkbox"/> Air particulate + 1/2 <10% DAC <input type="checkbox"/> All GA smears counted on the BC-4 <LLD <input checked="" type="checkbox"/> $\Delta$ no detectable $\alpha$
Tele	14464	<input checked="" type="checkbox"/> All GA smears in dpm/100 cm <sup>2</sup> <input type="checkbox"/> All HP smears in HP's/smear <input checked="" type="checkbox"/> All gamma readings in mrem/hr <input type="checkbox"/> All neutron readings in mrem/hr <input type="checkbox"/> All beta readings in mrad/hr
Rm-14 SA	747	
SAC-4	1142	

Comments: Leak in Reg cube - water on Floor

Survey RWP  
95-2-2018

Survey Team Doss. mrem (SRD/DAD or Calculated) 1.0  
 Submitted By (Printed Name, Signature) J. Dunnivant / JS  
 Reviewed By (Printed Name, Signature) Mark Daniel Markley  
 Date 3-25-95



Gen Area     Contact     GA Smear     LA Smear     HP Smear    AS Air Samplers Location    LCK Locked Door    \*\*\* Barrier    (F) Foreign Smear



ALARA EVALUATION NUMBER:

UNIT # 2

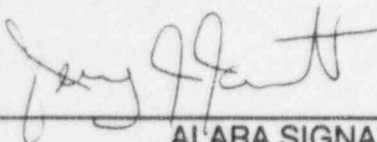
JOB DESCRIPTION: ISI/NDE REGEN HEAT EXCHANGER INSPECTIONS

TASK	WORK GROUP	MAN HOURS	DOSE RATE	MAN-REM/ WORKGROUP	TASK TOTAL
<hr/>					
TOP Hx:	ISI/NDE				
- UT (2) NOZ TO VESSEL WELDS		2.7	1.000	2.700	
- UT (2) INNER RADIUS WELDS		2.2	1.000	2.200	
MID Hx:					
- UT (2) NOZ TO VESSEL WELDS		2.7	1.000	2.700	
- UT (2) INNER RADIUS WELDS		2.2	1.000	2.200	
BOTTOM Hx:					
- UT (2) NOZ TO VESSEL WELDS		2.7	1.000	2.700	
- UT (2) INNER RADIUS WELDS		2.2	1.000	2.200	
- UT (4) CIRCUMFERENTIAL WELDS		5.3	1.000	5.300	
- PT (6) WELDED ATTACHMENT LUGS		3.0	1.000	3.000	23.000
<hr/>					
SUPPORT ACTIVITIES:					
- INSUL. RMVL/INSTALL	INSUL.	5.3	0.650	3.445	
- SCAFFOLDING INSTALL/RMVL	CARP.	0.0	0.000	0.000	
- WELD PREP	PF	3.5	1.000	3.500	
- HP COVERAGE	HP	36.0	0.010	0.360	
- (3) CLAMP RMVL/INSTALL	PF	2.0	1.000	2.000	9.305

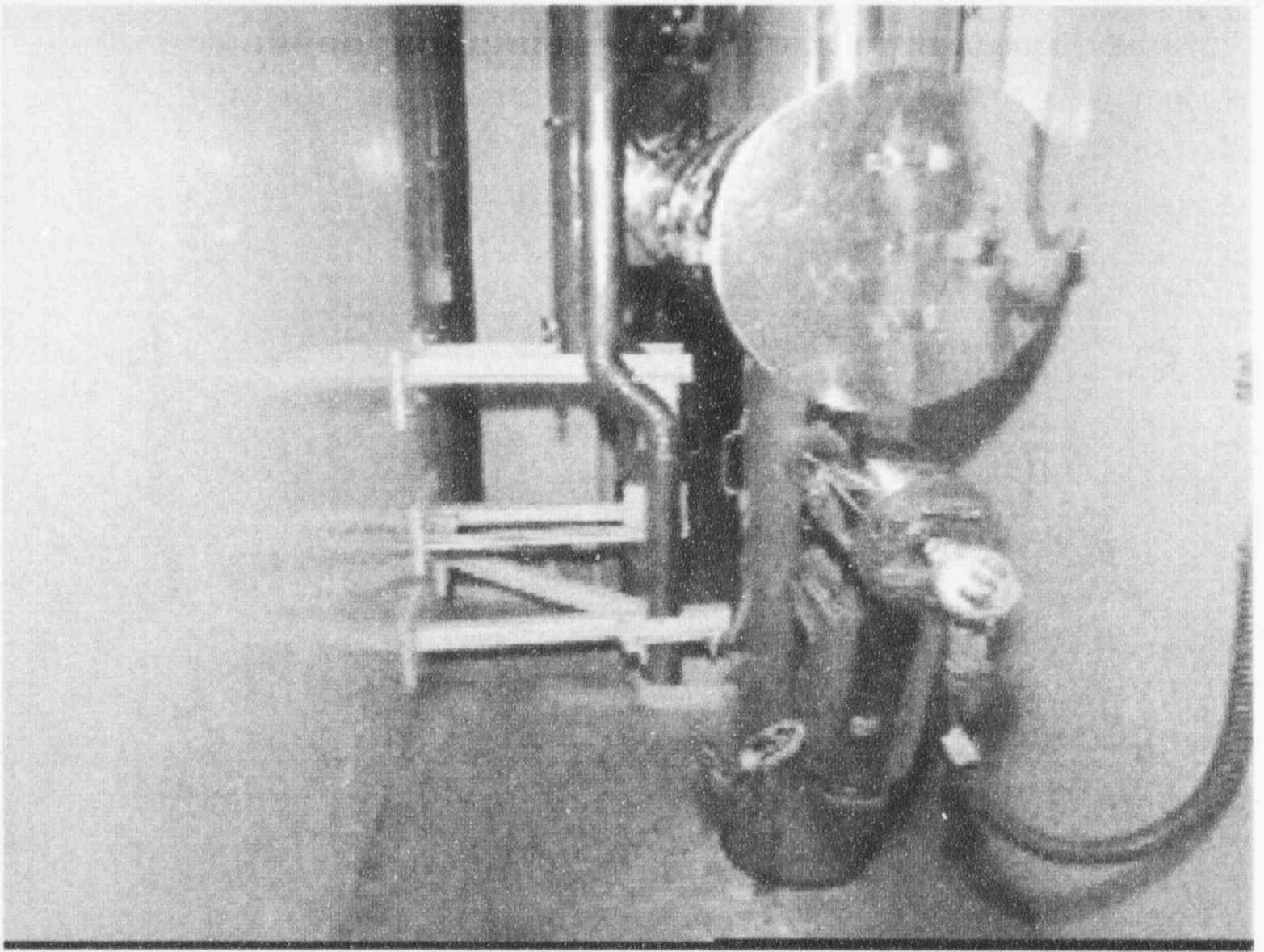
NOTE: UT INSPECTION FOR CIRCUMFERENTIAL WELDS INCLUDE (3) PASSES: 0, 45, AND 60 DEGREES

MAN-REM TOTAL 32.305 REM

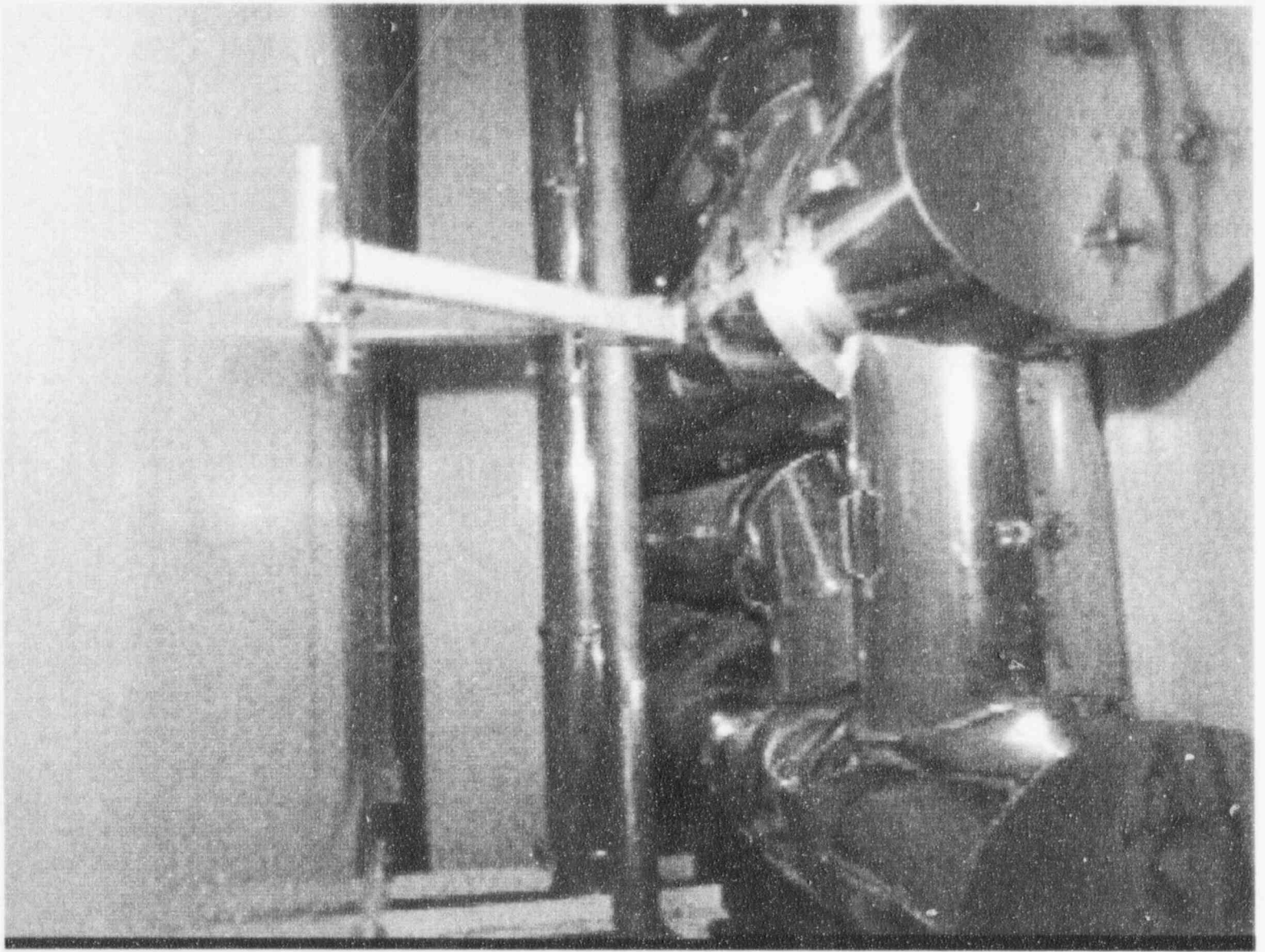
MAN-HOUR TOTAL 70 HOURS



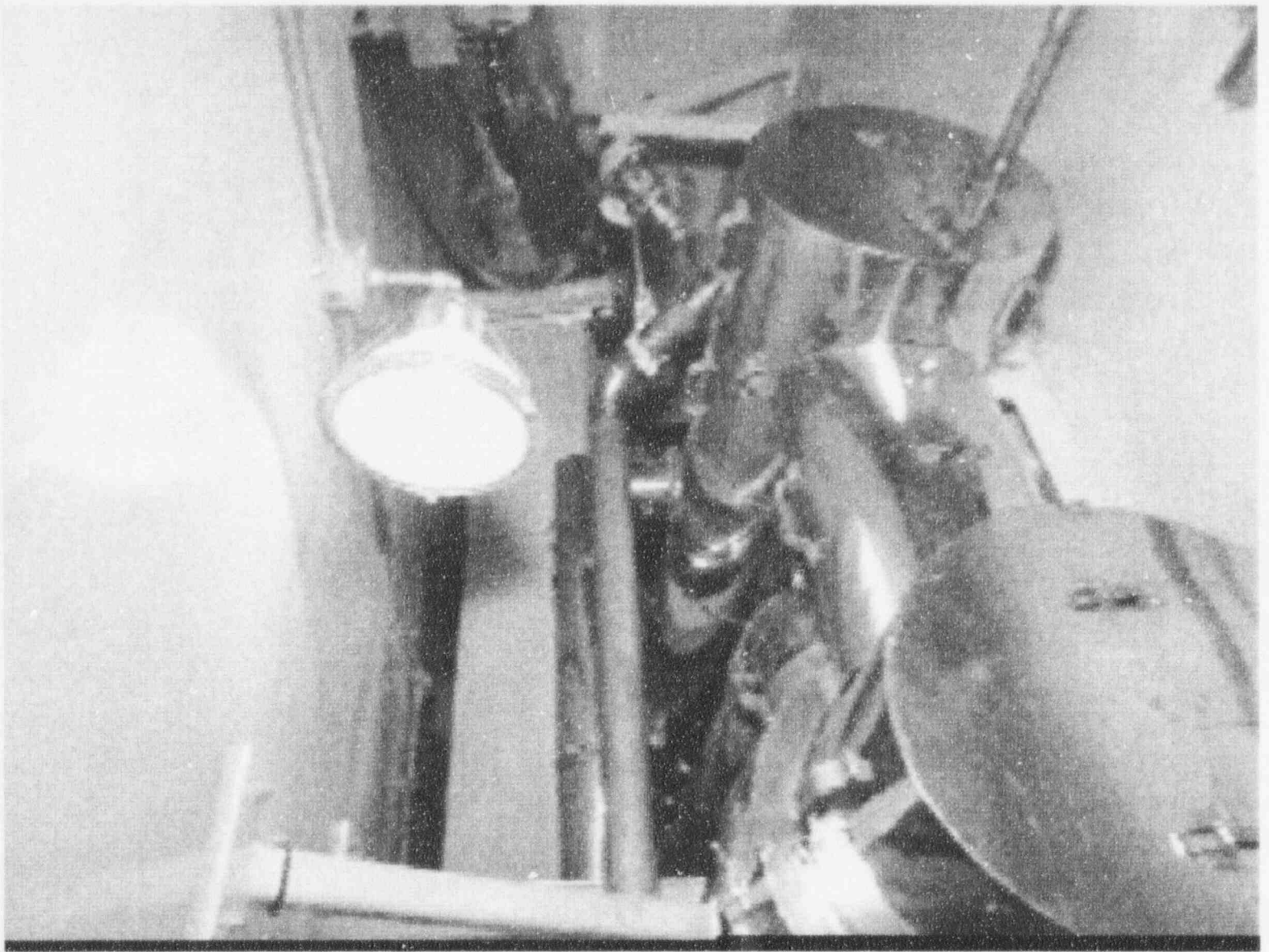
ALARA SIGNATURE



North Anna Unit 2 Regenerative Heat Exchanger  
lower shell - shell side inlet



North Anna Unit 2 Regenerative Heat Exchanger  
lower and middle shells



North Anna Unit 2 Regenerative Heat Exchanger  
middle and upper shells

F

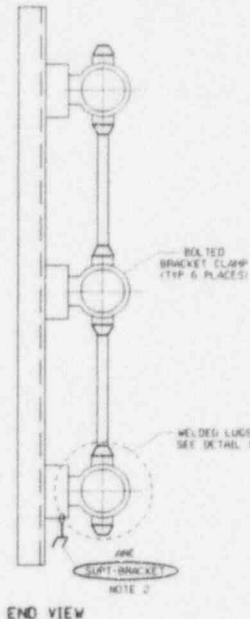
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D

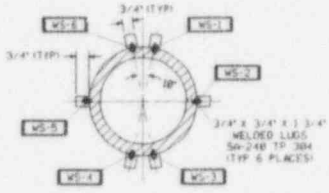
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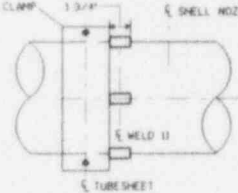
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END VIEW

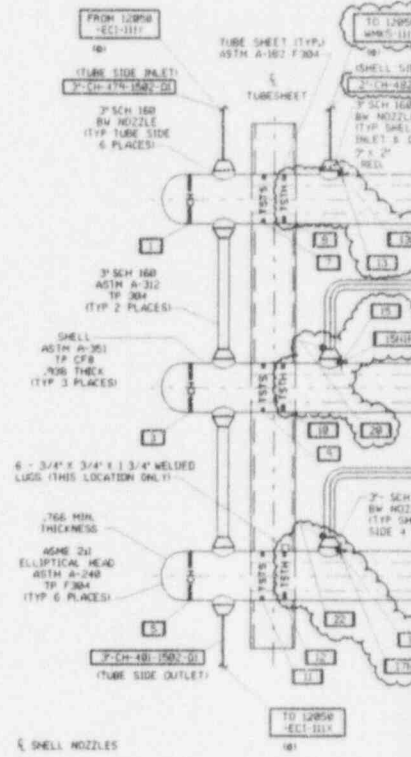


END VIEW



SIDE VIEW

DETAIL 1



REV	DATE	ISSUED BY	CHKD BY	DRGNO	PROJ	ELEC	MACH	REV	DATE	ISSUED BY	CHKD BY	DRGNO	PROJ	ELEC	MACH	REV	DATE	ISSUED BY	CHKD BY	DRGNO	PROJ	ELEC	MACH
2																							

**NOTES**

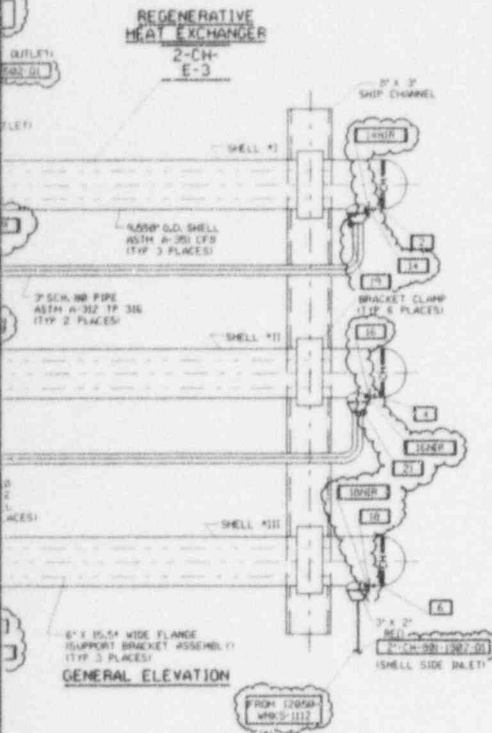
1. ITEM NUMBERS F1.0, F2.0, AND F3.0 COVER THE EXAMINATIONS OF F3.0 THROUGH F3.0. AS APPLICABLE.
2. SUPP-BRACKET INCLUDES ALL WIDE FLANGE, TUBE STEEL, SHIP CHANNEL AND CLAMPS, ETC. ASSOCIATED WITH THE WALL MOUNTING OF 2-CH-E-3 THAT IS WITHIN THE IMP SUPPORT EXAMINATION BOUNDARY.
3. THIS DRAWING IS ON A NEW SINGLE SHEET FORMAT WHICH SUPERSEDES THE OLD MULTI SHEET FORMAT AND ELIMINATES THE ISI TABLES FOR THIS DRAWING AND ASSOCIATED CAD DATABASE.

**REFERENCE DRAWINGS**

- NO. DRAWING NUMBER
1. 12050-COH-WMS-2 SHEET 1
  2. 12050-4.14-10
  3. 12050-4.14-03
  4. 12050-4.14-04
  5. 12050-4.14-06
  6. W02-2-1150

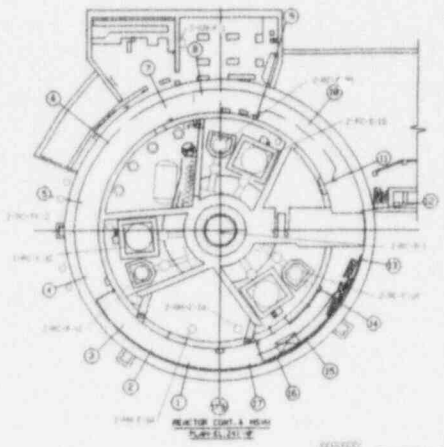
**DESCRIPTION**

- ISI CLASSIFICATION BOUNDARY DRAWING INTERVAL: 2  
 REGENERATIVE HEAT EXCHANGER - OUTLINE DRAWING  
 REGENERATIVE HEAT EXCHANGER - SUPPORT BRACKET  
 REGENERATIVE HEAT EXCHANGER - UNIT ASSEMBLY  
 REGENERATIVE HEAT EXCHANGER - SUBASSEMBLY & DETAILS  
 WESTINGHOUSE ISI COMPONENT SKETCH



**ANSTEC  
 APERTURE  
 CARD**

Also Available on  
 Aperture Card



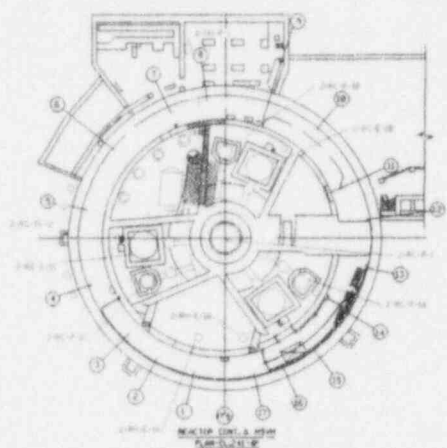
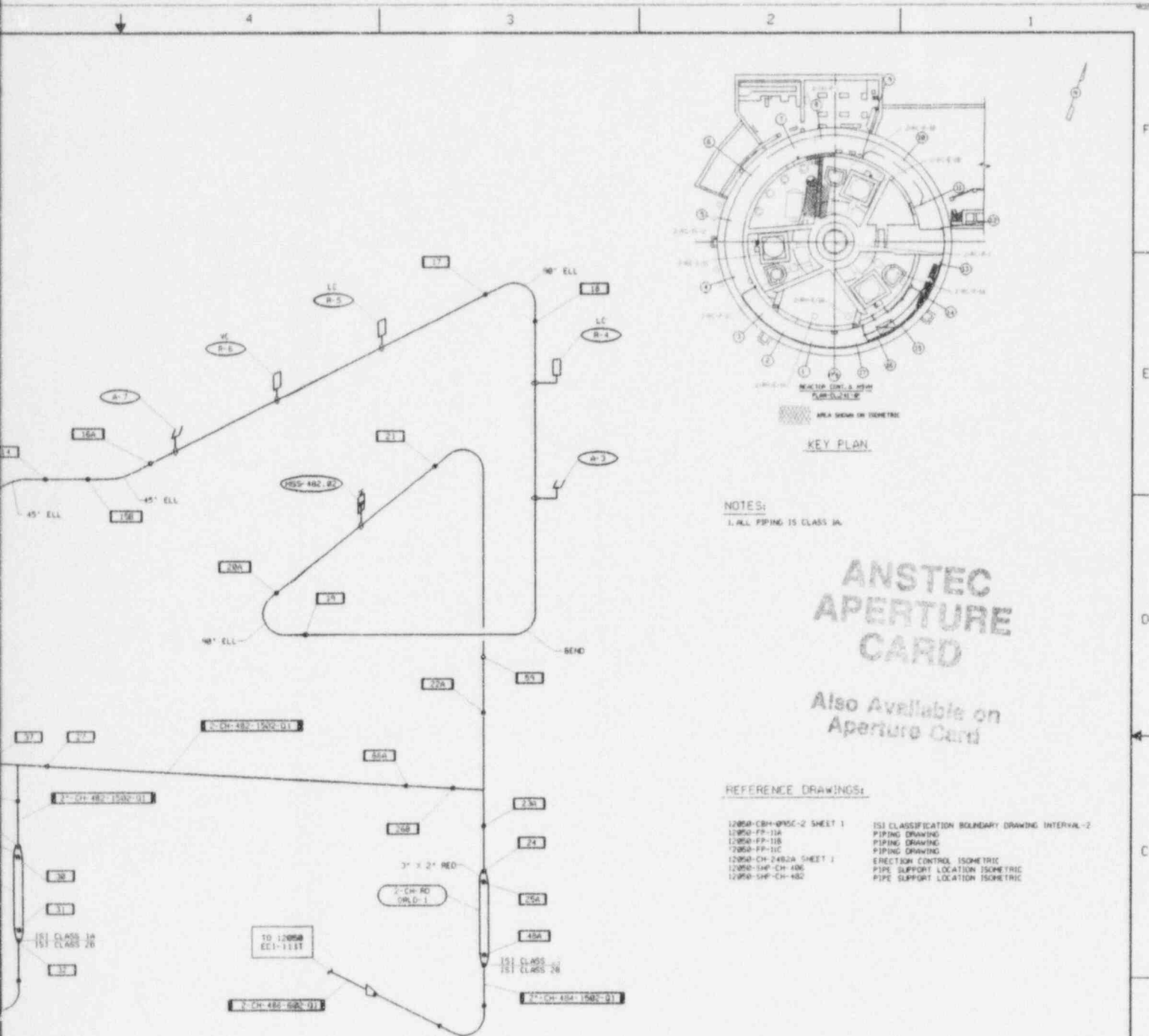
GENERAL ARRANGEMENT

9602120226-04

<b>VIRGINIA POWER</b> <b>NORTH CAROLINA POWER</b>	
NUCLEAR ENGINEERING SERVICES RICHMOND, VIRGINIA	
INSERVICE INSPECTION DETAIL DRAWING REGENERATIVE HEAT EXCHANGER; 2-CH-E-3 NORTH ANNA POWER STATION UNIT 2 VIRGINIA POWER	
DSGN: _____ DRWN: HIL	DSGN SUPPLY: Jaf ENGR SUPPLY: _____
CHKD: HIL	CAD NO.: 12050-WMS-CH-E-3 DRAWING NO.: 12050-WMS-CH-E-3 REV.: 2
SCALE: _____	UNLESS OTHERWISE NOTED SH 1 OF 1

1 REVISED PER ISI REVIEW	0 INITIAL ISSUE	2 DSGN: _____ DRWN: HIL CHKD: HIL	1 CAD NO.: 12050-WMS-CH-E-3 DRAWING NO.: 12050-WMS-CH-E-3 REV.: 2
4 DATE: _____ DSGN: _____ DRWN: _____ CHKD: _____	3 DATE: _____ DSGN: _____ DRWN: _____ CHKD: _____	2 DATE: _____ DSGN: _____ DRWN: _____ CHKD: _____	1 DATE: _____ DSGN: _____ DRWN: _____ CHKD: _____





NOTES:  
1. ALL PIPING IS CLASS 26.

# ANSTEC APERTURE CARD

Also Available on Aperture Card

REFERENCE DRAWINGS:

- 12050-CBH-QPSC-2 SHEET 1 IS1 CLASSIFICATION BOUNDARY DRAWING INTERVAL-2
- 12050-PP-11A PIPING DRAWING
- 12050-PP-11B PIPING DRAWING
- 12050-PP-11C PIPING DRAWING
- 12050-CH-2402A SHEET 1 ERECTION CONTROL ISOMETRIC
- 12050-SHF-CH-486 PIPE SUPPORT LOCATION ISOMETRIC
- 12050-SHF-CH-482 PIPE SUPPORT LOCATION ISOMETRIC

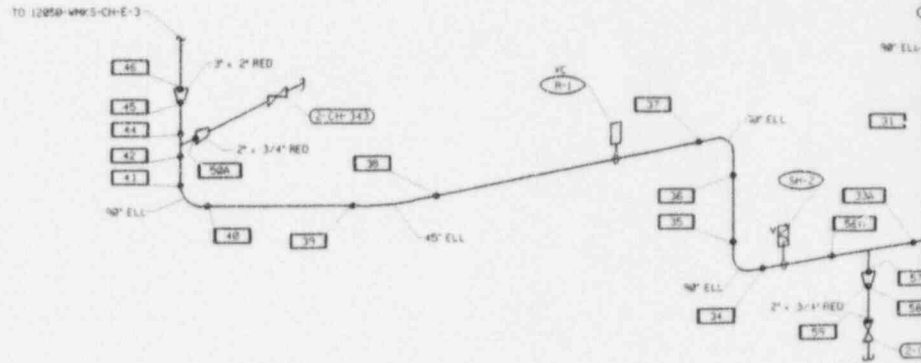
9602120226-05

<b>VIRGINIA POWER</b> <b>NORTH CAROLINA POWER</b>	
NUCLEAR ENGINEERING SERVICES RICHMOND, VIRGINIA	
<b>INSERVICE INSPECTION ISOMETRIC</b> <b>CH SYS:CHEMICAL AND VOLUME CONTROL</b> <b>NORTH ANNA POWER STATION UNIT 2</b> <b>VIRGINIA POWER</b>	

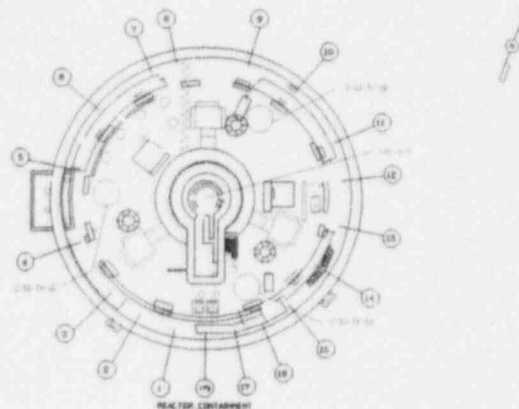
ORIGINAL ISSUE PER DC 92-809-3.														
0														
DESIGN					CHECK					APPR				
DESIGN	CHKD	INSP	ENGR	ENGR	DESIGN	CHKD	INSP	ENGR	ENGR	APPR	CHKD	INSP	ENGR	ENGR
DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE



F  
 E  
 D  
 C  
 B  
 A



REV	DATE	ISSUED BY	CHKD BY	APP'D BY	DISC'D BY	DATE	ISSUED BY	CHKD BY	APP'D BY	DISC'D BY	DATE	ISSUED BY	CHKD BY	APP'D BY	DISC'D BY	DATE	ISSUED BY	CHKD BY	APP'D BY	DISC'D BY



REACTOR CONTAINMENT  
DOME E-3

AREA SHOWN IN ISOMETRIC

KEY PLAN

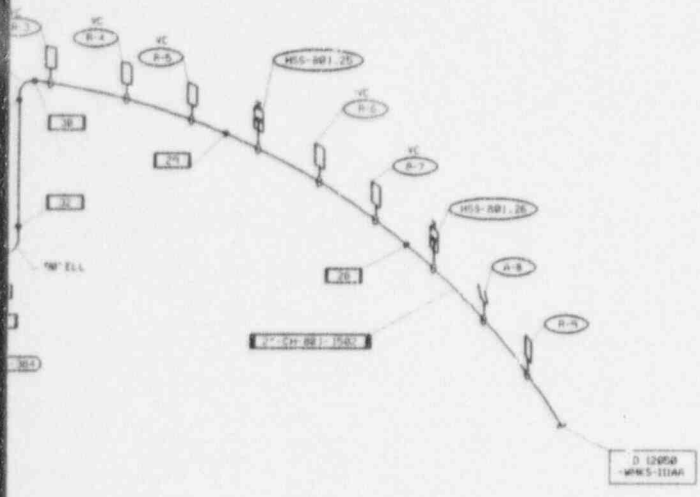
NOTES:  
1. ALL PIPING IS CLASS 1A.

# ANSTEC APERTURE CARD

Also Available on  
Aperture Card

REFERENCE DRAWINGS:

- 12050-CH-015C-2 SHEET 1
- 12050-111-30-11A-0
- 12050-CH-048A SHEET 1
- 151 CLASSIFICATION BOUNDARY DRAWING INTERVAL 12
- PIPING DRAWING
- ERECTION CONTROL ISOMETRIC



9602120226-06

<b>VIRGINIA POWER</b> <b>NORTH CAROLINA POWER</b>		CAD NO. / Revision: 305 / 12 / 1112000 / 150 Rev 1	
NUCLEAR ENGINEERING SERVICES RICHMOND, VIRGINIA			
INSERVICE INSPECTION ISOMETRIC CH SYS:LETDOWN TO 2-CH-E-3 NORTH ANNA POWER STATION UNIT 2 VIRGINIA POWER			
DESGN: _____ ENGR SUPV: _____	DESGN: _____ ENGR SUPV: _____	DRAWING NO. <b>12050-MMS-01112</b>	REV. <b>B</b>
SCALE: NONE		UNLESS OTHERWISE NOTED SH 1 OF 1	

DESIGNED BY		CHECKED BY		DATE		DESIGNED BY		CHECKED BY		DATE	