

SAFENIGHT TECHNOLOGY INC.

"the safer smoke detector network"

2121 Electric Road SW
Roanoke, Virginia 24018
(703) 989-5738

September 26, 1995

Ms. Michelle Burgess, Mechanical Engineer
United States Nuclear Regulatory Commission
#2 Wide Flint North
11555 Rockville Pike T-8f5
Rockville, MD 20852

Re: Response to August 30, 1995 letter

Dear Michelle:

In response to your questions, we have the following elaborations:

- 1)a) Drawings of button and ion chamber - materials, dimensions and methods of fabrication

Button

Amersham model AMM.1001H source and holder or NRD model A-001 source in model A-1056 holder. Both are well-documented and drawings are included in Appendix 1.

Ion Chamber

- Figure 1 - Exploded view of chamber
- Figure 2 - Exploded view of chamber
- Figure 3 - HomeWatch Source Holder
- Figure 4 - Profile/base view of chamber

Method of fabrication

The nickel plated copper HomeWatch source holder is fabricated with a female plug in the bottom of it. The aluminum source holder from NRD or Amersham is crimped around the edge with a manually operated crimper into the HomeWatch source holder. Both are then pressed all the way down inside a snug-fitting plastic source holder. The whole process does not contact the sealed source.

There is a gap of approximately 2.2 mm between the top of the source holder and the bottom of the receiver plate. The receiver plate is placed on top of a plastic ledge in

rec'd
9/27/95

the plastic source support above the source holders and held in place by a screw and a plastic nodule present on the plastic source holder. The screw penetrates all the way down to the plastic holder. The steel tin/copper/nickel-plated cup is then placed over the plastic source holder (again a snug fit) and twist-locked. A screw is applied that penetrates both the steel/tin cup and the plastic source holder. This screw will be covered with solder to prevent tampering. Its presence will prevent any un-twisting action of the cup short of destruction. The chamber will be delivered from our supplier, HomeWatch, at this stage.

The chamber is aligned on the PCB using a nodule present at the bottom of the plastic holder and a small hole in the PCB. Then it is screw connected from the other side. The lead wire from the receiver plate is soldered to the smoke detector chip and the other lead wire is soldered to the board. Both will prevent the unscrewing of the chamber from the board short of destruction.

1b) Models.

SN-100. Basic Model. Drawings per original submission
SN-500. A/C model. No significant changes affecting structural integrity to SN-100.
PL-100. Different redistributor of SN-100.
PL-500. Different redistributor of SN-500.
RS-100. Different redistributor of SN-100.
RS-500. Different redistributor of SN-500.
MA-100. Different redistributor of SN-100.
MA-500. Different redistributor of SN-500.

2) a) How is ion chamber connected to circuit board?
See method of fabrication answer to question 1.
Also see Figures 1,2,5.

b) How circuit card is secured within smoke detector base? Per drawings with original submission, the PCB is held in place by 5 plastic clips molded into the housing. See Figure 6 which superimposes a circuit card layout onto a housing drawing.

- 3) a) Drawings of the detector labeling.
Per figure 7, "CONTAINS RADIOACTIVE MATERIALS AMERICIUM 241 0.9 MICROCURIE" is etched into the base of all model plastic ABS housings. In addition, an adhesive paper label will be placed approximately in the area shown in figure 7. The label will either state SafeNight (licensee - SN model series) or "U.S.NRC License No. XXX" (PL, RS, and MA model series)
- b) Point-of-sale made of typical box material. All model packaging will include the following:
- a) "Contains Radioactive Material Americium 241 0.9 Microcuries"
- b) "THIS DETECTOR CONTAINS RADIOACTIVE MATERIAL AND HAS BEEN MANUFACTURED IN COMPLIANCE WITH U.S.NRC SAFETY CRITERIA IN 10 CFR 32.27. THE PURCHASER IS EXEMPT FROM ANY REGULATORY REQUIREMENTS."
- c) 1) SN Series will contain the name SafeNight
See Appendix 2 for approximate packaging.
- 2) All other model series will contain "U.S.NRC License No. XXX" instead of the SafeNight name. Marketing designs yet to be determined.

4) Quality control flow chart

Foil Source manufacturer - NRD or Amersham
delivered Foil in buttons

- 1) 100% tested for removable contamination
- 2) Use of lot tolerance percent defective (LTPD) 5% acceptance sampling for conformity to design specs

to HomeWatch Ltd Inc., Hong Kong
Incorporated into ion chamber housing.

delivered to contract manufacturer (SCI Systems Inc.), one of 20 company-owned plants worldwide

Prior to Final packaging:

- 1) LTPD 5% sampling for removable contamination on ion chamber after chamber is installed on PCB
- 2) LTPD 5% sampling for design conformity



Prior to Distribution:

- 3) a) If foreign plant, LTPD 5% sampling to be sent to USA contracted location to perform distributor LTPD 5% sampling 1) removable containment 2) Design conformity
- b) If USA plant, Distributor LTPD 5% sampling for labels done on sight of SCI plant by SCI.



Drop-shipped to retailer/other distribution channels from plant location after USA sample testing is successfully completed.

Should there be any other questions about our responses, please let me know. Thank you.

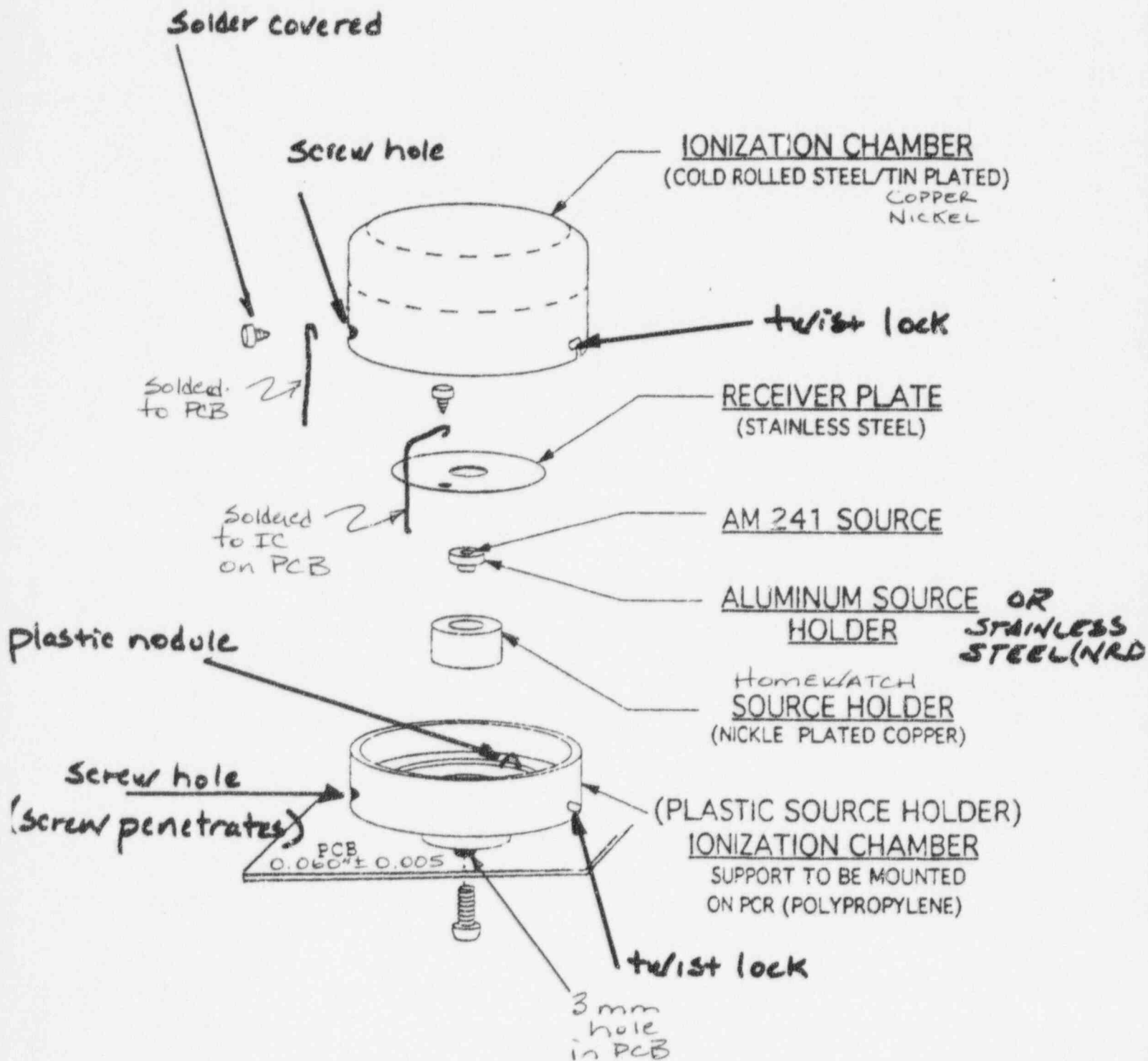
Sincerely,



Scott N. Markwell
President

SNM/ct

FIGURE 1

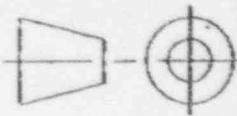


CONTAINMENT OF SOURCE WITHIN DETECTOR

FIGURE 1

JCW

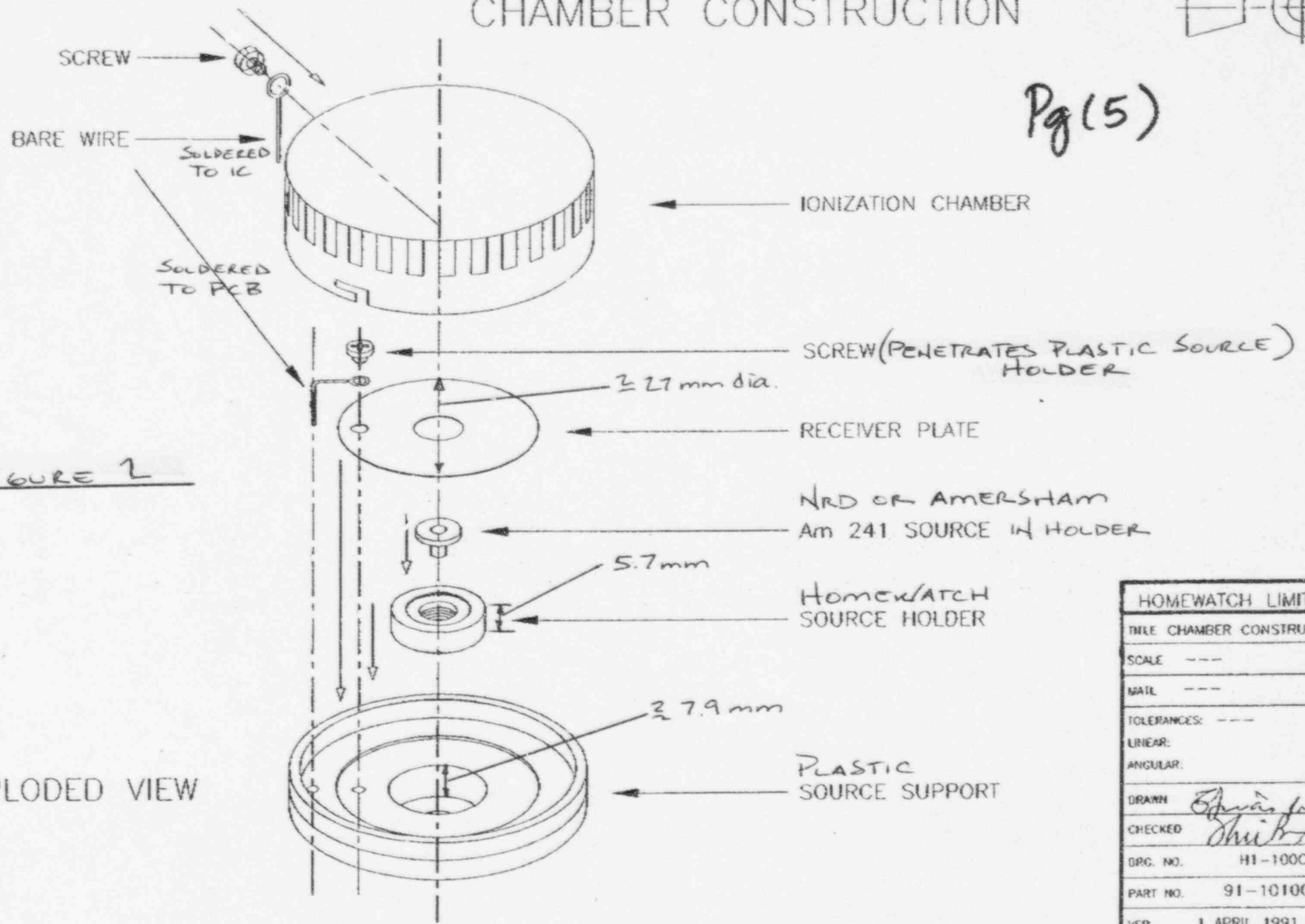
CHAMBER CONSTRUCTION



Pg(5)

FIGURE 2

EXPLODED VIEW



JCW

NO ALTERATIONS WITHOUT DRAWING OFFICE APPROVAL

HOMEWATCH LIMITED	
TITLE CHAMBER CONSTRUCTION	
SCALE	---
MATL	---
TOLERANCES: ---	
LINEAR:	
ANGULAR:	
DRAWN	<i>Shirley</i>
CHECKED	<i>Shirley</i>
DRG. NO.	H1-100C
PART NO.	91-101001
VER.	1 APRIL 1991 (A)
SHEET	ONE ONLY

HW

Pg (4)

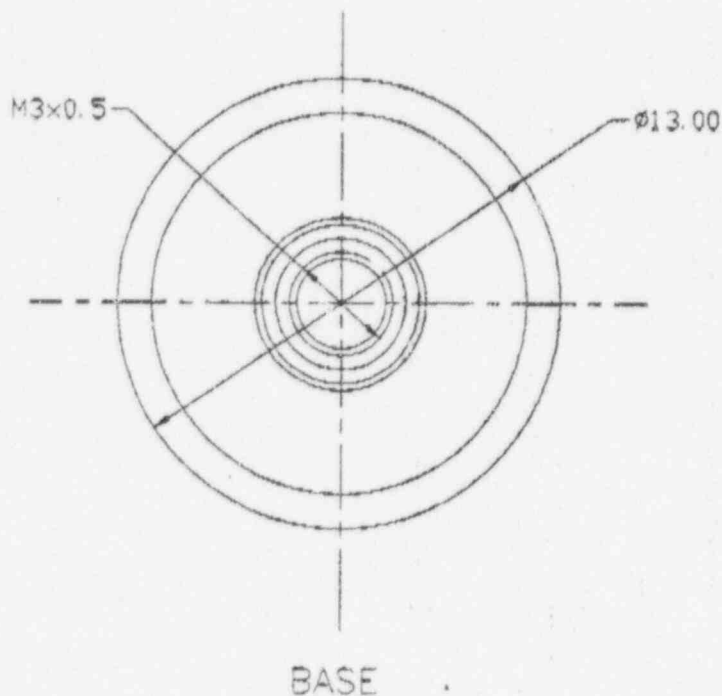
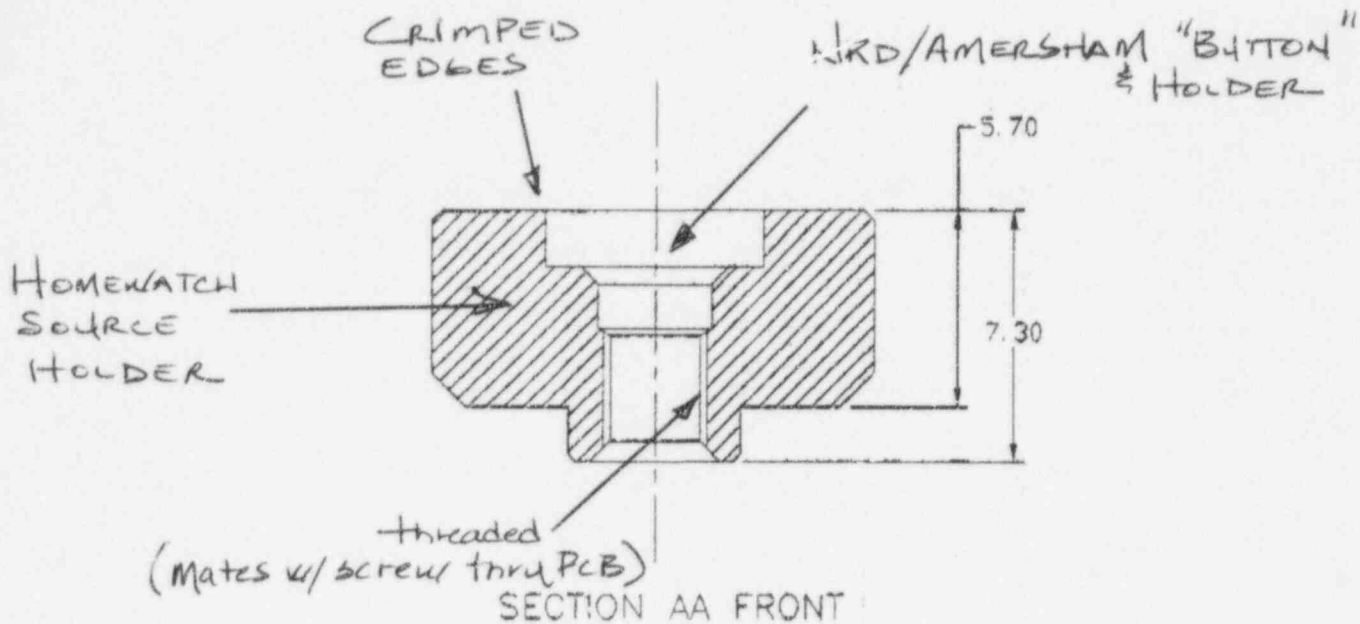
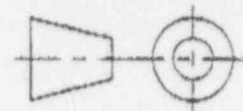
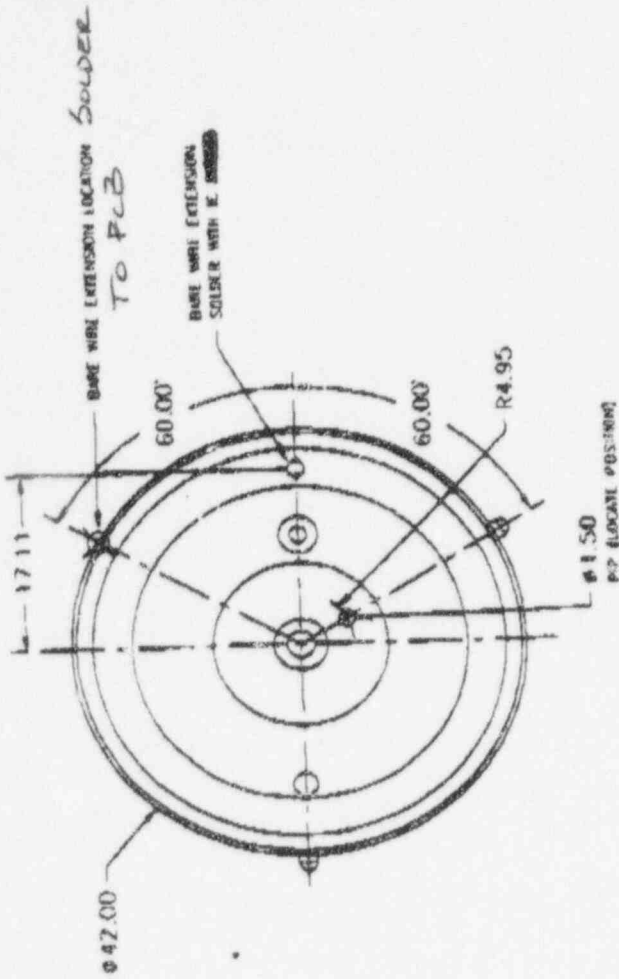


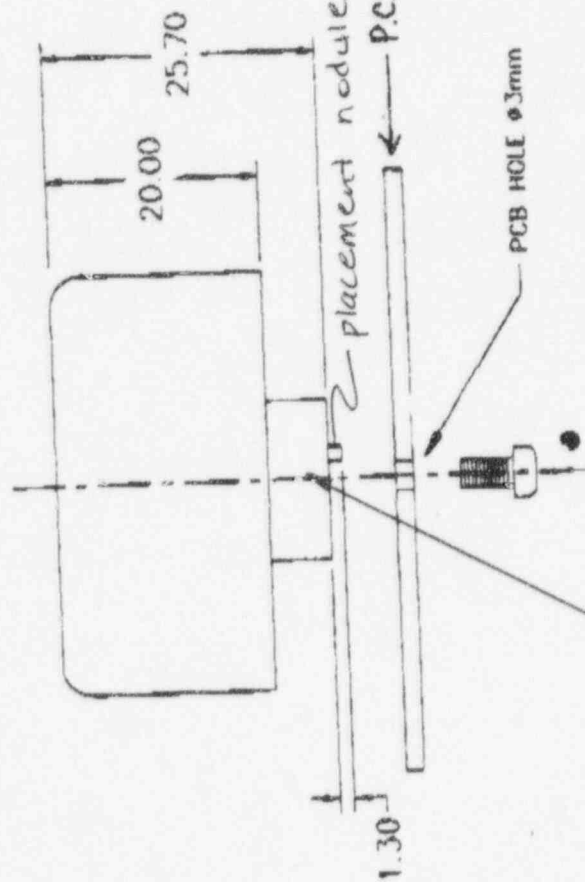
FIGURE 3

HW

HOMEWATCH LIMITED	
TITLE	NRD SOURCE HOLDER
SCALE	NOT TO SCALE (mm)
MATL	BRASS plated with Ni
TOLERANCES:	
LINEAR:	±0.2
ANGULAR:	±0.2
DRAWN	<i>Shub</i>
APPROVED	<i>Shub</i>
DWG. NO.	HW-M18
DATE	1 APR 92
VER.	
PART NO.	



BASE VIEW OF IONIZATION CHAMBER



HOMEWATCH LIMITED	
DATE	DATE OF IONIZATION CHAMBER
SCALE	1:0.7 (UNIT=mm)
NOTE	unless noted
TOLERANCES:	
LINEAR	
ANGULAR	
DRAWN	
CHECKED	
DRG. NO.	
PART NO.	
VER	13 NOV 1993
SHEET	ONE ONLY

NO ALTERATIONS WITHOUT DRAWING OFFICE APPROVAL

FIGURE 4

HW

HW

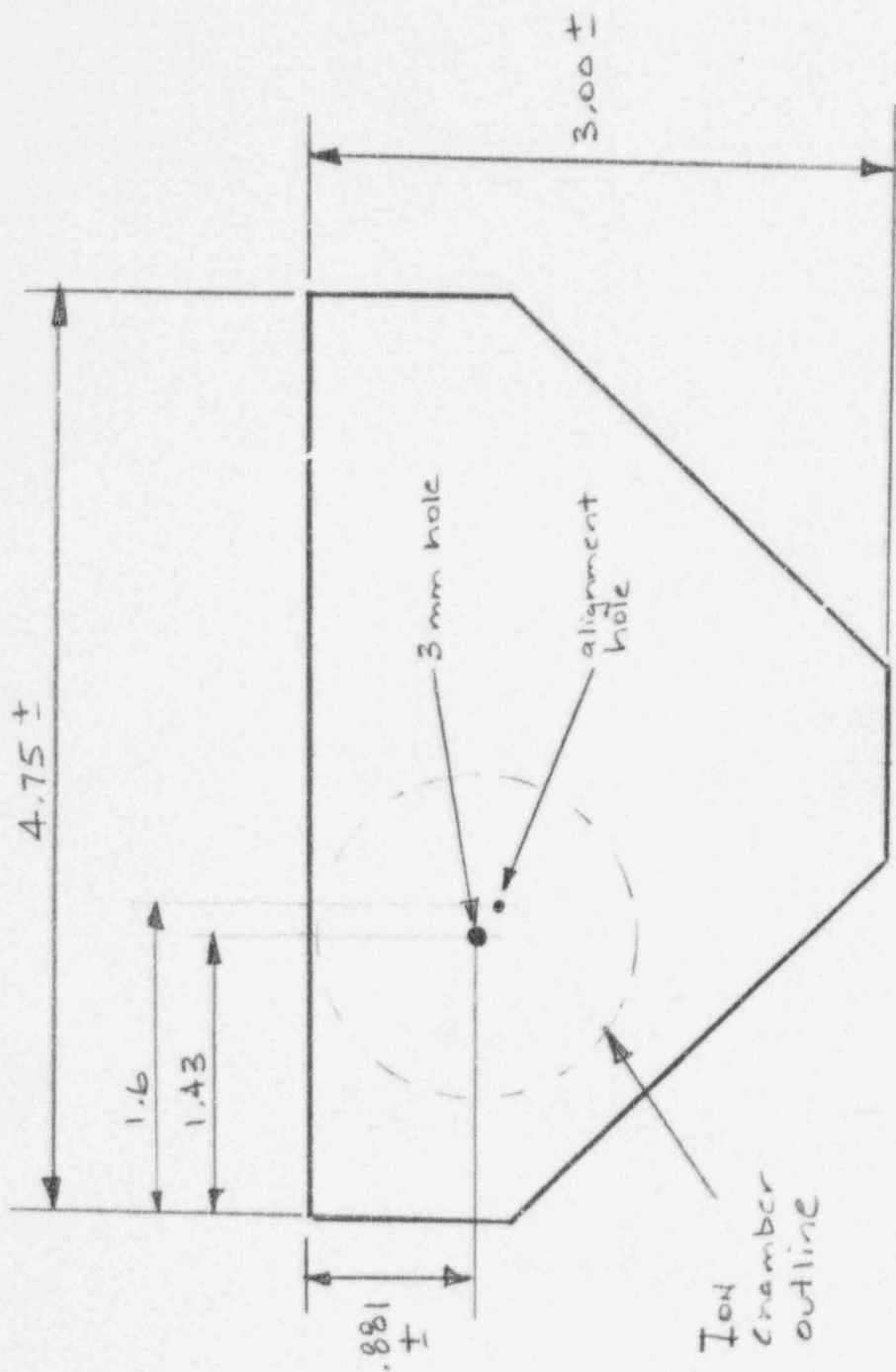
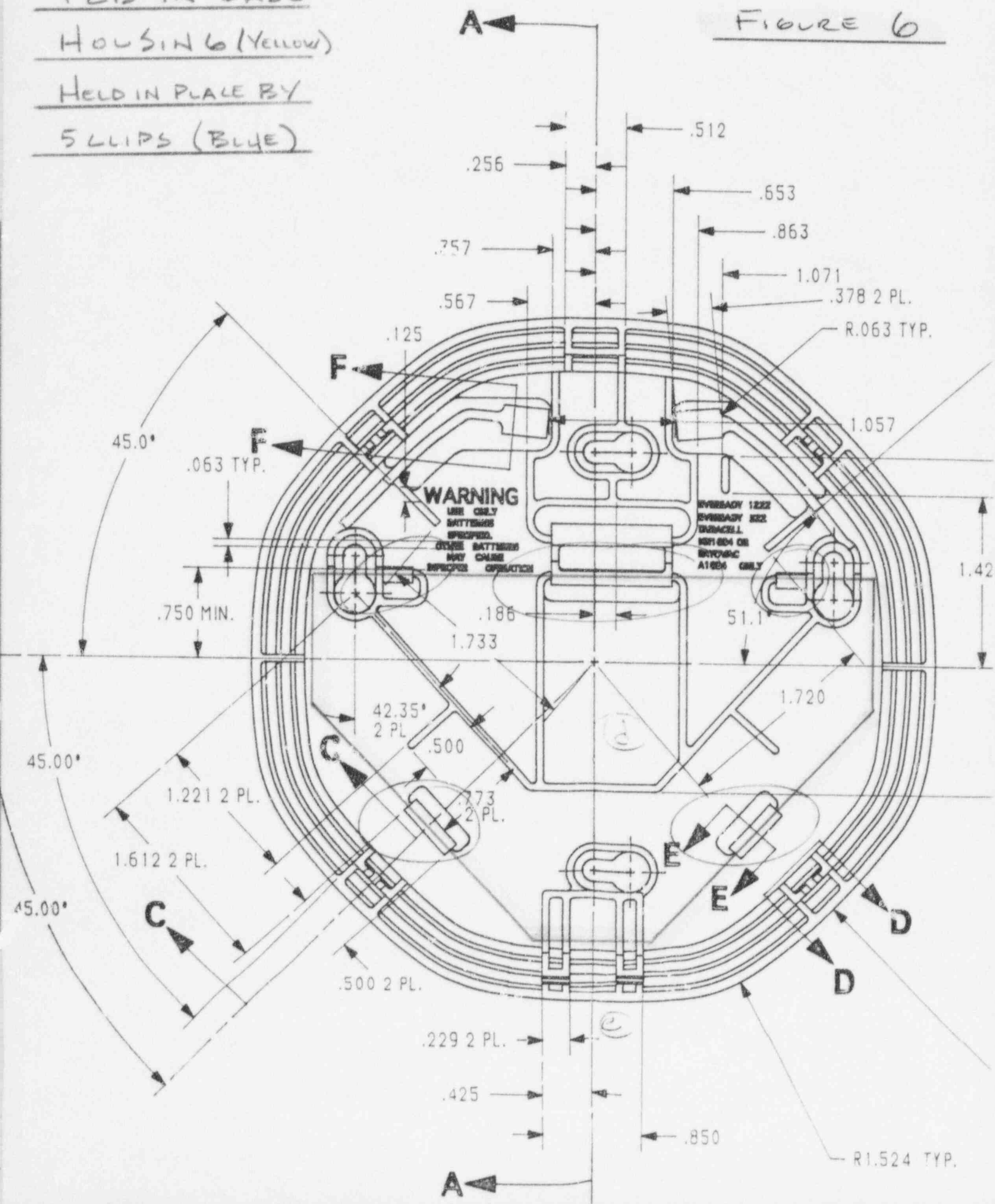
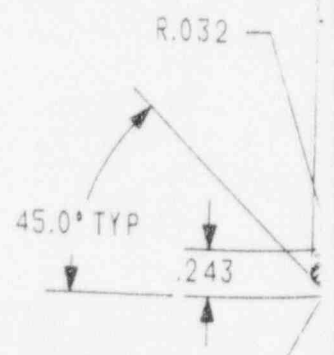
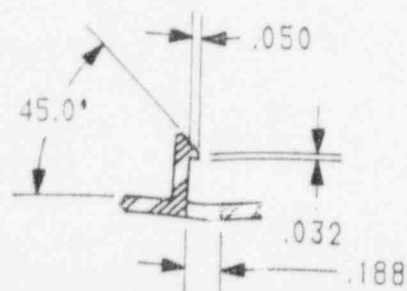
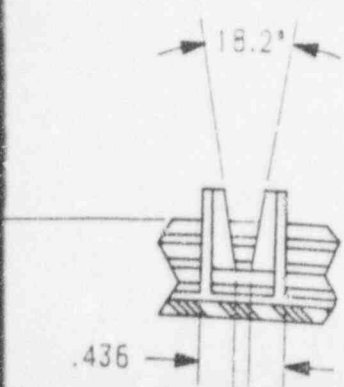
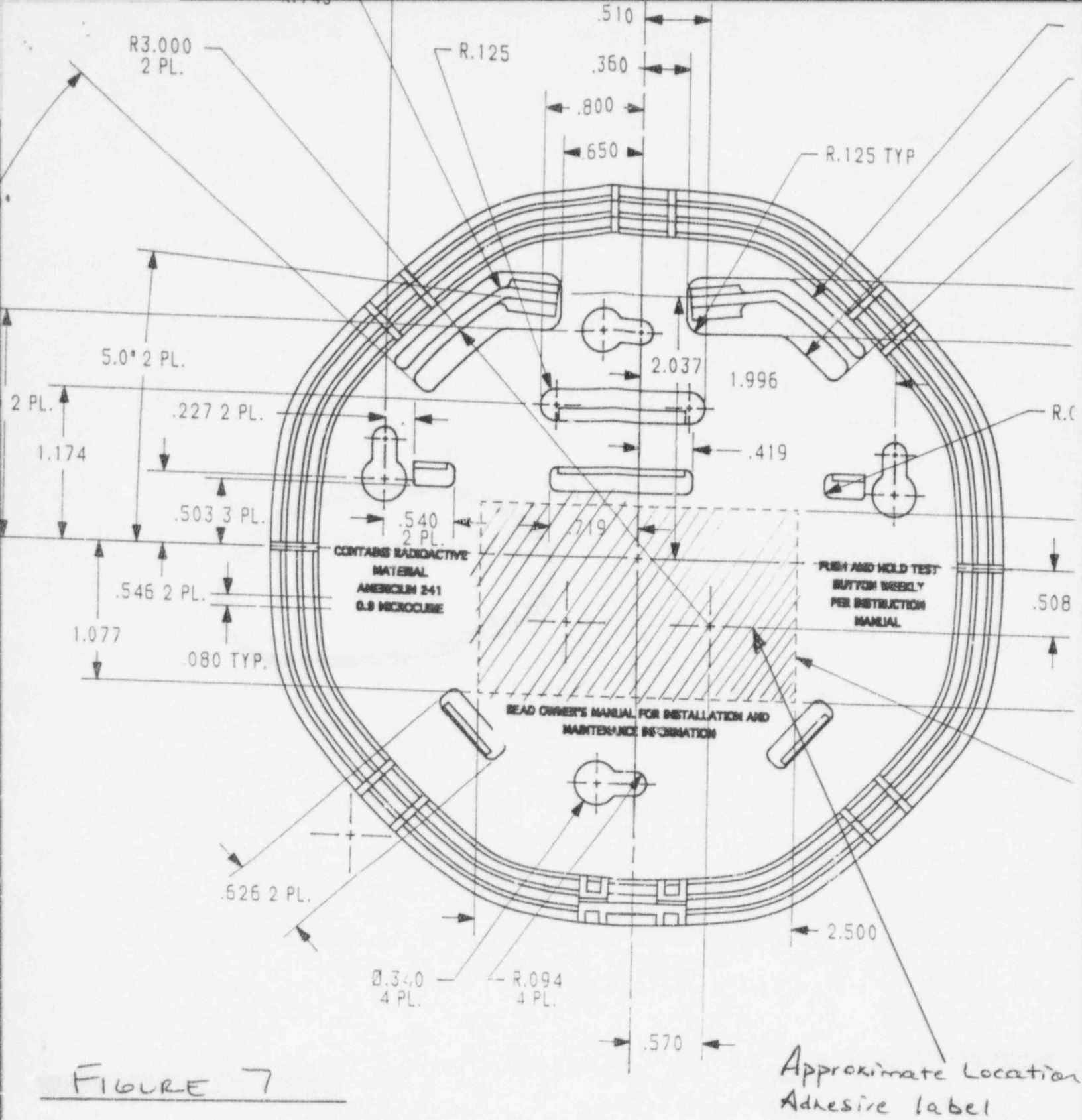


FIGURE 5
PCB LAYOUT

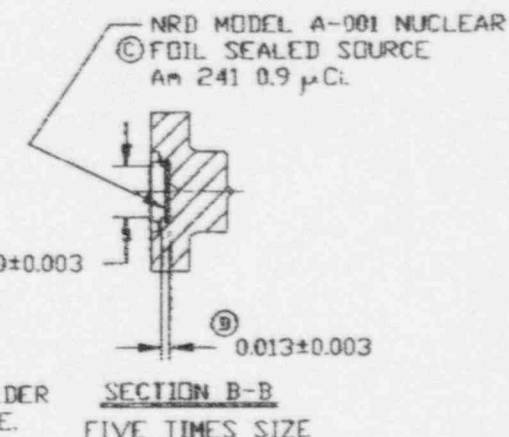
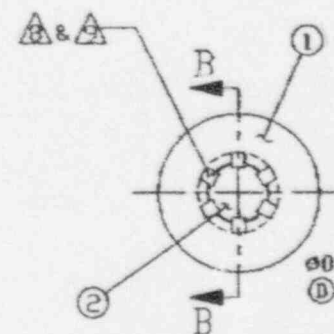
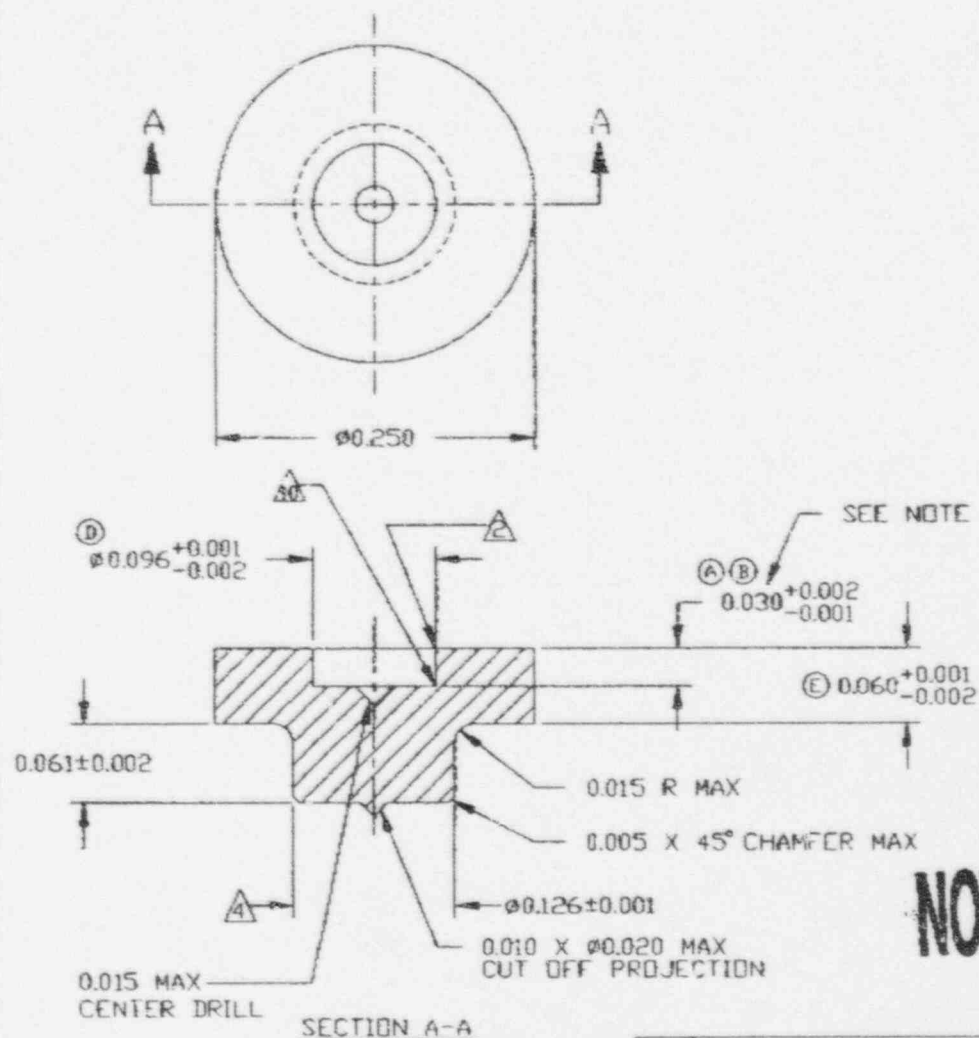
5 LIPS (BLUE)





APPENDIX 1

DATE	SYN	REVISION RECORD	AUTH	DR	CHK
02-08-94	A	ADD NOTE 4	TC	JES	
02-08-94	B	CHANGE DIM 0.030 TO 0.030 ± 0.001		JES	
02-08-94	C	ADD FOIL NOTE		JES	
02-08-94	D	REWORK ON ANNOTATION		JES	
02-08-94	E	SEE NRD SPEC 2016 FOR DIMENSIONS	JES	CRD	
02-08-94	F	SEE NRD SPEC 2016 FOR DIMENSIONS	JES	CRD	
02-08-94	G	SEE NRD SPEC 2016 FOR DIMENSIONS	JES	CRD	
02-08-94	H	SEE NRD SPEC 2016 FOR DIMENSIONS	JES	CRD	
02-08-94	I	SEE NRD SPEC 2016 FOR DIMENSIONS	JES	CRD	



NOTES:

1. SOURCE HOLDER AND SOURCE HOLDER ASSEMBLY MUST COMPLY WITH NRD SPECIFICATION 2016 DATED 2/8/85.
2. NUMBERED Δ REFER TO SPECIFIC NOTES.
3. ALL DIMENSIONS ARE IN INCHES.
4. EACH SHIPMENT, 0.030 DIMENSION MUST BE HELD TO ±0.001 WITHIN THE +0.002 -0.001 TOLERANCE.

NOT TO SCALE

NRD DIV. MARK IV IND. INC.			
2937 ALT BOULEVARD GRAND ISLAND, NEW YORK 14072			
TOLERANCES UNLESS AS SHOWN		TITLE	
DECIMAL: ± 0.005		SOURCE HOLDER MODEL A-1056	
FUNCTIONAL: ± 0.005		MATERIAL & FINISH	
ANGULAR: ± 1°		SCALE	
		10 : 1	
		DRAWN BY JES	
		APPROVED BY	
DATE		REVISION	
07FEB85		85B026	
		7	

NO.	DESCRIPTION	DWG.	REQ'D	MAT'L
2	SOURCE A-001-2-0.9	79A045	1	COMB.
1	SOURCE HOLDER A-1056	85B026	1	S. STEEL

GENERAL NOTES FOR STAINLESS STEEL SCREW MACHINE HOLDERS:

1. MATERIAL: 303 STAINLESS STEEL
FINISHED SOURCE HOLDER HARDNESS: ROCKWELL B100 MAX.
2. COUNTERBORE TO HAVE SHARP CORNERS, 0.001" MAX. COUNTERBORE SURFACE TO BE FLAT AND FREE FROM PROJECTIONS.
3. CONCENTRICITY TO BE WITHIN 0.003" ON ALL DIAMETERS.
4. ROUNDNESS TO BE 0.001" MAX.
5. SURFACE FINISH TO BE NO GREATER THAN 90 MICRO INCHES UNLESS OTHERWISE SPECIFIED. SHARP CORNERS NOT TO EXCEED 0.005" RADIUS.
6. SOURCE HOLDER CAVITY MUST PASS A $\phi 0.094$ " PLUG GAUGE CHECK.
7. AFTER MACHINING, PARTS SHOULD BE DEBURRED, PASSIVATED, AND THEN DEGREASED.
8. AFTER ASSEMBLING, CRIMPED TABS SHOULD HOLD FOIL FIRMLY TO THE BOTTOM OF THE FOIL CAVITY. CRIMPED SURFACES SHOULD BE FREE FROM CRACKS OR FLAWS.
9. SOURCE MUST REMAIN FLAT AND FREE OF DISTORTIONS AFTER CRIMPING.
10. CORNERS TO BE SHARP, 0.003" MAX.
11. CUT OFF BURR NOT TO EXCEED 0.003" HIGH X $\phi 0.015$ ".

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
29NOV90	1	NOTE 3 & 6 CHANGED: $\phi 0.096$ WAS $\phi 0.098$; $\phi 0.094$ WAS $\phi 0.096$		CDD	
04JAN91	2	NOTE 2 CHANGED: 0.001 WAS 0.003	JES	CDD	
07JAN91	3	NOTE 10 ADDED	DH	CDD	
22NOV91	4	NOTE 1 CHANGED: B90 WAS B100	JS	CDD	
12DEC91	5	NOTE 1 CHANGED: B100 WAS B90 NOTE 11 ADDED	DH	CDD	
23JAN92	6	HARDNESS SPEC REVISED; PAGE 1 OF 2 REMOVED FROM TITLE; NOTE 3 REVISED	F.C.	CDD	

FOIL MODEL	A-001
RIVET MODEL	A-1056
ASSEMBLY MODEL	—
ENCAPSULATION CODE	I-405
PROTOTYPE TESTS	11211111
Q.C. TESTS	AGRSVW

NRD INC. A SUBSIDIARY OF MARK IV INDUSTRIES, INC. 2937 ALT BOULEVARD GRAND ISLAND, NEW YORK 14072			
TOLERANCE <small>EXCEPT AS NOTED</small>		TITLE NRD SPECIFICATION 2016	
DECIMAL ±	MATERIAL & FINISH	SCALE	DRAWN BY
FRACTIONAL ±			APPROVED BY J.M.
ANGULAR ±	DATE 08FE85	DWG. NUMBER SPEC FOR 85B026	REVISION 6