



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY ELECTRONICS RESEARCH
AND DEVELOPMENT COMMAND
2800 POWDER MILL RD., ADELPHI, MD 20783

4 JUN 1985

AMDEL-SS

SUBJECT: Request to Amend Nuclear Regulatory Commission Byproduct
License No. 29-01022-07, U.S. Army Electronics Research
and Development Command

Commander
U.S. Army Materiel Command
ATTN: AMCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333-0001

1. Reference Amendment Request for Nuclear Regulatory Commission Byproduct
License Number 29-01022-07, U.S. Army Electronics Research and Development
Command, dated 1 May 1985. (AMC Control Number 85-0800).

2. Request subject license be amended as follows:

a. Remove sealed source, Co-60, [] from the Underground Vault
(decay corrected to 600 Ci as of 1 Jul 85) [] the Isotope
Facility, in its storage container, and place in [] the Isotope
Storage Facility, for permanent storage until disposal procedures can be
completed. (See Supplement C, pages C-4 and C-14 of reference 1). S 2

b. Be permitted to temporarily store [] of Cs-137 sealed source (encl
1) in its storage container in the Underground Vault Facility until safe and
adequate standard operating procedures are developed. (See Supplement C,
pages C-6 thru C-9 of reference 1). S 2

3. Point of contact is Mr. Scott L. Davis, AV 996-5292 or Commercial (201)
544-5292.

4. ERADCOM - Providing Leaders the Decisive Edge.

FOR THE COMMANDER:

- 2 Encls
1. Source capsule
2. Mechanical drawings of
storage container

Kenneth S. Norris
KENNETH S. NORRIS
COL, GS
Chief of Staff

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemption 2
FOIA 2006-0238

EE/4
04215
[Signature]



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY ELECTRONICS RESEARCH
AND DEVELOPMENT COMMAND
2800 POWDER MILL RD., ADELPHI, MD 20783

REPLY TO
ATTENTION OF

24 JUN 1985

AMDEL-SS

SUBJECT: Supporting Information for Amendment Request for
Nuclear Regulatory Commission Byproduct License
Number 29-01022-07, U.S. Army Electronics Research
and Development Command. (AMC Control No. 85-0800)

Commander
U.S. Army Materiel Command
ATTN: AMCSF-P (D. Taras)
5001 Eisenhower Avenue
Alexandria, Virginia 22333-0001

1. Reference 1st Endorsement, AMCSF-P, 13 May 85, subject: Amendment Request for Nuclear Regulatory Commission Byproduct License Number 29-01022-07, U.S. Army Electronics Research and Development Command.

2. Forwarded for your information is Supplement C of Amendment Request to subject license, dated 1 May 1985. Supplement C contains all of the necessary drawings and illustrations pertinent to the Underground Vault Facility. The Underground Vault Facility has been previously rated/designated for [] of Co-60. (See Item III, para 2 of enclosure 1). Ex 2

3. Radiation surveys of the Vault/Control Room were performed, as requested in reference 1, with data contained in enclosure 2, pages 3 thru 6. Surveys were conducted using a Victoreen 440 Ion chamber and an AN/PRD-27J for comparison. All readings were taken with the [] Co-60 source in the "up" position. Ex 2

a. Figure 2, page 3, of enclosure 2, provides an overhead view of the Vault Facility. Measurements taken and their location are designated by a square □, meaning closed window. Numbers 1, 2, and 3 are actual measurements, see cover page of enclosure 2 for radiation levels. Radiation levels, indicated inside of Exposure Room, are theoretical calculations of the in-air exposure. See page 7 of enclosure 2 for calculations.

b. Figure 3, page 4, provides a side view of the Vault Facility and measurements taken. Their location is again designated by a square □. Measurements were made outside of the Control Room and Exposure Room to ascertain the levels of exposure at ground level above the source, while the source (Co-60) was in the "up" position. All levels were found to be \geq BKG or 0.02 mR/hr.

AMDEL-SS

SUBJECT: Supporting Information for Amendment Request for
Nuclear Regulatory Commission Byproduct License
Number 29-01022-07, U.S. Army Electronics Research
and Development Command. (AMC Control No. 85-0800)

c. Figure 4, page 5, provides another overhead view of the facility and some of the safety devices associated with the facility. Readings will correspond with the preceding values.

d. Figure 5, page 6 is an example of the monthly survey form that is used. It contains the three measurement locations, with a brief explanation of exactly where the measurements were taken. The values given in the Exposure Room are again theoretical in-air exposure rates, not to be construed as shielded values.

e. Page 7 of enclosure 2 lists the theoretical calculations for all three sources. Number 1 is the G.E. source presently being used. Number 2 is the Picker Corporation source, and number 3, the expected/requested R-Metrics, Amersham Cs-137 source.

4. The findings of the vault survey and calculations, indicate that the present facility is designed to adhere to all the safety precautions outlined in 10 CFR Part 20.203(c)(1 thru 6), even though the total activity of both sources will not deliver a radiation level in excess of 500 rems in one hour at 1 meter. Other safety features are identified in enclosure 2, Figure 4, page 5.

5. Documentation sent with the source description from R-Metrics, identifies a radiation level of 100 mR/hr at the center of the collimator (enclosure 3). A lead shield will be designed and attached to the source container to further reduce the exposure levels. Other readings taken around the source, indicate only 1 mR/hr at the top surface and no detectable levels on the sides.


6. The shipping criteria is presently being worked out because of the need to transport source across international boundaries.

7. Point of contact is Mr. Scott L. Davis, AV 996-5292 or Commercial (201) 544-5292.

8. ERADCOM - Providing Leaders the Decisive Edge.

FOR THE COMMANDER:

3 Encls


KENNETH S. NORRIS
COL, GS
Chief of Staff

Supplement C

- NRC 313, Items 9A,B,C and 13 a,b,c

The following facilities and containers are described:

- I. Building T-383 - Isotope Storage Vault
- II. Building S-45
- III. Underground Vault

I. Material Storage Vault, Bldg. T-383. (Sketch on page C-4)

Drawing, Fig. C-1, shows the radioactive material storage vault. This building is used to store radioactive materials and radioactive waste.

II. Building S-45, (Sketch on page C-5)

Drawing, Fig. C-2, shows the decontamination room and processing room located in Building S-45. The processing room is provided with remote handling equipment, glove box, and ventilated hood (100 linear feet per minute across opening when half open). Coveralls, surgical caps and gloves, and booties are also available in various sizes. All work surfaces are stainless steel designed to contain spills.

The decontamination room contains a shower, sink, absorbent paper with waterproof backing, and decontamination chemicals. Sewage is stored in an underground tank and the controls for dilution, before permitting it to enter regular sewage, are located in the processing room.

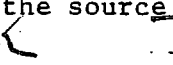
Lead bricks are available for shielding radioactive materials while under hood, in glove box, or on other work surfaces, or for temporary storage while waiting use.

III. Underground Vault


1. The location of the underground area, consisting of the Vault Console and Exposure Room, in relation to the remainder of [] is shown in Fig. C-3.

2. The Vault Exposure Room (see Fig. C-4 & C-5) was designed for the use of a cobalt-60 sealed source. The figures show the 18" thick wall that extends the maze 5'4" into the Vault Exposure Room. Interlocking ferrite bricks were used in the construction of the wall. The ferrite block used on each side of the Zinc Bromide Window in the wall, between Vault Console and Exposure Room, is also shown in the same figures.

3. Figure C-6 shows the relative location of a warning light that is visible in the Control Room when either source is "up" and other pertinent components. Other warning lights that are lit when either source is "up" are located on top of the earth mound, in the hall at the top of the stairs, and a lamp on the control panel. The "radiation alarm system" refers to a system which provides a separate readout in the Control room of the dose rate at each of three (3) remote sensing units. The remote sensing unit located in the Exposure Room is connected to a readout unit which covers a 0.1-1000 R/hr range with a logarithmic scale. Two remote sensors (one of which is located near the control panel and the other on the exterior earth mound) are connected to readout units which cover a 1 to 1000 mR/hr range with a logarithmic scale. Radiation levels in excess of pre-set alarm conditions, are indicated by a red alarm light for each unit.

4. The components shown in the primary source storage shield (Figure C-7), Capsule and rise tube assembly (Figure C-8a), Storage Plug Control Mechanism (Figure C-8b), Electrical System wiring schematic (Figure C-9), and pneumatic system used to "blow" the source to the rise tube head, make up the storage and use device for the  source. S2

The Shield and Rise Tube Adapter of the Rise Tube Assembly (Figure C-8) fits into the plug well, Item 3 of Figure C-7. The Rise Tube Assembly is held in place by a Plug Plate that fits over the shoulder of the Shield and Rise Tube Adapter and the top of the Primary Source Storage Shield. The Plug Plate is held down by nuts screwed onto the stainless steel lugs (see Item 4 of Figure C-7). The Rise Tube Extension is screwed and bolted onto the top of the Rise Tube. (Figure C-8).

5. An assembly which raises the lead storage plug for the  source (shown in Figure C-8b) is mounted on the wall containing the zinc bromide window. After a ten-second warning period, the motor-driven spool raises the plug. A magnetic clutch releases to lower the plug. S2

6. The electrical control system schematic is shown in Figure C-9. The electrical interlock system will cause the source and its shielding plug to be lowered into its Source Storage Shield if:

- a. The maze door is opened.
- b. The zinc bromide in the observation window is low.
- c. The remote control switch in the Exposure Room or the main control switch in the Control Room are switched to the "down" position.
- d. An electrical power failure occurs.
- e. The wooden barrier, past the lead door, is in the vertical position.
- f. If the electrical lock on the lead door is open.

The connection TB 4-5 (Figure C-9) was closed when the system was tested with a dummy source; however, now this connection is open so that the sources cannot be raised from inside the Exposure Room.

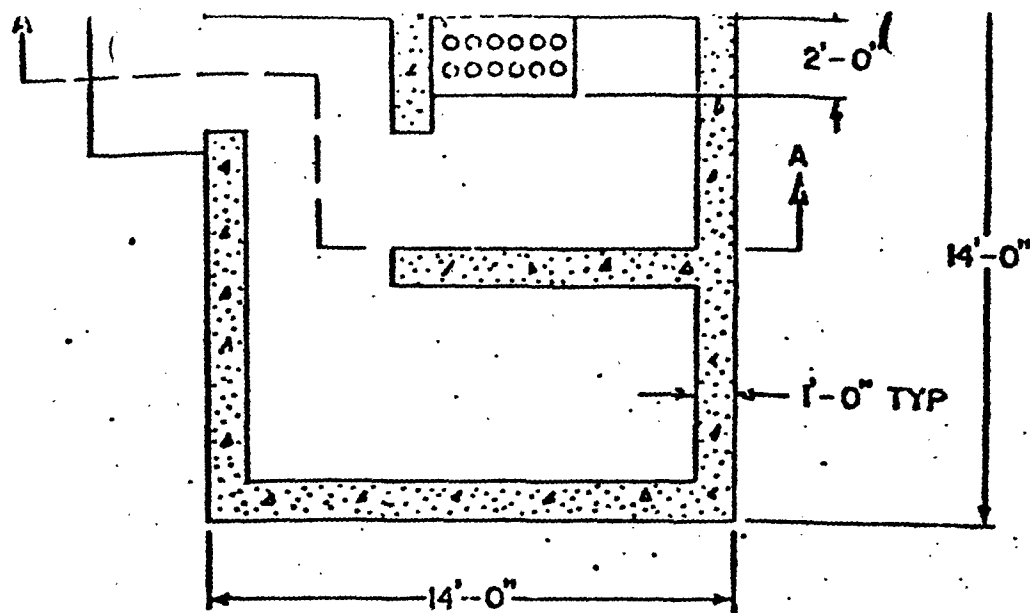
7. A pair of Argonne Type D-8 Slave manipulators (see Figure C-5) are installed to move the equipment located in the Exposure Room while the operator is in the Control Room.

8. The sump in the Exposure Room is connected to the radioactive waste dilution system in Building S-45. (Described on Page C-1)

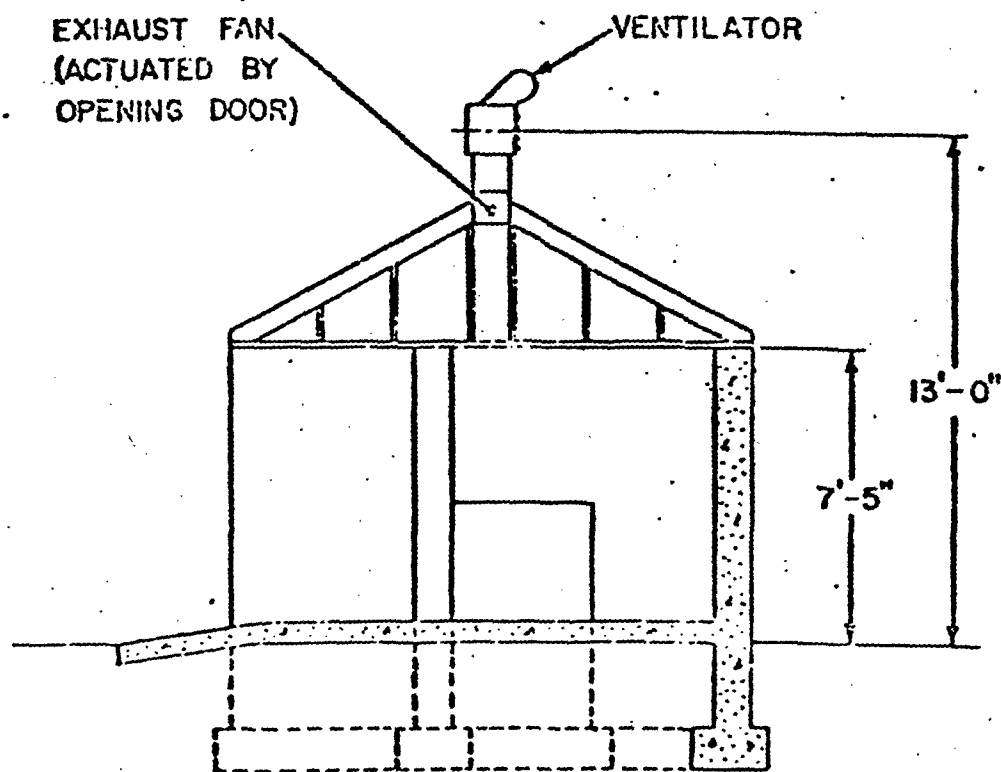
9. An alarm bell rings if the radiation level in the Console Room goes above 1.0 mR/hr. The alarm bell is audible throughout Building 401.

10. The components shown in Figure C-10, make up the storage/shipping container for Source Number 2 [] which is in permanent storage.

~~Ex~~ 2



FLOOR PLAN



SECTION A-A

FIG. C-1 BUILDING T-383 RADIOACTIVE STORAGE VAULT, EVANS AREA

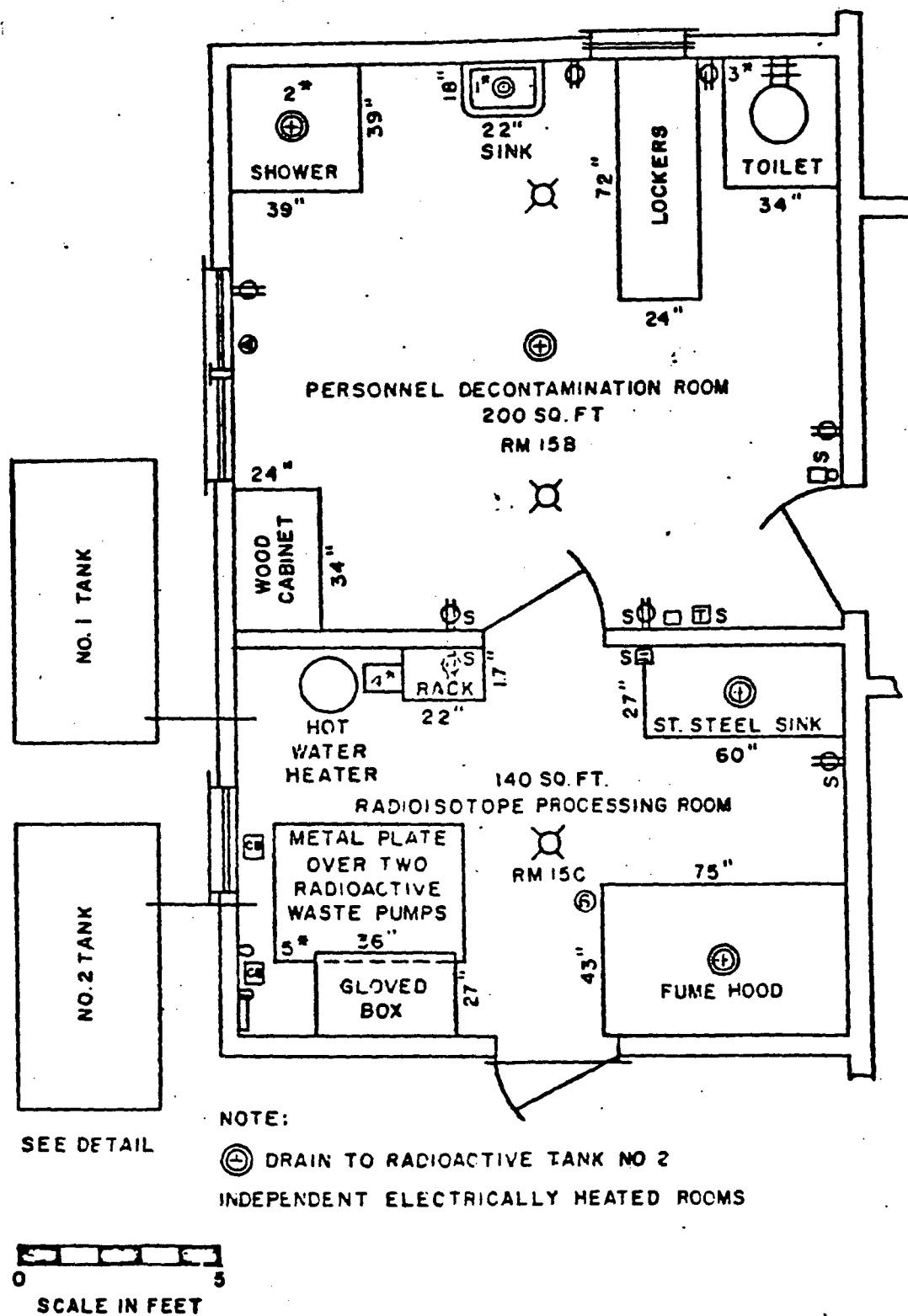


FIG. C-2 DECONTAMINATION AND PROCESSING ROOMS, BLDG S-15, EVANS AREA

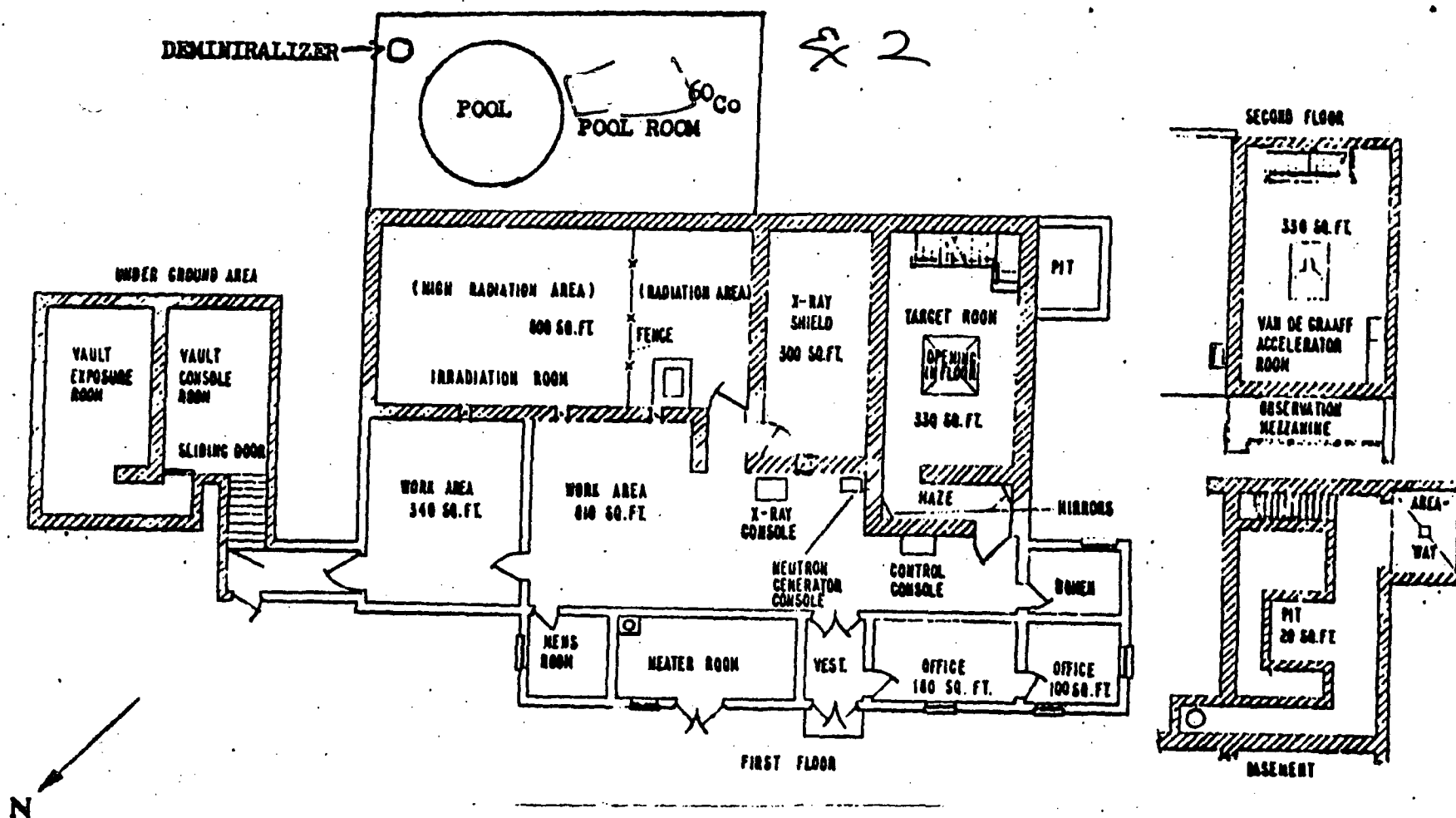


Fig. C-3. BLDG 401, EVANS AREA

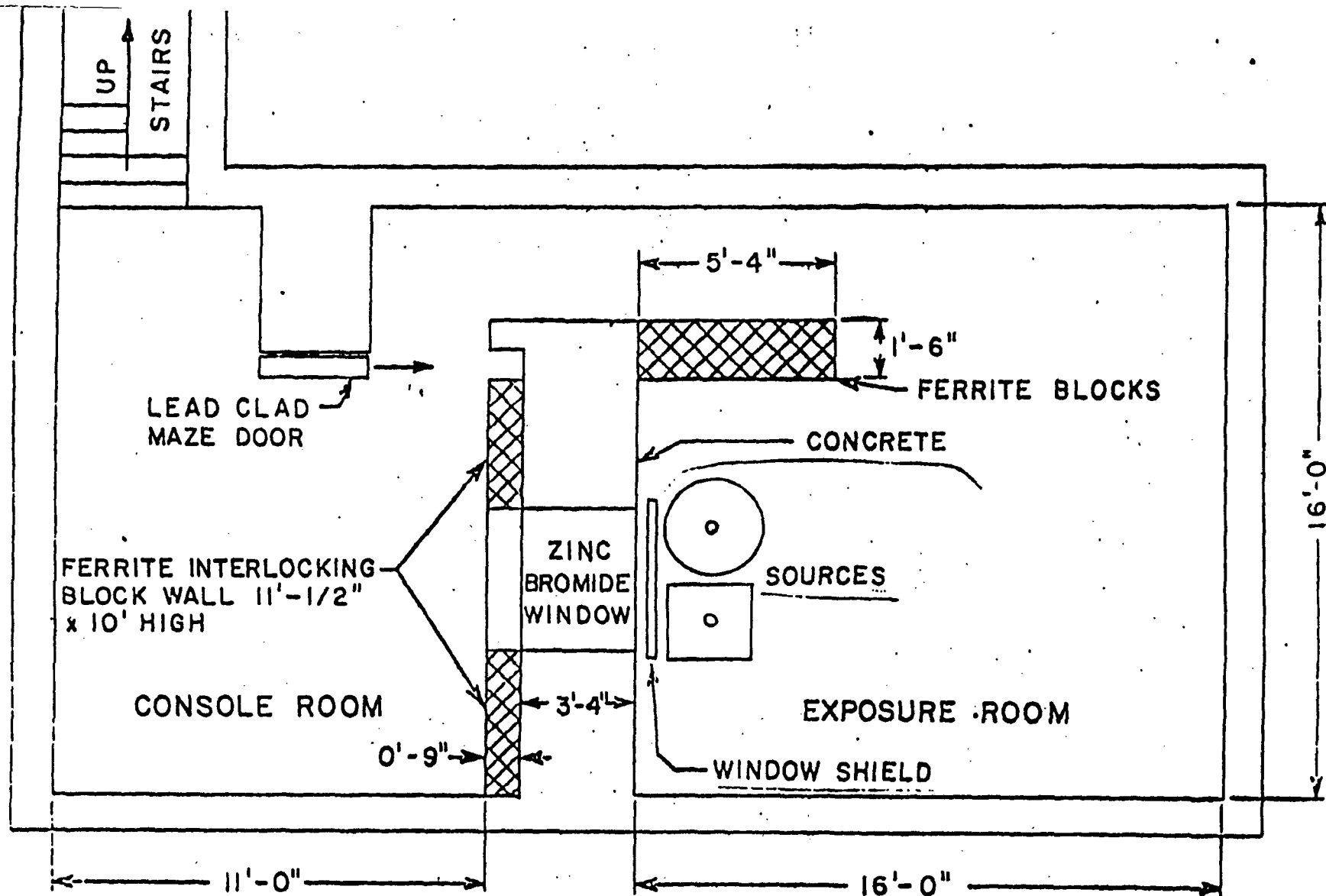


FIG. C-4. PLAN VIEW UNDERGROUND VAULT

SCALE $\frac{1}{4}" = 1' - 0"$

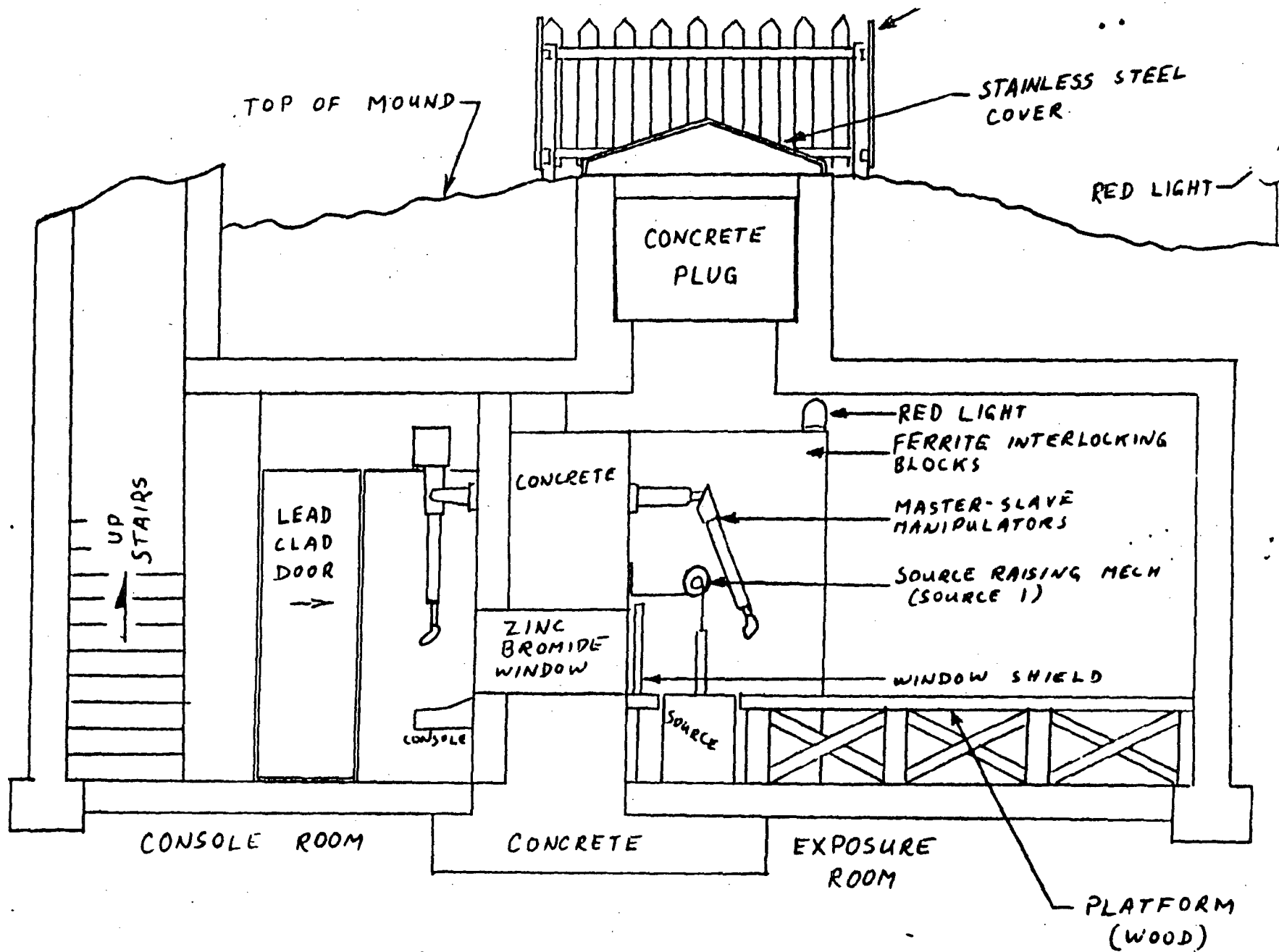
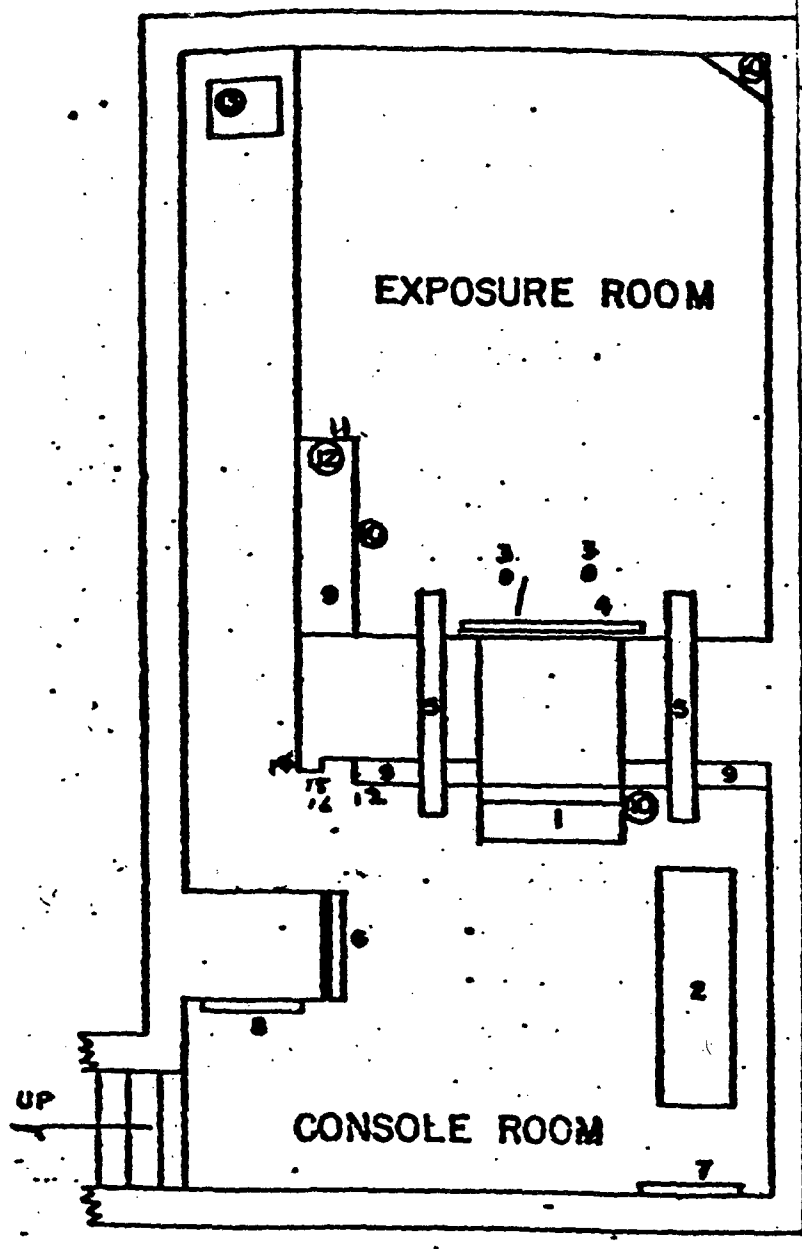


FIG. C-5 ELEVATION VIEW UNDERGROUND VAULT



1. CONTROL PANEL
2. MONITOR CONSOLE
3. SOURCE POSITION
4. WINDOW SHIELD
5. SLAVE MANIPULATORS
6. MAZE DOOR (lead lined)
7. PNEUMATIC CONTROL SYSTEM
8. ELECTRICAL PANEL
9. FERRITE INTERLOCKING BLOCK
10. RADIATION ALARM SYSTEM
11. MANUAL EMERGENCY SWITCH
12. WARNING LIGHT
13. SUMP PUMP
14. WOODEN BARRIER WITH SWITCH
15. MAZE DOOR SWITCH
16. MAZE DOOR ELECTRIC LOCK WITH SWITCH

FIG. C-6 UNDERGROUND VAULT INSTRUMENTATION

SCALE $\frac{3}{16}$ " = 1'

1. AISI 1/4" TYPE 316 STAINLESS STEEL (ANNEALED, PICKLED & OILED)
2. STAINLESS STEEL ARC WELDING (ALL WELDING)
3. PLUG WELL 3" I.D. X 12 1/2" DEEP
4. STAINLESS STEEL LUGS FOR PLUG PLATE
5. 1" DIA. STAINLESS STEEL RODS
6. LIFTING HOLES
7. THREADED PLATE
8. BASE MOUNTING
9. PLUG PLATE

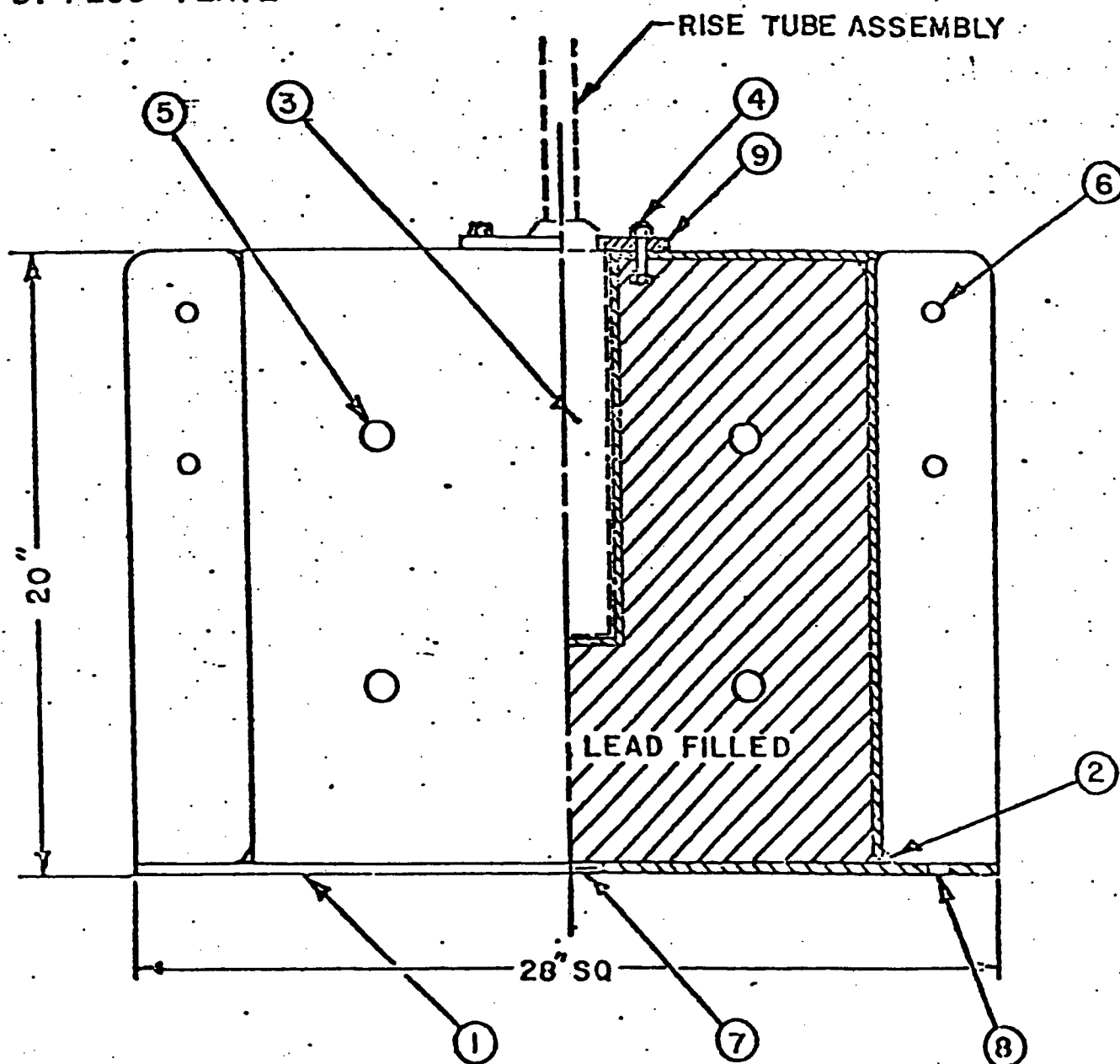


FIG. C-7. PRIMARY SOURCE STORAGE SHIELD
SOURCE 1

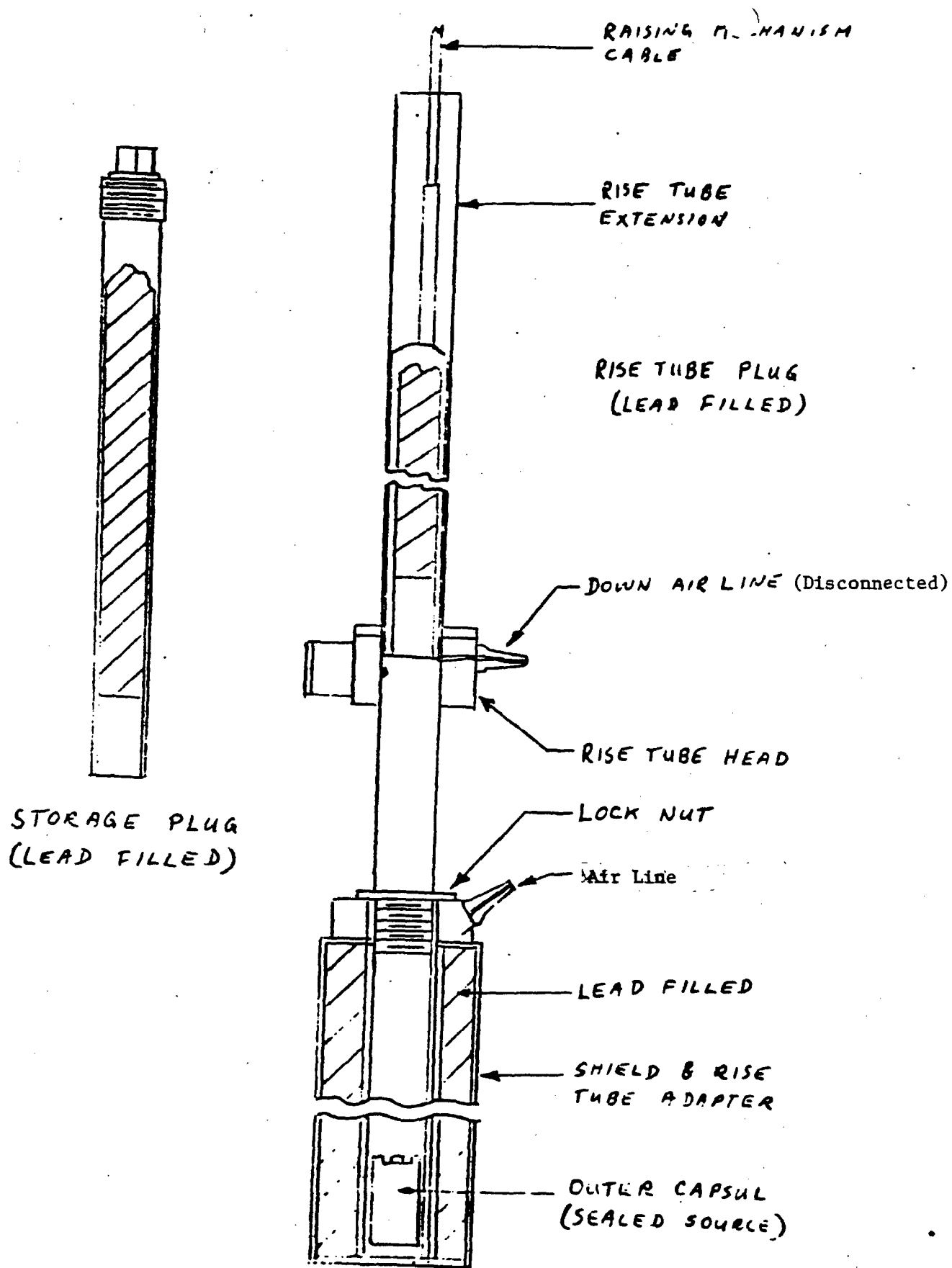


FIG. C-8a CAPSULE & RISE TUBE ASSEMBLY
SOURCE 1

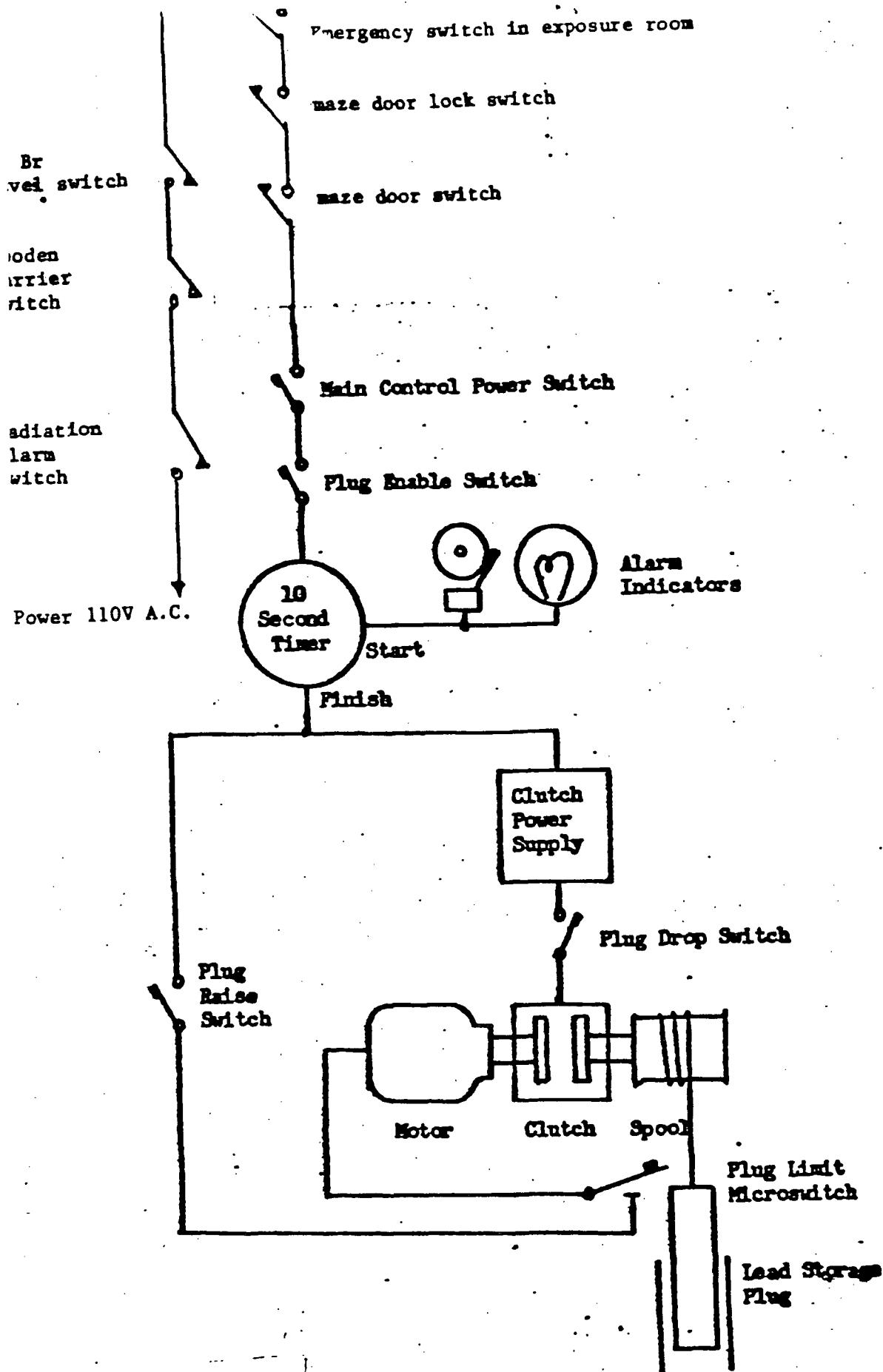
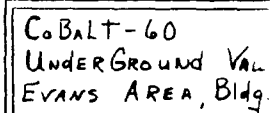


Figure C-8b

SCHEMATIC OF STORAGE PLUG CONTROL MECHANISM
(SOURCE 1)



By L. Lockhart 3-27-

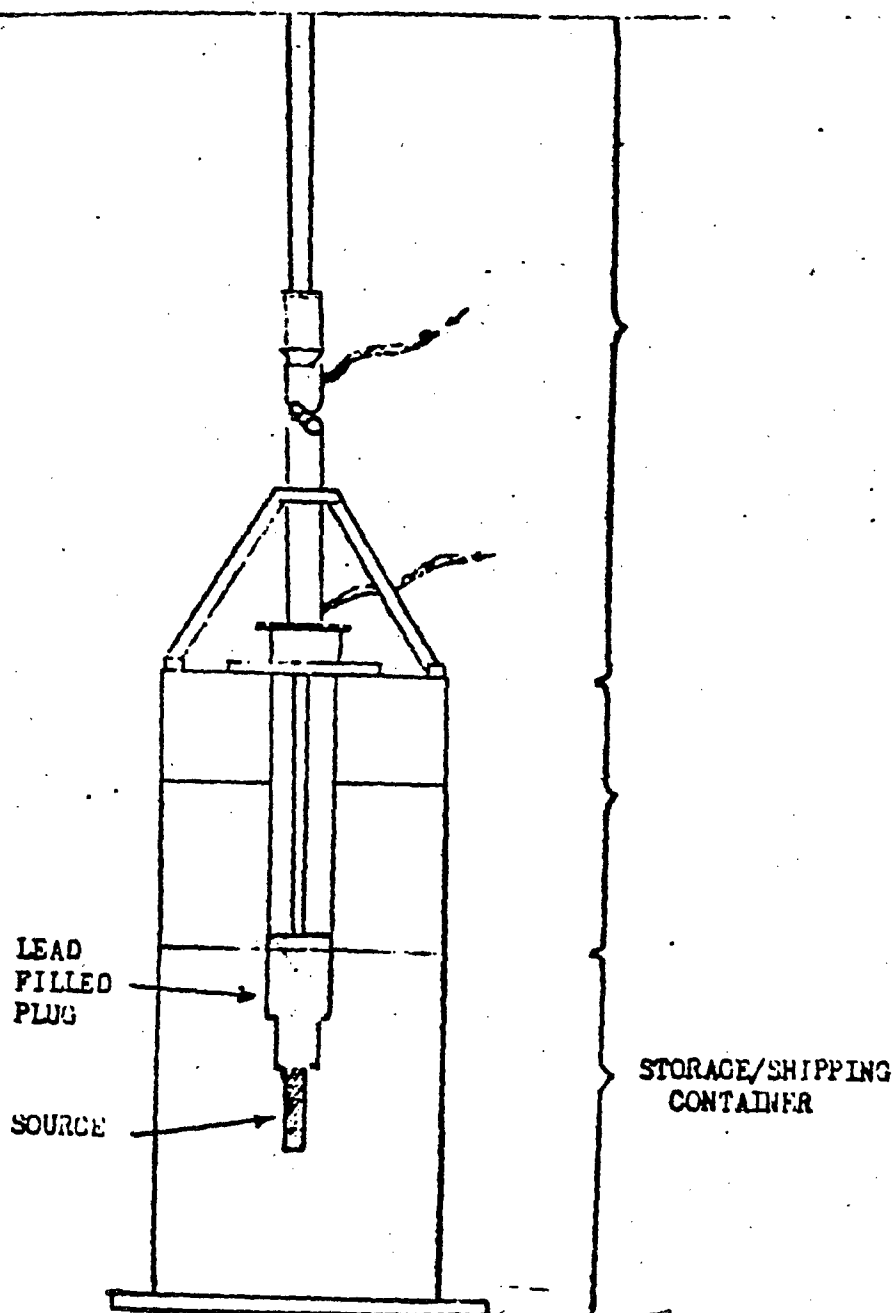


Figure C-10 Source in down (storage) position.

(This source is disconnected and cannot be operated)

Ex 2

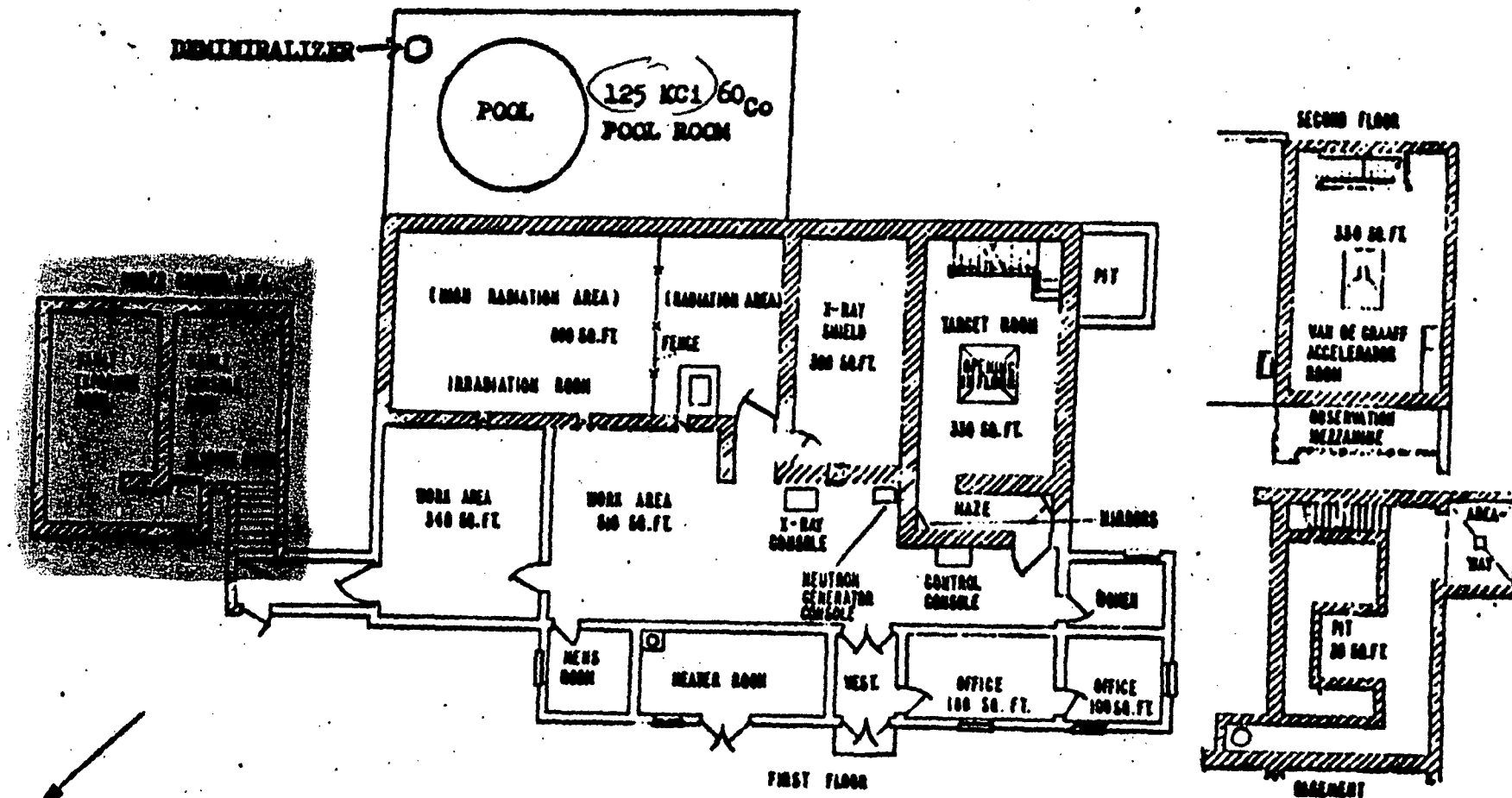


Fig. 1 BLDG 401, EVANS AREA

Measurements of Exposure Levels
of
Underground Vault Facility

Measurements are as follows:

Figures 2, 4, and 5

<u>Reading</u>	<u>Ion Chamber Victoreen 440</u>	<u>Geiger Tube AN/PDR-27J</u>
# 1 -----	0.05 mR/hr -----	0.04 mR/hr
# 2 -----	0.20 mR/hr -----	0.15 mR/hr
# 3 -----	0.05 mR/hr -----	0.04 mR/hr
BKG -----	0.02 mR/hr -----	0.01 mR/hr

Figure 3

# 1 -----	0.05 mR/hr -----	0.02 mR/hr
# 2 -----	0.05 mR/hr -----	0.02 mR/hr
# 3 -----	0.04 mR/hr -----	0.02 mR/hr
# 4 -----	0.05 mR/hr -----	0.01 mR/hr
# 5 -----	0.05 mR/hr -----	0.02 mR/hr
BKG -----	0.05 mR/hr -----	BKG

All measurements were obtained with source in "up" position. Theoretical calculations of in-air exposure, inside exposure room, are included and given on page 7 of this enclosure (encl 2).

2/10/52

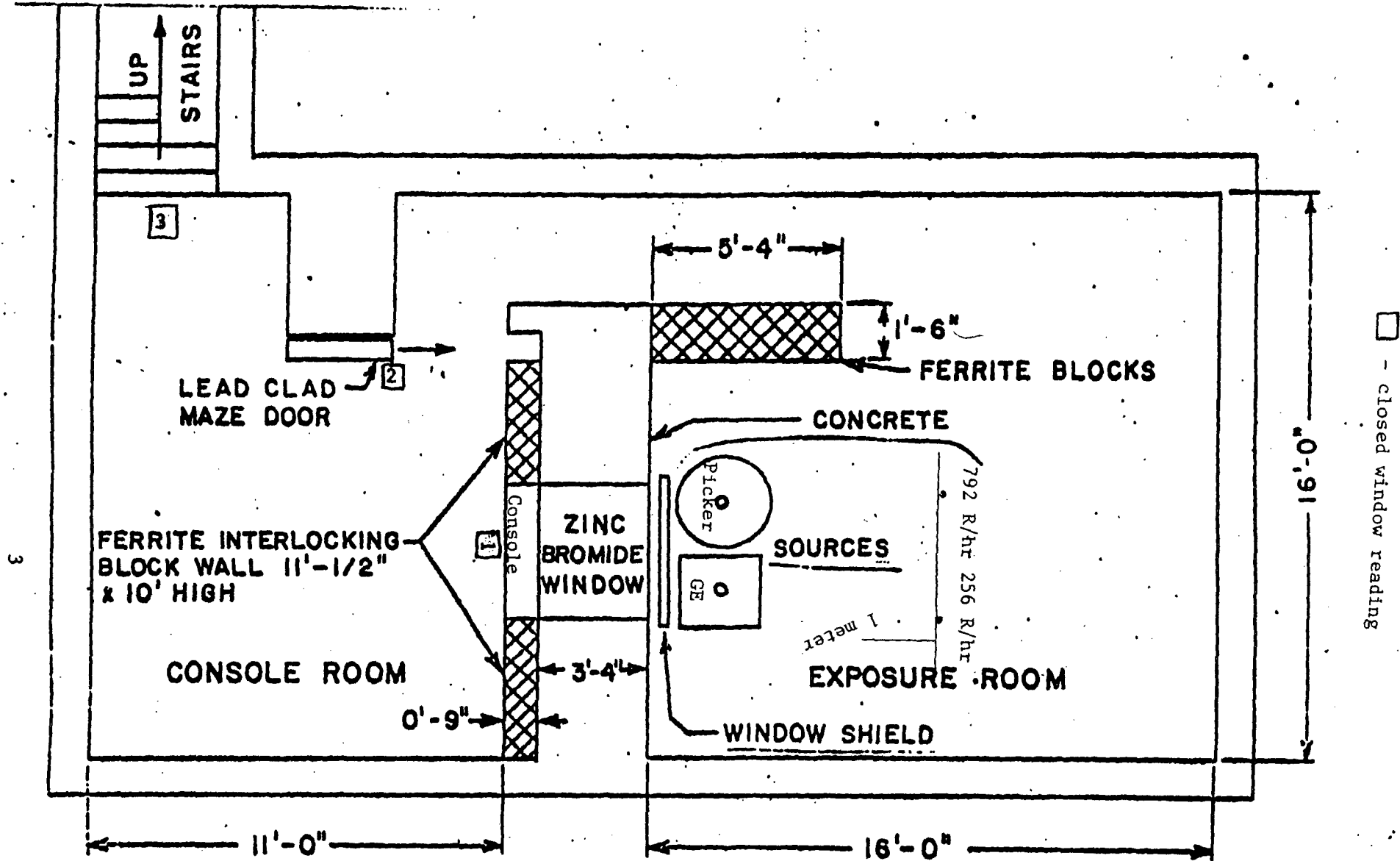


FIG. 2 PLAN VIEW UNDERGROUND VAULT

SCALE 1/4" = 1' - 0"

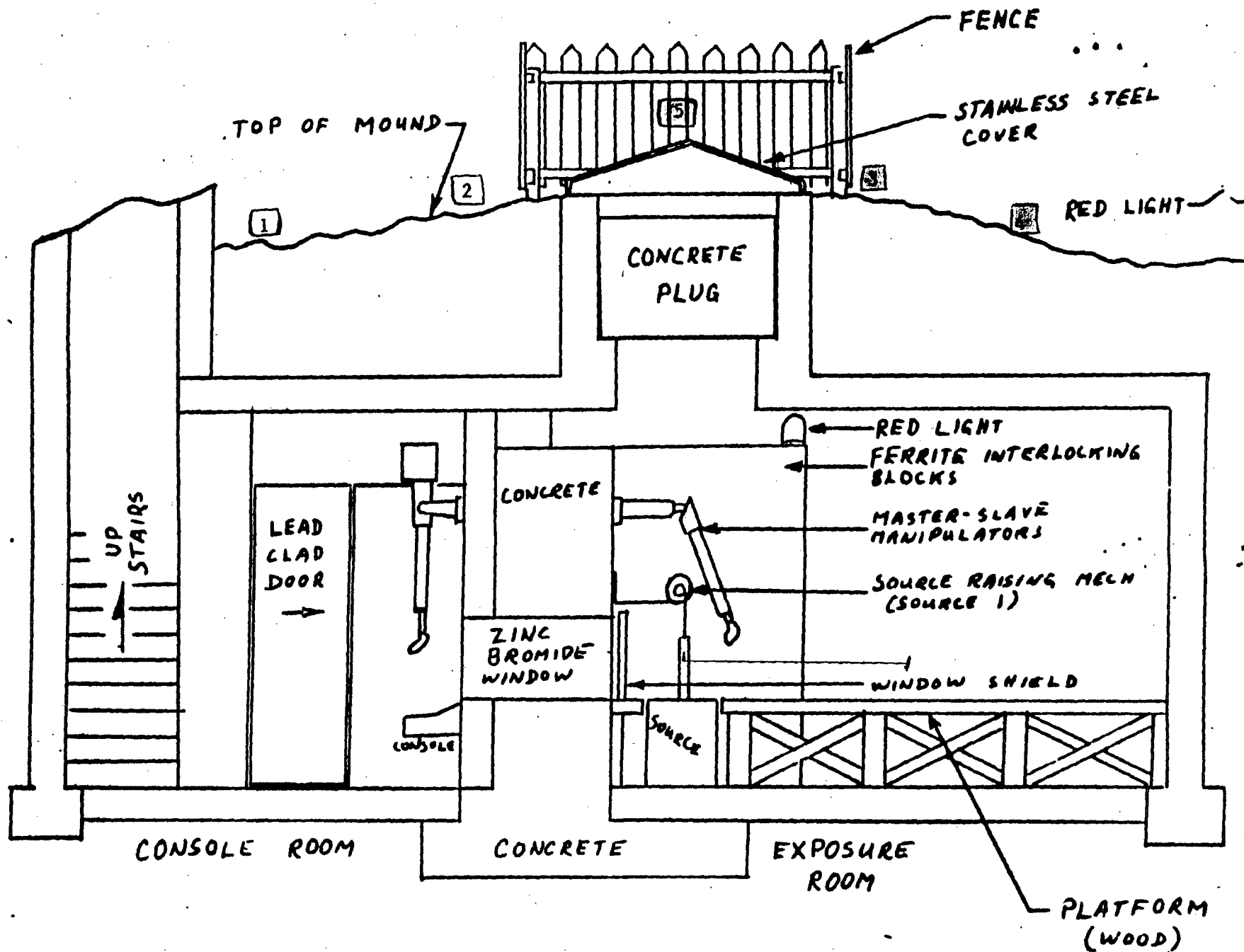
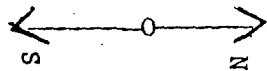
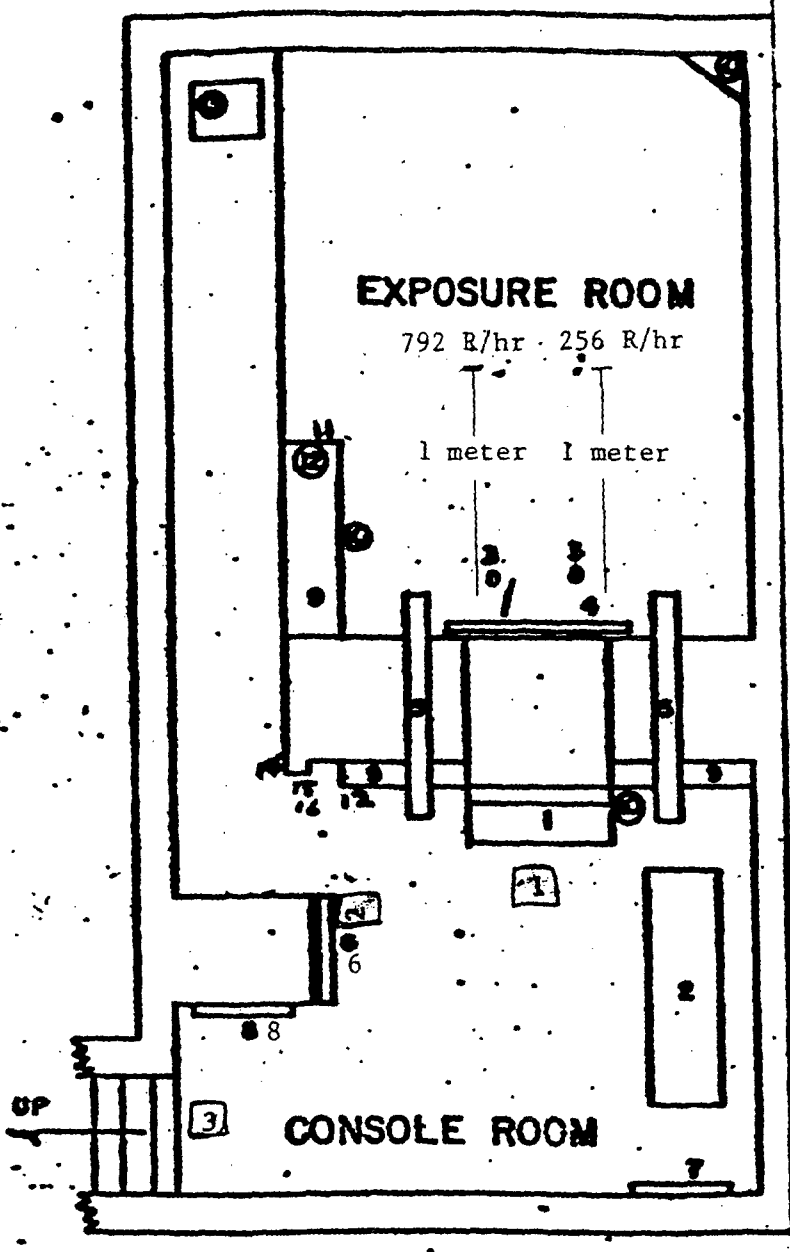


FIG. 3 ELEVATION VIEW UNDERGROUND VAULT





1. CONTROL PANEL
2. MONITOR CONSOLE
3. SOURCE POSITION
4. WINDOW SHIELD
5. SLAVE MANIPULATORS
6. MAZE DOOR (lead lined)
7. PNEUMATIC CONTROL SYSTEM
8. ELECTRICAL PANEL
9. FERRITE INTERLOCKING BLOCK
10. RADIATION ALARM SYSTEM
11. MANUAL EMERGENCY SWITCH
12. WARNING LIGHT
13. SUMP PUMP
14. WOODEN BARRIER WITH SWITCH
15. MAZE DOOR SWITCH
16. MAZE DOOR ELECTRIC LOCK WITH SWITCH

FIG. 4 UNDERGROUND VAULT INSTRUMENTATION

SCALE $\frac{3}{16}$ " = 1'

Theoretical Calculations of
Underground Vault Sources

1. G.E. Vallicitos - []

[] of Co60 Assayed on 1 July 63
Decay corrected to 1 July 85
 $T_{1/2}$ of 5.27 years (R.H.H.)*
Gamma Ray Constant $\Gamma = 1.32 \frac{\text{R-hr}}{\text{m-Ci}}$ (R.H.H.)

Present Activity [193.9 Ci]
Exposure Rate at 1 meter 256 R-hr

2. Picker Corp. - []

[] of Co60 Assayed on 29 June 62
Decay corrected to 1 July 85
 $T_{1/2}$ of 5.27 years (R.H.H.)
Gamma Ray Constant $\Gamma = 1.32 \frac{\text{R-hr}}{\text{m-Ci}}$ (R.H.H.)

Present Activity []
Exposure Rate at 1 meter 792 R-hr

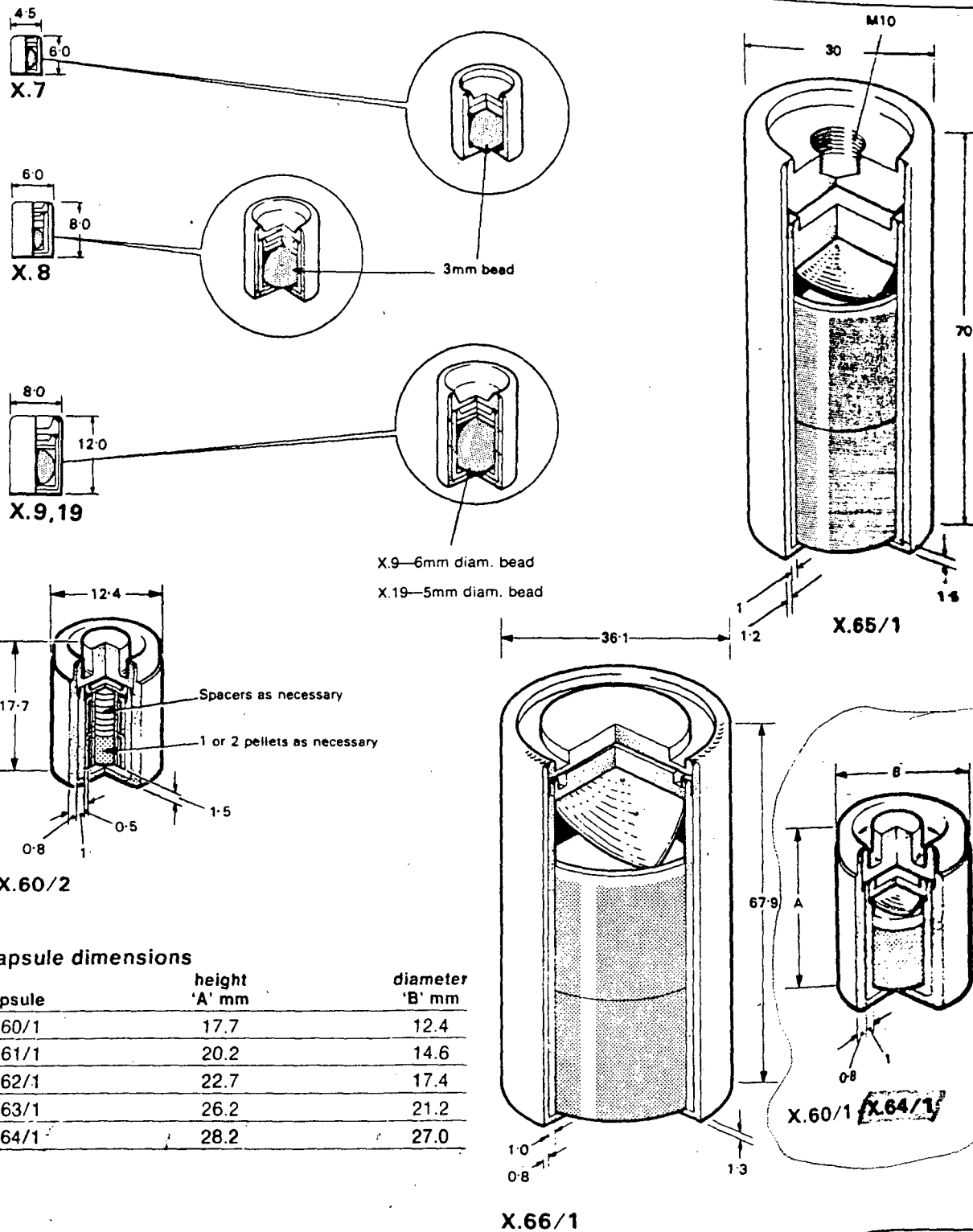
3. Expected New Source - Amersham Corp.

[] Assayed, assumed on 1 Jan 85
 $T_{1/2}$ of 33 year (R.H.H.)
Gamma Ray Constant $\Gamma = .33 \frac{\text{R-hr}}{\text{lm-Ci}}$

Exposure Rate at 1 meter 148.5 R-hr

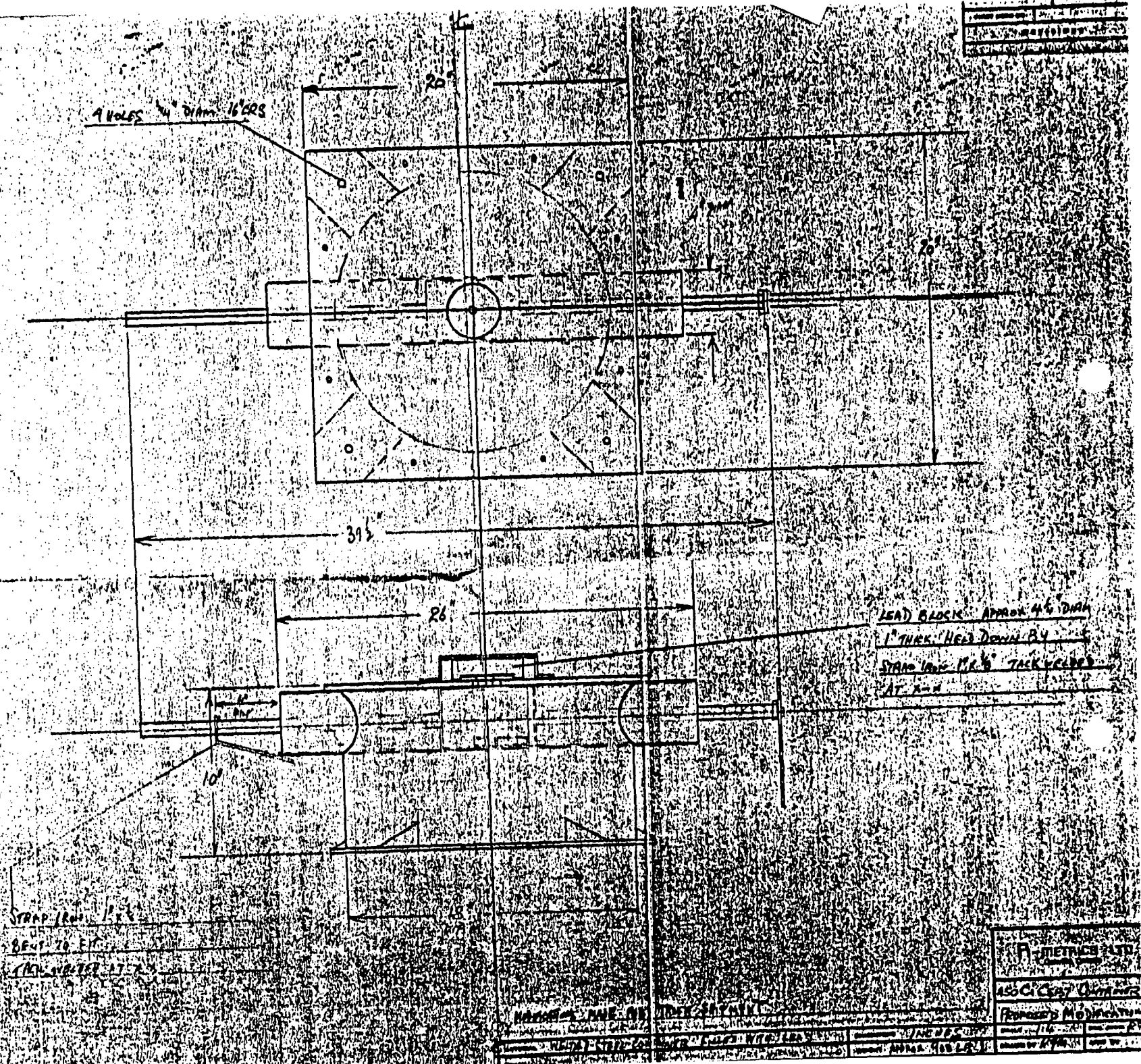
*R.H.H. - Radiological Health Handbook

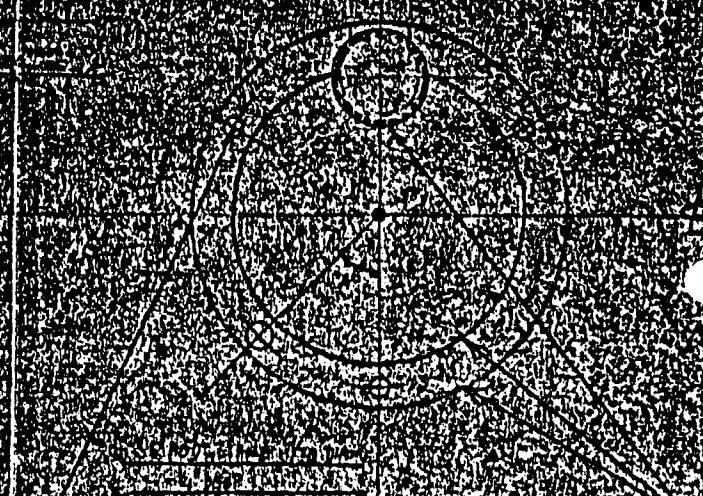
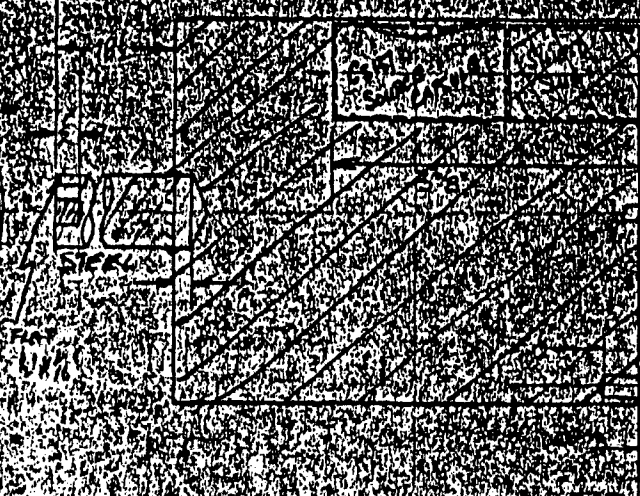
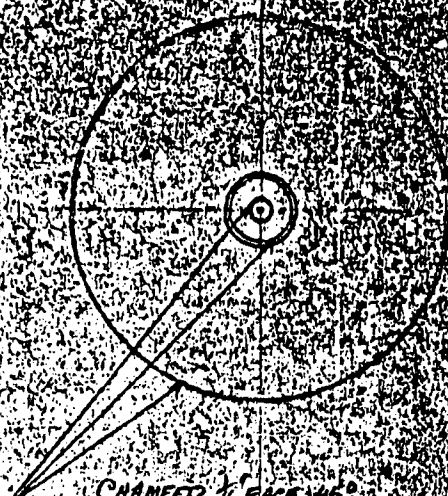
Cesium-137 source capsules



Dimensions in mm

Encl 1





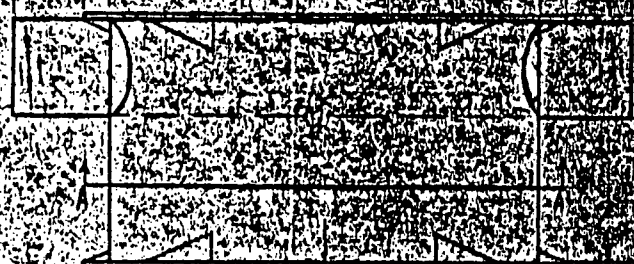
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CS 1/2\"/>

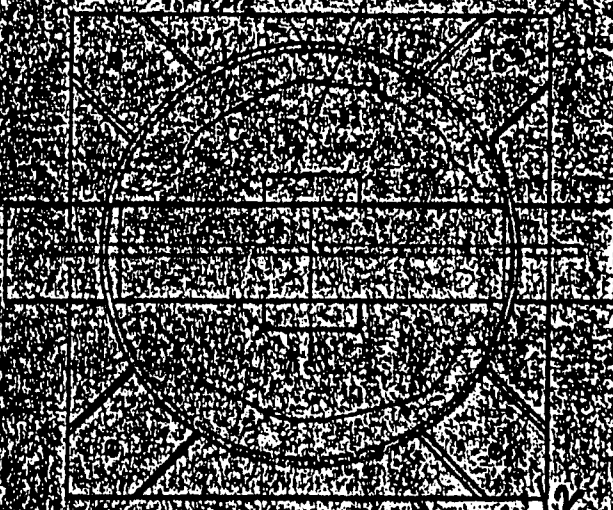


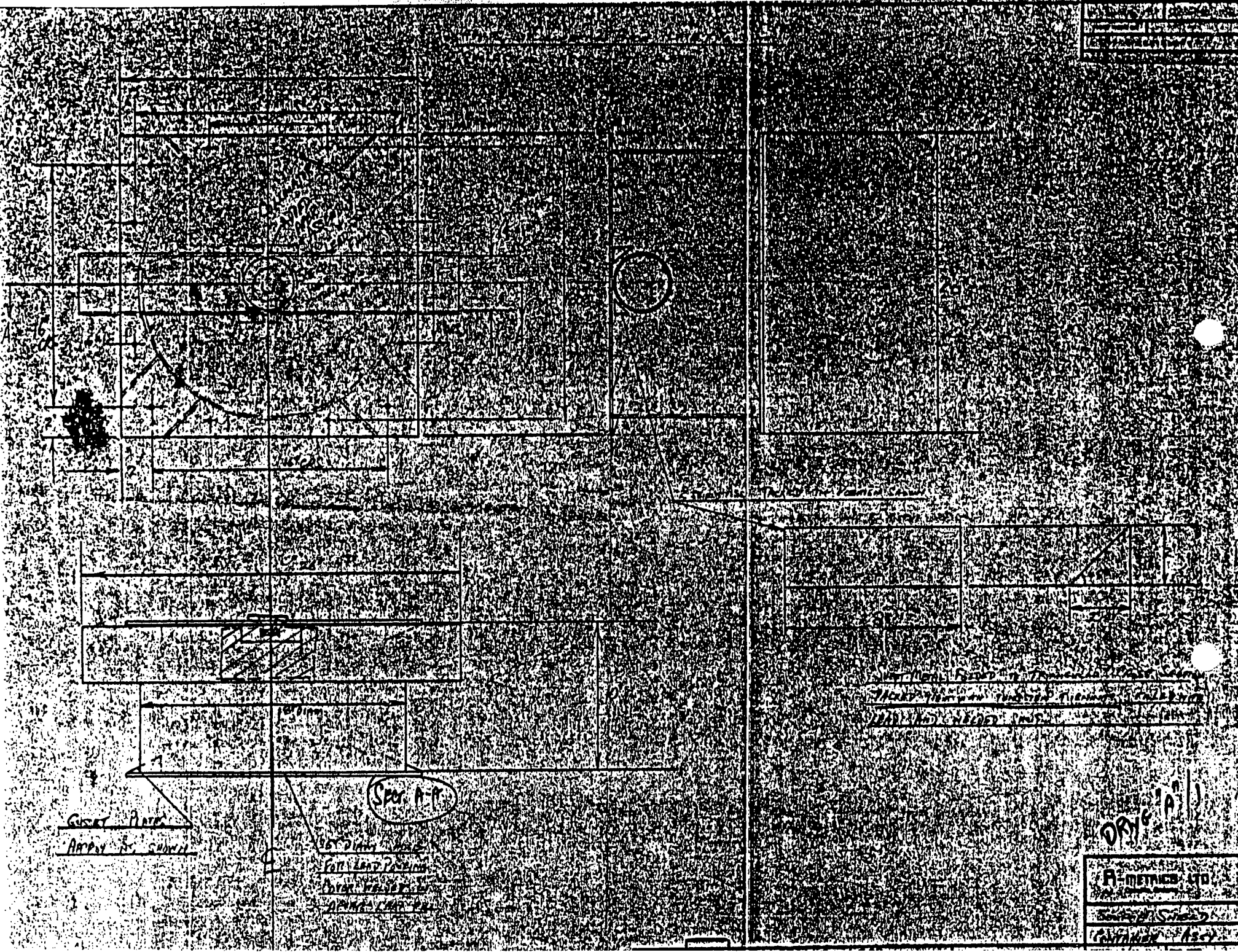
DWG: C/1

A-METALCO LTD
Some Drawing
Retain Book



5/17/68
FIVE FOR ALL
LOAD PENDING
COVER WAIVED
IN APRIL
LOAD FALL





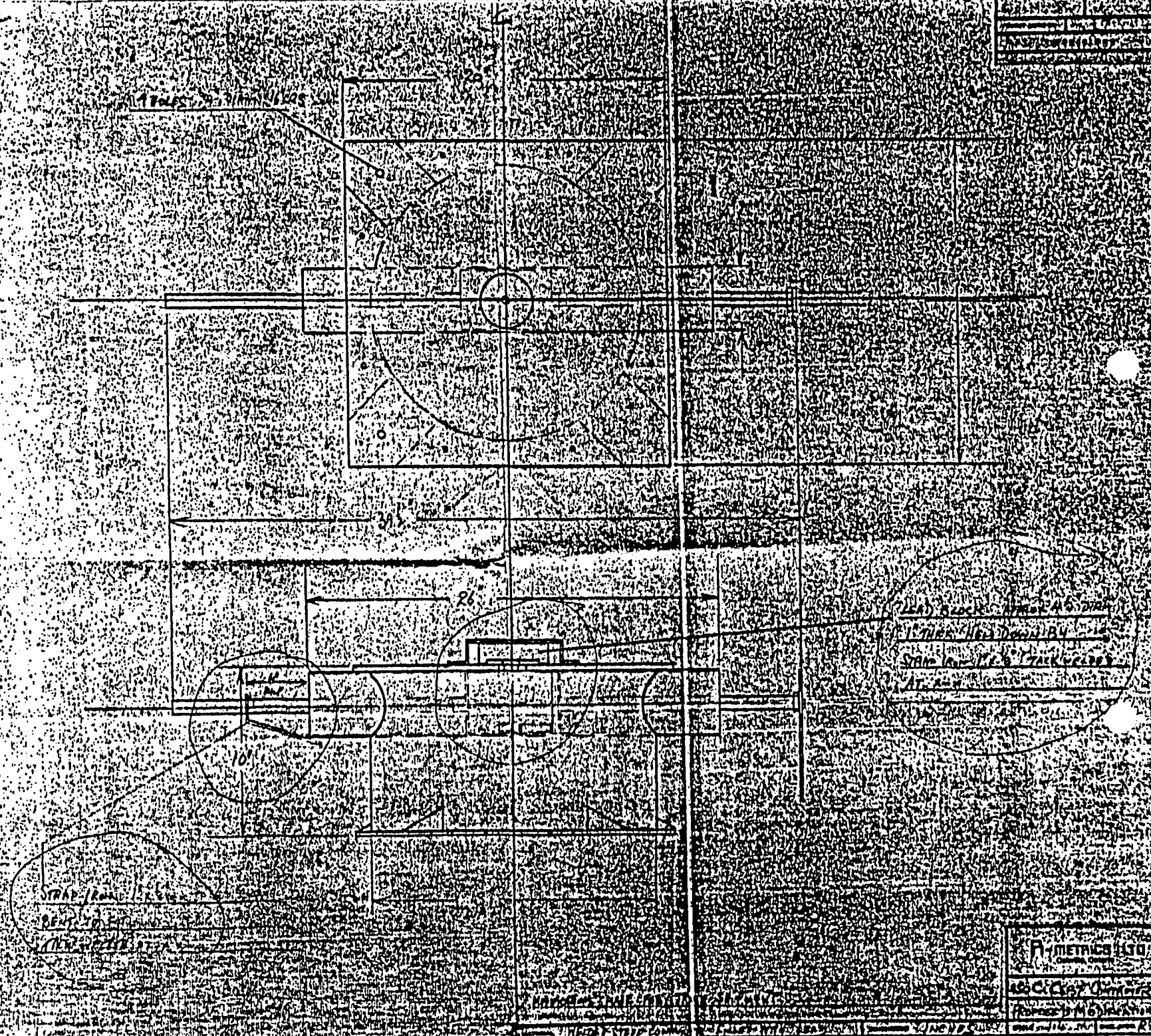
Gusset Plate
Apply to Surface

Spec A-1

15' Dia. Hole
Full Area Painting
Outer Edge
2" Thick

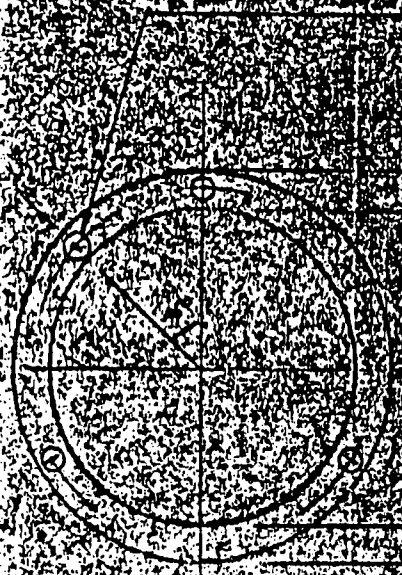
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10-10-10



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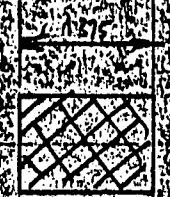
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STANDARD ALUMINUM EQUALIZER STANDARD 112

F. DILL

CHAMFER 1/16" R



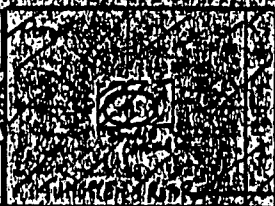
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CHAMFER 1/16" R

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A-METRICS LTD	
SOUTH AFRICA	
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FULL	

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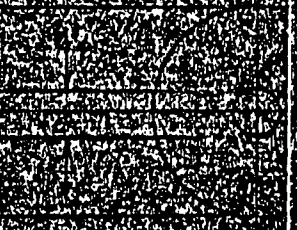
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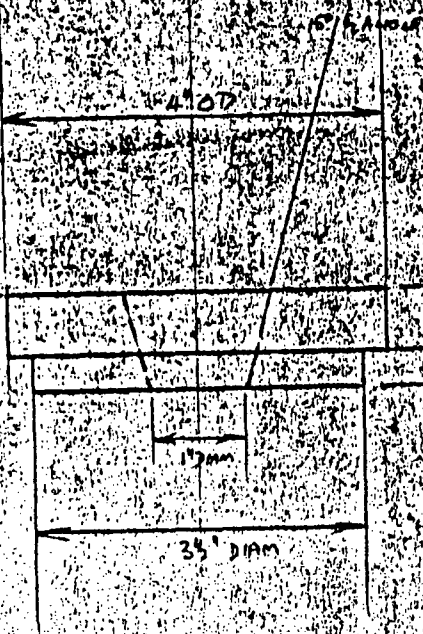
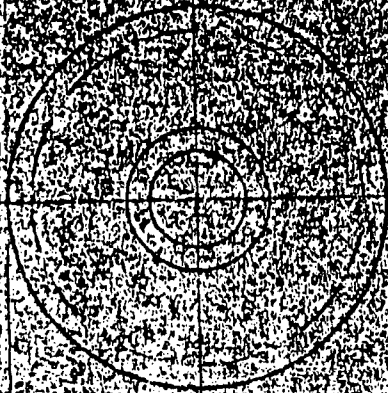
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DRNG'E

A-METRICS LTD	
Source Shield	
TAP-SCREEN	
MAILED 1000 (RNGRTN)	INCHES