



DEPARTMENT OF THE ARMY

HEADQUARTERS, US ARMY COMMUNICATIONS-ELECTRONICS COMMAND  
AND FORT MONMOUTH  
FORT MONMOUTH, NEW JERSEY

REPLY TO  
ATTENTION OF

AMSEL-SF-RIR (385-11m)

25 September 1987

AMC87-0146

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

FOR: U.S. Nuclear Regulatory Commission, Region I, 631 Park  
Avenue, King of Prussia, PA 19406

18 Nov 86

SUBJECT: Request for Amendment to U.S. Nuclear Regulatory  
Commission (NRC) License Number 29-01022-07

1. Request subject license issued to the U.S. Army  
Communications-Electronics Command, Fort Monmouth, NJ, be amended  
to allow for the utilization of the Cesium-137 (Cs-137) source  
currently authorized for storage only.

2. In support of this amendment request, the following  
information is provided:

a. At enclosure 1 is a facility drawing indicating the  
location of the Cs-137 source.

b. At enclosure 2 is the Standard Operating Procedure for  
utilization of the irradiator facility.

c. At enclosure 3 is a schematic diagram of the facility  
electrical system indicating interlock devices to prevent  
accidental exposure of personnel.

d. The following radiation levels were determined by  
measurement or theoretical calculation:

- (1) Cs-137 source shielded at opening: 200 mR/hr.
- (2) Cs-137 source shielded at one meter: 1.4 mR/hr.
- (3) Cs-137 source open at one meter: 450 R/hr.
- (4) Cs-137 and Co-60 sources open at point A of  
enclosure 1: 1400 R/hr.
- (5) Cs-137 and Co-60 sources open at point B of  
enclosure 1: 0.2 mR/hr.
- (6) Cs-137 and Co-60 sources open at point C of  
enclosure 1: 0.05 mR/hr.

FEE EXEMPT

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REG1 LIC30  
29-01022-07

PDR

"OFFICIAL RECORD COPY" ML10

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RECEIVED-REGION I

AMSEL-SF-RIR

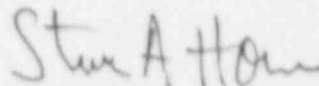
SUBJECT: Request for Amendment to U.S. Nuclear Regulatory  
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3. Point of contact, this command, is Mr. Joseph Furia, AV 995-  
4427 or commercial (201) 544-4427.

4. MSE Fielding (19 Feb 88): Today is F-147.

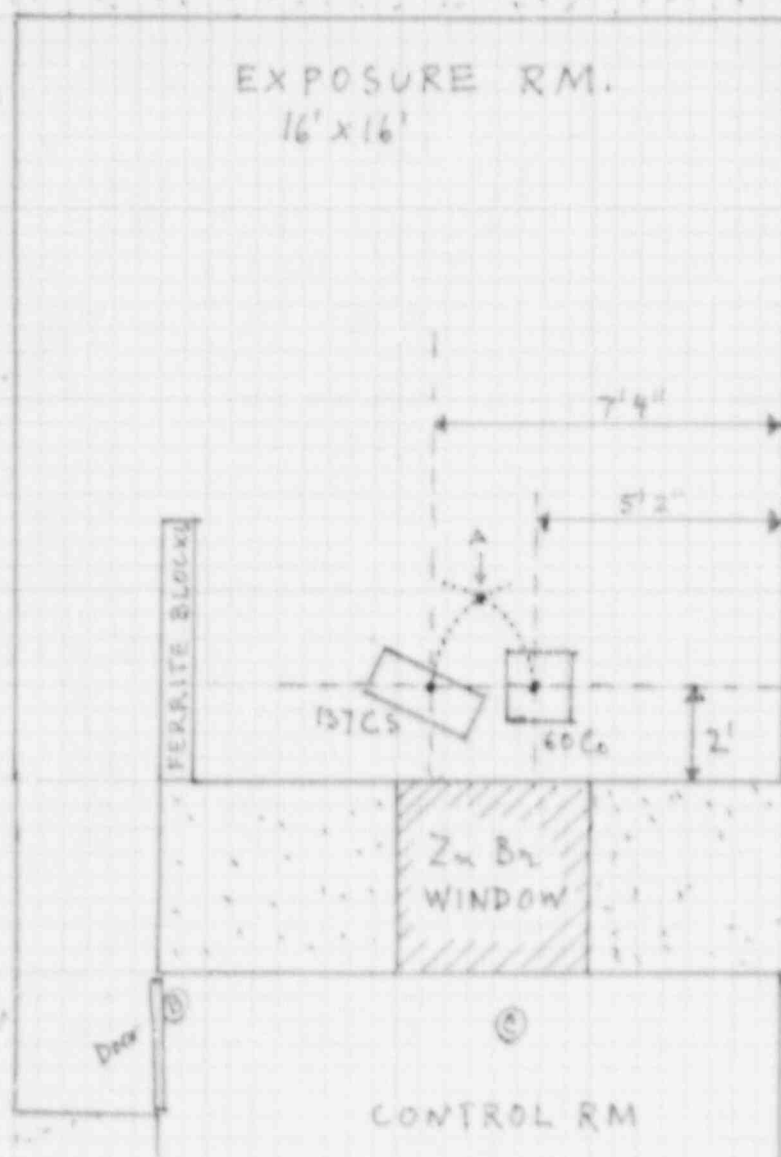
FOR THE COMMANDER:

3 Encl (8 cys)



STEVEN A. HORNE  
Chief, Safety Office

# EXPOSURE ROOM, $^{137}\text{Cs}$ AND $^{60}\text{Co}$ SOURCES



End 1

STANDARD OPERATING PROCEDURES FOR THE UNDERGROUND VAULT  
COBALT-60 IRRADIATION FACILITY

LOCATION: Building 401, Evans Area of Fort Monmouth, N.J.

ORGANIZATION: Sensor Systems Division, USACECOM, Fort Monmouth, N.J.

1. Reference:

- a. NRC License No. 29-01022-07
- b. AR 40-14 "Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials", dated 15 Mar 81.
- c. CECOM R-385-18 "Safety, Ionizing Radiation Protection Program", dated 19 Mar 87.
- d. DF, subject: "Radiation Protection, Combined Directive", dated 15 Dec 83, from: Commander, TSA, Commander, CSTAL, Director, ETDL, and Director, EWL.

NOTE: Copies of the above references are available in the Control Room, in the office of the Supervisor of Radiation Facilities (Bldg. 401, X45443 or 45683) and/or the Radiological Safety Office (Room 25, Bldg. 45, X45725).

2. Description of Facility: See Supplement C of Reference 1a.

3. Purpose: The purpose of these procedures is to:

- a. Provide guidance to individuals who may have occasion to enter the area.
- b. Serve as a check list or reminder to operator of approved operations.
- c. Serve as a training aid for individuals studying to become approved operators of the facility.
- d. Minimize the exposure of personnel to radiation and radioactive materials.
- e. Minimize the release of radioactive material if the sealed source should rupture.

4. Applicability: These procedures apply to:

- a. Visitors
- b. Custodial Personnel

- c. Maintenance Personnel
- d. Individuals who position material to be irradiated
- e. Facility Operators
- f. Operator Trainees
- g. Emergency Personnel (Firemen, Guards, Rescue Squad, etc...)
- h. Inspectors
- i. Any other individual who may have occasion to enter the areas involved.

5. Responsibility:

- a. The Supervisor of the Radiation Facilities or his designated representative is responsible for enforcement of these procedures.
- b. The Supervisor of Radiation Facilities or his designated representative have the responsibility of ensuring that individuals do not enter the exposure room without an approved operator being present to directly supervise the entrance.
- c. Approved operators and individuals authorized to directly supervise the work of individuals undergoing operator training, shall ensure that the items listed in these Operating Procedures are carried out and that every individual entering the area involved are apprised of the potential hazards.
- d. Individuals entering the areas involved have the responsibility of following the instructions given by the approved operator in charge at the time they are in the areas.

6. Personnel Limits:

a. Control Room

(1) Up to ten (10) individuals may be in the Control Room when the sources are in their "storage" position.

(2) Up to six (6) individuals may be in the Control Room when any of the sources are in the "up" (exposure) position. An approved operator must be present when anyone is in the Control Room and any source is in its "up" (exposure) position.

7. Radioactive Material Limits: The amount of Cobalt-60 in the Exposure Room at any one time shall not exceed 3,500 Ci. The amount of Cs-137 shall not exceed 500 Ci.

8. Radiation Limits:

a. Control Room. The shielding material between the Exposure Room and the Control Room shall be maintained in such a manner that the exposure rate in the Control Room does not exceed 1.0 mR/hour at locations near the Exposure Room door and the surfaces of other shielding between the two rooms. The average exposure rate in the room shall not exceed 2 mR/hour.

b. Exposure Room.

(1) When the sources are in the off position, the exposure rate 30 inches in line from the source opening shall not exceed 250 mR/hour.

(2) For closed sources, the exposure rate, 30 inches along the center line defined by the opening in the source and 40 inches perpendicular to that line, shall not exceed 1 mR/hour.

9. Exposure Limits: The exposure of personnel shall be limited to values given in AR 40-14 (see Para 1.b).

10. Dosimetry Requirements:

a. Radiation workers shall wear their film badges while in the Underground Vault area.

b. Each individual who performs work in the Exposure Room shall wear a film badge and a pocket dosimeter (0.200 R) while in the room. At least one of each two individuals working in the room shall wear a "chirpee" type monitor or use a dose-rate meter which produces an audible signal for individual counts. The two individuals shall stay together if only one of them is wearing a "chirpee" or carrying the dose-rate meter.

c. At least one out of each group of four or less of visitors in the Exposure Room at one time shall wear a personnel dosimeter. The members of such a group shall stay close to each other so that any exposure indicated by the dosimeter will be representative to each member of the group.

d. The Supervisor of Radiation Facilities, the Radiation Protection Officer, or one of their designated representatives, or the approved operator in charge of the facility at the time, may require the use of additional personnel dosimeters and/or radiation detectors.

11. General Safety Precautions:

a. Individuals wishing to visit the Underground Vault Area, to have material irradiated, or to enter the area for some other reason (other than for emergency reasons) should schedule the visit so that advance preparation can be made. Contact the Supervisor of Radiation Facilities, X45443 or X45683 to make reservations.

b. Individuals shall sign in and be issued personnel dosimeters, radiation detection and measuring devices before entering the restricted portion of Bldg. 401.

c. All individuals going to the Underground Vault shall be accompanied by an approved operator or his designated representative.

d. Only an approved operator may obtain the two keys for the switch locks that operate the Plug control device and the solenoid air valves that control the positioning of the sources by compressed air or by the mechanical system.

e. The door to the Underground Vault area shall be locked during unattended exposures. If overnight or weekend exposures are required, notify the Fire Department on X45432 also the Security Guard on X45670.

#### 12. Source Storage:

a. The sources will be kept in their off or storage position if:

- (1) The source is not in use
- (2) Individuals are in the Exposure Room
- (3) A leak test of the source indicates the source is leaking
- (4) Radioactive contamination is found in the Exposure Room

b. The steps to follow in order to put the sources in their "storage" positions are listed in Item 14g below.

#### 13. Emergencies:

a. Source Leakage. If the meter that indicates exposure rate at the source exhaust air vent or the meter in the Control Room read above 3 mR/hour or if there are other indications of possible source leakage:

- (1) Cut off the air supply valve to the source controls
- (2) Shut off the Control Room exhaust fan. The switch for this fan is located on the wall beside the electrical panel.
- (3) Leave the Underground Vault Area. Close the door at the top of the stairs as you leave. Remove your shoes as you leave the area (they may be contaminated).
- (4) Proceed to the large Work Area of the building. If anyone is in the Work Area, ask them to contact the Supervisor of Radiation Facilities or the Radiological Safety Office (X45725), and ask for assistance. If no one is in the area, try to contact the Radiological Safety Office yourself. Two phones are in the large Work Area.

(5) Proceed to the nearest restroom, wash exposed portions of the body and remove outer garments. Remain in or near the rest room until you have been checked for contamination.

b. Electrical Power Failure. In the event of any interruption of the electrical circuit, the source capsule automatically returns to the lead storage container by being pushed down by the lead plug. No further action by the operator is required.

c. Individuals inadvertently remaining in the Exposure Room. Upon hearing the warning alarm, any individual remaining in the Exposure Room will immediately:

(1) Set the emergency stop switch, located near the maze wall, to the "down" position.

(2) Proceed to the lead clad door and announce your presence.

(3) Exit when control room operator opens lead clad door.

NOTE: No further action is required since plug cannot be raised when emergency stop switch is in the "down" position.

#### 14. Sequence of Operations:

##### a. Pre-Entry Requirements

(1) Obtain advanced approval of the Supervisor of Radiation Facilities or his designated representative.

(2) Register in office for film badge (if not permanently assigned) and personnel monitoring equipment (e.g. dosimeter, meter, "chirpee").

(3) Proceed to locked entrance of Vault Control Room.

b. Entry into Control Room. Upon entering the Control Room, operator will:

(1) Check readings of monitors in the Control Room

(a) If the Control Room Area monitor indicates that the exposure rate is over 1 mR/hour, notify the Supervisor of Radiation Facilities or the Radiation Safety Office (X45725).

(b) If the exhaust air monitor, the Control Room monitor, or both, read over 3 mR/hour, follow the instructions in paragraph 13a; Source Leakage, above.

(2) Activate equipment by turning on main electrical switch on wall panel.

(3) Open valve supplying air pressure to source controls.



(4) Open valve at bottom of filter to remove water from air line.

c. Interlock operability checks. Prior to placing any equipment in the Exposure Room:

(1) With the source plug in the "down" position, independently check the following interlock systems:

(a) Try to raise the plug, as described at paragraph 14, below, with the emergency switch in the Exposure Room "down". It should not work.

(b) Try to raise the plug with the barrier bar down. It should not work.

(c) Try to raise the plug with the lead clad door open. It should not work.

(d) Try to raise the plug with the emergency stop switch on control panel "down". It should not work.

(2) Raise the plug and source, as described below.

(3) With the source in the "up" position, independently check the following interlock systems:

(a) Unlock lead clad door. Sources should return to storage container.

(b) Place emergency stop switch on control panel in "down" position. Source should return to storage container.

(4) Annotate log to indicate interlock checks performed.

NOTE: If the facility is used two (2) or more items during the same day, only one interlock check is required. Further interlock checks may be performed at the discretion of the operator(s).

d. Entry into the Exposure Room

(1) Make sure all entrants have required dosimeters and radiation instruments in addition to their film badges.

(2) Ensure that both sources and plug are "down" by observing lights on control panels. Turn plug control key switch counter-clockwise and remove key.

(3) As a final check, observe the remote monitor marked "vault" and ensure that that source is "down" (background readings only).

(4) The operator will place both control switch keys in his pocket and keep them there.

(5) The first individual to enter the Exposure Room must take survey meter readings before and during entrance. (Check meter response, before entry, with source in lead pig at maze door entrance).

(6) Check survey meter at end of maze to ensure that the source is in its safe position.

(7) When setting up equipment for exposure, do not lean over source rise tubes.

(8) Make sure all equipment in Exposure Room is secure and in correct position.

(9) Remove all excess cables and wires from Exposure Room.

(10) Exit Exposure Room, making sure to bring survey meter out.

(11) The operator in charge will check the Exposure Room to ensure that everyone is out of the room before proceeding.

(12) Raise barrier bar and close lead clad door to maze.

e. Operating the 60-Co Source

(1) Raise control power panel switch (S2) to "on" position. Red power on lamp is lit.

(2) Insert key into source key switch (SW3) and place in central position.

(3) Insert key into plug control panel key switch and turn clockwise. A red "pwr-on" lamp and green "plug down" lamp will be lit and the lead clad door to maze will lock.

(4) Raise and hold warning switch on plug control panel. A ten (10) second alarm will sound in the Exposure Room.

(5) Within 45 seconds after alarm stops, raise and hold plug raise switch. This initiates a two (2) minute period during which the lead storage plug is being raised. During this period the yellow "plug-tran" lamp is lit. The red lights near the maze door in the Control Room, in the upper hallway, outside of the building, and on top of the earth mound, will turn on. They will remain on until the plug returns to its "down" position. The plug is raised when the red "plug-up" lamp is lit on the plug control panel.

(6) Turn key switch (SW3) on control panel clockwise to "up" position. Compressed air will push the source capsule up the rise tube in the exposure position. When red source "up" lamp, above key switch, is lit, return key to center position. This light, as well as the timer and its red light, are activated by an ion chamber detector located 75 cm from the source rise tube. A reading above the original background level on the 0.0-1000 R/hr remote monitor (labeled "Vault") on the console will also indicate the presence of radiation.

f. Lowering the source:

(1) Turn the source key switch (SW3) counter-clockwise. Source "down" lamp and plug "down" lamps (green) will be lit. Return key switch to central position.

g. Operating the Cs-137 Source

(1) Raise control power panel switch (2) to "on" position. Red power on lamp is lit.

(2) Insert key into source key switch (SW3) and place in central position.

(3) Insert key into plug control panel key switch and turn clockwise. A red "pwr-on" lamp and green "plug down" lamp will be lit and the lead clad door to maze will lock.

(4) Raise and hold warning switch on plug control panel. A ten (10) second alarm will sound in the Exposure Room.

(5) Turn the key switch marked 137 Cs source clockwise to the "on" position. The red Cs source lamp will light up and the ion chamber detector as well as the 0.0-1000 r/Hr remote monitor (labeled "Vault") on the console will indicate the presence of radiation.

(6) To stop the exposure turn the key sw. to off, then the source will close in about six (6) seconds, as a 14 pound weight pulls the gears and source shaft to the closed position.

NOTE: Any momentary loss of power or any activation of safety interlocks will close either source. To reinstate the exposure the warning bell sequence must be done over.

(7) Both sources can be exposed at the same time, but in that case the Co-60 source must be exposed FIRST so the up switch key can be used to put the Cs-137 source into exposure position.

h. Leaving Underground Vault after completing exposure.

(1) Make sure all excess equipment, cables, etc., are removed from Exposure Room

(2) Enter the exposure, just performed, in the log book

(3) Turn off air pressure valve

(4) Turn off main electrical switch

(5) Make sure you have the keys to both the source and plug raise switches, and the door to the vault, before leaving

(6) Make sure door to entrance of Underground Vault is locked

(7) Turn in all personnel monitors, (Bldg. 401)

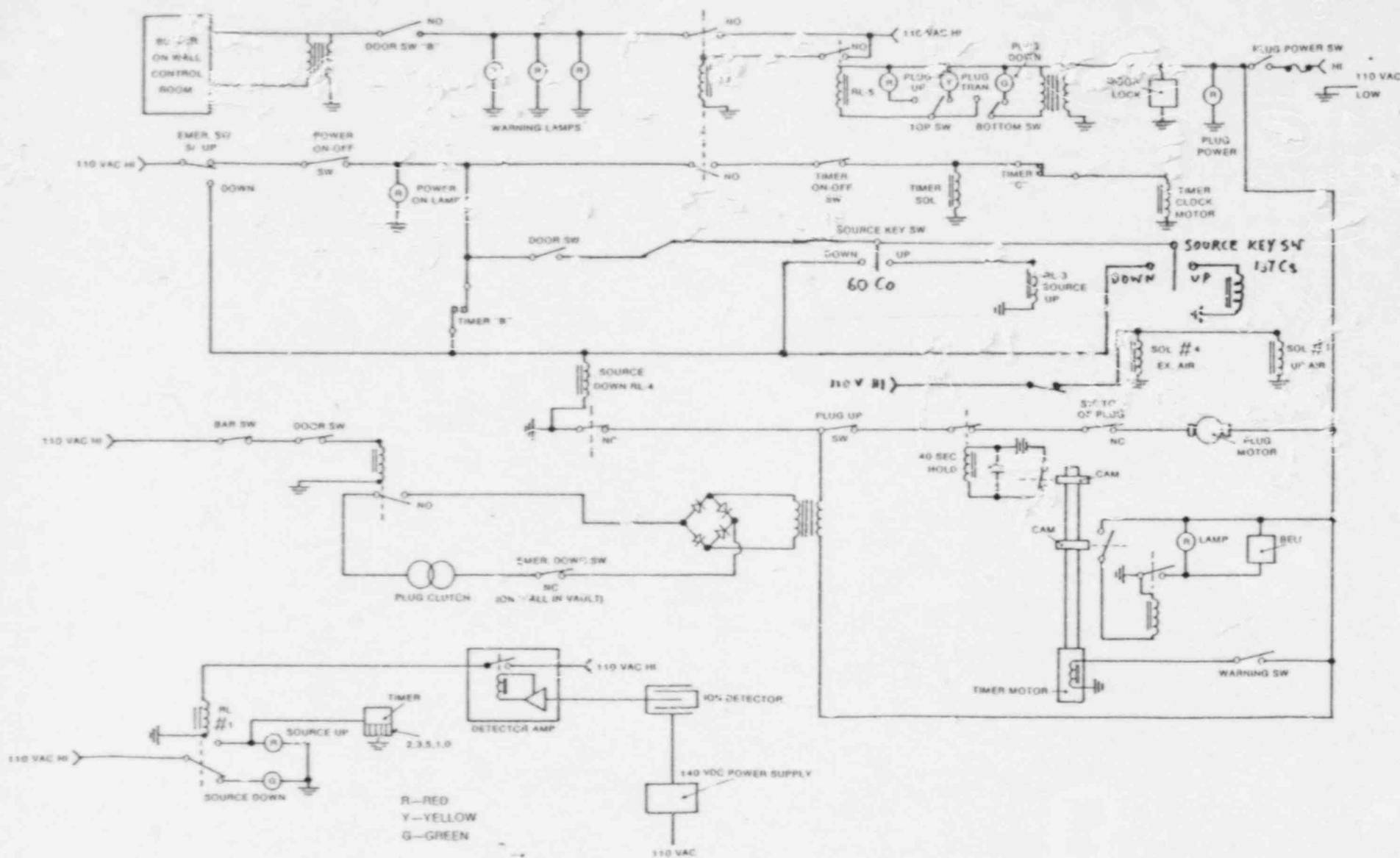
15. Periodic Inspection and Maintenance Procedures

a. Prior to the first use of the facility during a calendar day, the operators perform the interlock checks listed at paragraph 14c, above, and annotate the log book.

b. On a monthly basis: The operation of the remote monitor and alarms will be checked by using a test source during monthly routine health physics surveys.

c. Every six months:

(1) Sources will be leak tested. (See Supplement G of ref 1a, for method).



60 Co and 137 Cs sources in the vault at bldg 401 Evans Area - Schematics.

INFORMATION FROM LMS

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

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: PROGRAM CODE: 03511
: STATUS CODE: 0
: FEE CATEGORY: EX 3E
: EXP. DATE: 19910531
: FEE COMMENTS:

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A. REGION

APPLICANT/LICENSEE: ARMY, DEPARTMENT OF THE  
RECEIVED DATE: 871123  
DOCKET NO: 3006989  
CONTROL NO.: 108113  
LICENSE NO.: 29-01022-07  
ACTION TYPE: AMENDMENT

AMOUNT: \_\_\_\_\_  
CHECK NO.: \_\_\_\_\_

SIGNED  
DATE

1. FEE CATEGORY AND AMOUNT: \_\_\_\_\_

AMENDMENT	-----
RENEWAL	-----
LICENSE	-----

SIGNED  
DATE