1. Keywords

   FAA
   FPS 6
   RADAR
   SPECIAL
   X-RAY

2. Start Date: FY 60 Quarter 3
   End Date: FY 60 Quarter 3

3. HQ Division: 42 - LASER MICROWAVE DIVISION

4. Phase:

5. Program NO:

6. Survey Type:

7. INSTALLATION OR SOURCE OF INFORMATION (CITY & STATE OR COUNTY ARE ESSENTIAL)
   AD - US ARMY AIR DEF CMD FORMERLY

8. Authors:

9. ARLOC/Activity: 25282 000 - FORT HEATH
   Location: FORT HEATH
   State: MA

10. Project Control Number: 3613R0666061

11. Document Type: 1
HEADQUARTERS
U.S. ARMY ENVIRONMENTAL HEALTH LABORATORY
United States Army Medical Service
Army Chemical Center, Maryland

21 JUL 1960

SUBJECT: Report of Microwave Radiation Hazards Study No. 3613R66-60

To:
The Surgeon General, Department of the Army, Washington 25, D.C.
ATTN: MEDCE-CH
Commanding General, First United States Army, Governors Island,
New York 4, New York
ATTN: Surgeon
Commanding Officer, 56th Artillery Brigade (Air Def),
Fort Banks, Winthrop, Massachusetts
ATTN: Surgeon
IN TURN

Included is Report of Microwave Radiation Hazards Study conducted at Fort Heath, Massachusetts during the period 25-30 April 1960 by 1st Lt. Edward B. Martin, WCC, and Sgt. Joseph B. Roszally, AMEDS, Health Physicists from this laboratory. The report includes findings of the survey, observations based on these findings, and recommendations of this laboratory with respect to certain of these findings.

1 Incl

Incl of Microwave Radiation Hazards Study

ADAM J. HAPALSKI
Colonel, MC
Commanding
REPORT OF MICROWAVE RADIATION HAZARDS STUDY NO. 361366-60
56TH ARTILLERY BRIGADE (AIR DEF)
FORT BANKS
WINTHROP, MASSACHUSETTS
25-26 APRIL 1960

1. AUTHORITY.


2. PURPOSE. The purpose of this survey was to accomplish the following objectives:

a. To evaluate the radiation exposure to persons operating, and to those remaining in the vicinity of, the microwave-radiation facilities and related ionizing radiation equipment at Ft Heath, Mass.

b. To make such recommendations as are necessary to protect personnel from needless exposure to microwave radiation.

3. STANDARDS. The publications which have been used as guides in determining the adequacy of the microwave-radiation-protection facilities and program are as follows:


4. ABBREVIATIONS. The following abbreviations of technical terms and words are used in this report:

a. db - decibel.

b. mw - milliwatt.
MEDEL-R  Rept of Microwave Radiation Haz Study #3613566-60 (Ft Banks)
25-26 Apr 60

c. cm² - square centimeter.
d. mrem/hr - millirem per hour.
e. RF - radio frequency.
f. DC - direct current.
g. CAA - Civil Aeronautics Administration.

5. INSTRUMENTATION. The following microwave-radiation-detection instruments were used:

a. Summation Bridge, TS-730/URM.
b. Cable CG-92B/U.
c. RF Bolometer Mount, Weinschel Model 569.
d. RF Attenuators, Weinschel Models 530-7 and 530-3.
e. S-Band Horn Antenna, Sperry Model 363A.

6. FINDINGS.

a. Two radar sets, AN/PS-5, with S-Band frequencies were surveyed.

b. Survey of the radio-frequency equipment of South Tower (A-4) indicated no hazardous ionizing radiation within the modulator, RF Group, Magnatron, and DC Power Supply cabinets. The highest radiation rate was found within the magnatron cabinet. However the radiation rate was not sufficient to warrant additional shielding for the cabinet.

c. Signs were posted on the control panels of both Army radar sets when personnel were in the dome covering the antennas to warn that the sets should not be operated.

d. The terrain in the vicinity of the control center is gently rolling but with no terrain feature at an elevation greater than that of the radar antennas.
e. The antenna of either Army radar set cannot be directed below a minus 20° from the horizontal position. Both antennae (A-4 and A-5) may radiate while rotating or "spotlighting". (Plate R-432)

f. A catwalk built 88 feet above the ground around the outside of the dome of each Army radar set permits personnel to walk or stand around the antenna while the set is being operated.

g. The antennae of both Army radar sets are approximately 110 feet above ground level.

h. The antenna of the CAA tower cannot be operated below the horizontal and is high enough to prevent any exposure to microwave radiation to personnel operating or in the vicinity of the Army radar sets.

i. Results of all measurements made in the vicinity of the radar units are shown on plate R-433.

7. RECOMMENDATIONS.

a. Insure that the cover is on the magnetron cabinet (A-4) when the unit is being operated except for very brief periods for repair or adjustment. This applies to both towers.

b. Signs, "Off Limits to Unauthorized Personnel," should be posted on all entrance doors of both Army towers and on ladders leading to catwalks.

c. The trapdoors opening onto the catwalks should be secured by locks to prevent personnel from ascending to the catwalks while the sets are in operation.

d. All personnel required to be on the catwalk should coordinate with the operator of the set to insure that the set will not be in operation.

e. No antenna should "spotlight" a building or person within a radius of 400 feet.
1. Personnel operating the CAA radar set should be requested to coordinate with personnel of the North Tower (A-5) prior to ascending the CAA tower to prevent unnecessary exposure (Plate R-432).

Edward B. Martin

3 Incls
Plates R-432 thru R-434

EDWARD B. MARTIN
1st Lt, MSC
Health Physicist

Joseph B. Roehlly
Sgt, AMEDS
Health Physicist

APPROVED:

Adam J. Rapalski
Colonel, MC
Commanding
LOCATION OF RADAR TOWERS
IN RELATION TO EACH OTHER

PT. HEATH, MASS.

A - Army Radar Tower (existing)
AF - Air Force Radar Tower (under construction)
CAA - Civil Aeronautics Administration Tower
(existing)

LEGEND
- Existing and Proposed Radar Towers

Microwave Radiation Hazards Study No. 361366-60
Fort Banks, Winthrop, Massachusetts

UNITED STATES
ARMY ENVIRONMENTAL HEALTH LABORATORY
ARMY CHEMICAL CENTER, MARYLAND

DATE 31 May 60
DRAWN J. B. R.
APPROVED L. B. M.
SCALE 1" = 20'
PLATE R-432
**MEASUREMENT LOCATIONS**

FT. HEATH, MASS.

- **C4A**
  - Measurements were made at the 2d landing of the stairwell.

**LEGEND**
- C4A Radar Tower
- Army Radar Towers

**Location at which microwave measurements were made.**

**MICROWAVE MEASUREMENTS**

<table>
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<th>Transmitting Antenna</th>
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<th>Attenuation (db)</th>
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All measurements taken with radar set beamed directly and continuously on the test antenna.

---

Microwave Radiation Hazards Study No. 3613R66-60
Fort Banks, Winthrop, Massachusetts

**UNIVERSITY STATES**
**ARMY ENVIRONMENTAL HEALTH LABORATORY**
**ARMY CHEMICAL CENTER, MARYLAND**

DATE: 31 May 60
DRAWN: J.B.R.
APPROVED: P.B.V.
SCALE: None
PLATE: R-433
ICHERIZING RADIATION MEASUREMENTS
RADAR AND RELATED EQUIPMENT
SOUTH TOWER (A-4)
FT. HEATH, MASS.

Legend:
• Location of film badges attached to the outside of the cabinets.
• Location of film badges attached to the inside of the cabinet and to operating parts of the equipment.

D.C. Power Supply Cabinet

Sheet 1 of 2 Sheets

Microwave Radiation Hazard Study No. 3613R66-60
Fort Banks, Winthrop, Massachusetts

DATE 31 May 60
DRAWN J.B.R.
APPROVED F.B.V.
SCALE None

UNITED STATES
ARMY ENVIRONMENTAL HEALTH LABORATORY
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Sheet 2 of 2 Sheets

Microwave Radiation Hazards Study No. 361J586-60
Fort Belknap, Winthrop, Massachusetts

UNITED STATES
ARMY ENVIRONMENTAL HEALTH LABORATORY
ARMY CHEMICAL CENTER, MARYLAND

DATE: 11 May 60
DRAWN: J.B.R.
APPROVED: F.D.H.
SCALE: 1:2
PLATE: D-2.34
SUBJECT: Radiological Hygiene Survey

TO: Commanding Officer  56th Artillery Brigade (Air Def)  
    5th Artillery Brigade  56th Artillery Brigade (Air Def)  
    Fort Banks  
    Winthrop, Massachusetts

1. Reference letter ADRP-8, Eq, 56th Art Brigade, Ft Banks, Mass,  
   30 March 1960, subject: "Request for Technical Assistance," thru the  
   CG, 1st Region, USA Air Defense Cad, Ft Totten, N.Y., to The Surgeon  
   General and indorsement thereto.

2. 1st Lt Edward P. Martin, 02235119, MSC and Sgt Joseph B.  
    Roskilly, RA172339435, will make a radiological hygiene survey at your  
    installation on 25 April 1960.

3. Lt Martin and Sgt Roskilly will arrive at the Back Bay  
    South Station, Boston, at 0825 hours, Monday, 25 April. Request  
    transportation be provided from the railroad station.

4. Lt Martin and Sgt Roskilly are cleared to receive informa-  
    tion and material up to and including SECRET.

5. If this date is not satisfactory, please advise this Labora-  
    tory so that an acceptable date may be arranged.

ADAM J. RAPALSKI  
Colonel, MC  
Commanding