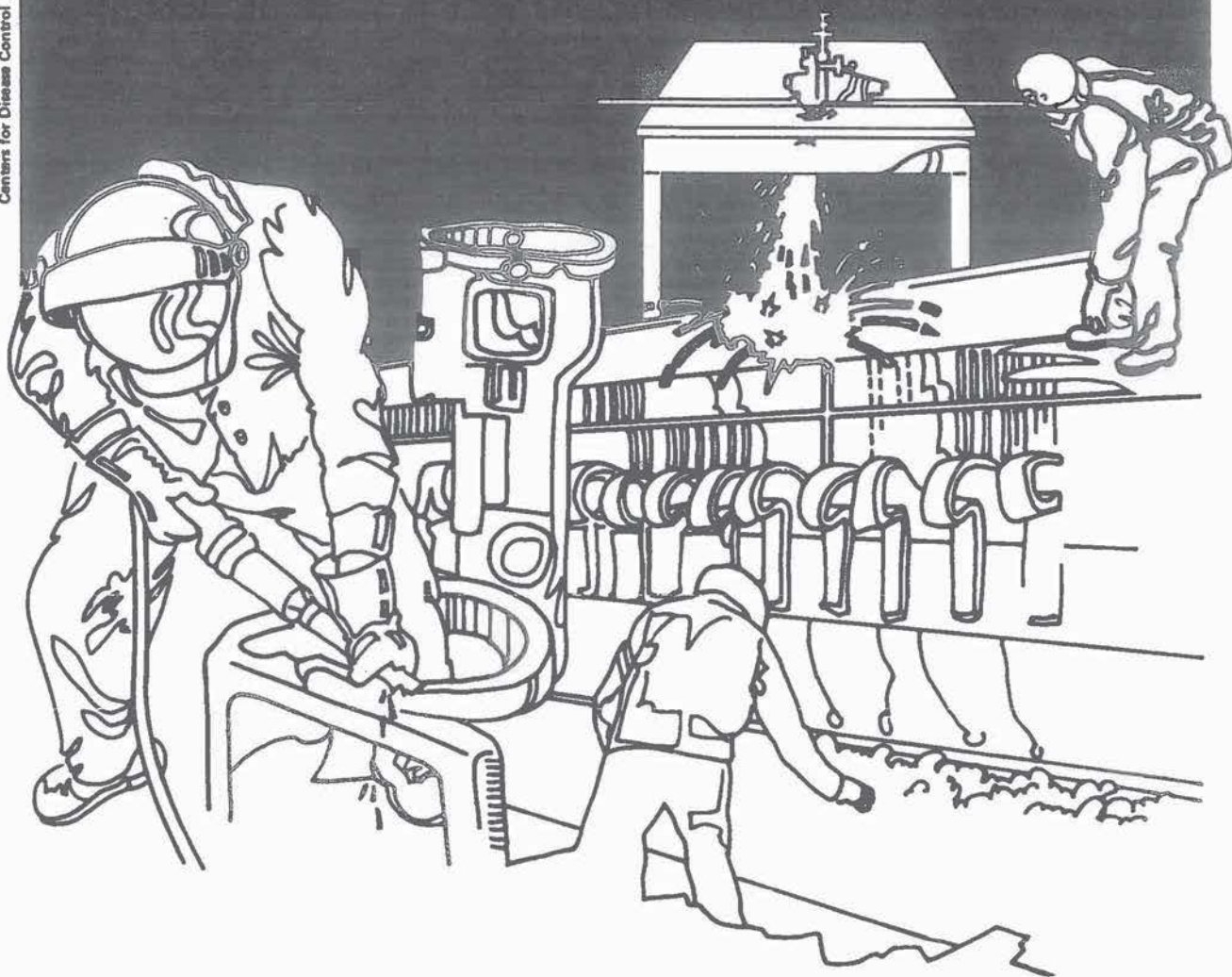


NIOSH



Health Hazard Evaluation Report

HETA 82-080-1153
WCMH-TV
COLUMBUS, OHIO

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 82-080-1153
August 1982
WCMH-TV
Columbus, Ohio

NIOSH INVESTIGATORS:
Peter A. Boxer, M.D.
James M. Boiano, I.H.

I. SUMMARY

On December 14, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from an authorized representative of the International Brotherhood of Electrical Workers (I.B.E.W.) Union Local No. 71 at WCMH-TV, Columbus, Ohio, requesting NIOSH to investigate a possible increased incidence of cancer among employees at WCMH-TV, and possible radiation hazards at the broadcasting station.

NIOSH conducted an initial site visit on January 6, 1982. A list of all deceased former employees of WCMH-TV was obtained, and relevant information was abstracted from available personnel records. Subsequent attempts were made to locate additional personnel records, and cause of death was verified in all cases in which sufficient information could be collected to obtain a death certificate. Of twenty former employees who died since the station began operation, three died of accidents, four of cancer, and one of a stroke. There was one death each from breast cancer, lung cancer, malignant melanoma, and lymphoma. In addition, one current employee has laryngeal cancer. In twelve cases insufficient information was available to permit obtaining a death certificate to verify cause of death.

NIOSH conducted a survey for radiofrequency/microwave (RF/MW) non-ionizing radiation and X-ray ionizing radiation on February 17, 1982. Localized surface magnetic (H) field intensities at the visual power amplifier of the TV transmitter were up to $0.8 \text{ A}^2/\text{m}^2$. Electric (E) field intensities at the antennas of the portable 2-way radios were up to $8 \times 10^4 \text{ V}^2/\text{m}^2$. Of all the electronic devices tested, only these two had surface RF emissions which exceeded the OSHA RF standard (H field equivalent of $0.25 \text{ A}^2/\text{m}^2$ and E field equivalent of $4 \times 10^4 \text{ V}^2/\text{m}^2$). These RF energies, however, did not pose an occupational exposure hazard, as workers used or had contact with this equipment on an infrequent basis. In addition, the measured levels rapidly decreased to nondetectable about 4 to 6 inches from the surface. With respect to the TV monitors, levels of X-radiation were not distinguishable from background levels.

Based on the radiation measurements, NIOSH concluded that workers operating or in the vicinity of the various types of electronic equipment at WCMH-TV are not exposed to a RF/MW or X-radiation hazard. Limited information did not allow verification of cause of death in approximately half the cases, making it impossible to determine if the rate of cancer among employees at the broadcasting station is higher than expected. However, based on the lack of exposure of employees to toxic chemicals or hazardous levels of X-radiation, NIOSH concluded that there is no evidence supporting a workplace exposure as an etiologic agent in the cancer deaths among WCMH-TV employees.

KEYWORDS: SIC 4833 (Television Broadcasting), cancer, RF/microwave (non-ionizing) radiation, x-rays (ionizing) radiation

II. INTRODUCTION

On December 14, 1981, NIOSH received a request from an authorized representative of the International Brotherhood of Electrical Workers (I.B.E.W.) Union Local No. 71 at WCMH-TV, Columbus, Ohio, on behalf of both company and union, asking NIOSH to investigate a possible increased incidence of cancer among employees, and possible radiation hazards at the broadcasting station. According to the request, several employees had died from cancer over the past few years, and several current employees were under treatment for cancer. Both union and management representatives were concerned that radiation might be playing a role in producing an apparently high rate of cancer among employees at the broadcasting station. Accordingly, NIOSH investigators made a preliminary visit to the station on January 6, 1982, and a followup industrial hygiene radiation survey on February 17, 1982. An interim report summarizing results of the radiation survey was submitted to union and management representatives on April 26, 1982. An interim report summarizing results of the radiation survey was submitted to union and company on April 26, 1982.

III. BACKGROUND

The WCMH-TV broadcasting station in Columbus, Ohio began operation on April 3, 1949. The number of current employees is approximately 120, including engineers, television technicians, photographers, floor directors, news directors, and newscasters.

The station consists of a main building (news studio/general office) and an unattended transmitter building with an adjacent 400-foot TV tower. The transmitter building houses the bulk of the transmitting equipment including the TV transmitter, microwave transmitters, and various paging and communication transmitters. All of the equipment in this building is operated by remote control from the news studio. The station also operates a variety of mobile and portable communications equipment including a microwave transmitter, TV monitors, and 2-way radios. Electronic equipment of interest in the news studios included TV monitors (located in clusters in the Master and Production Control Rooms) and two microwave ovens used for food preparation. The station broadcasts daily from 6:00 a.m. to 2:00 a.m.

Several employees reportedly died from cancer over the past few years, causing concern among both union and management representatives that an environmental agent might be responsible. The only chemicals used at the station are general cleaning materials, a number of biocides in the air conditioning system, and Freon TF, a volatile chlorofluorocarbon solvent used to remove oxides from tape machinery. Discussions during the initial NIOSH visit identified a high level of concern at the broadcasting station regarding a possible radiation hazard from the TV transmitter, numerous TV monitors, and a variety of other suspected sources of microwave/radiofrequency and/or x-ray emissions. Consequently, NIOSH decided to conduct a radiation survey at the station, in addition to an epidemiologic study of the deceased former employees.

IV. EVALUATION DESIGN AND METHODS

Environmental

NIOSH investigators evaluated a variety of electronic equipment for possible non-ionizing radiation emission including the TV transmitter, paging and communication transmitters, stationary and mobile microwave point-to-point transmitters, mobile and portable 2-way radios, microwave ovens, and numerous TV monitors. Selected TV monitors were also evaluated for possible X-radiation emission. All equipment, with exception of the TV transmitter, stationary microwave transmitter, and TV monitors were not in use and thus had to be activated in order to be surveyed.

Radiofrequency/microwave (RF/MW) measurements were made using a calibrated Holiday Model HI-3002 broadband field strength meter equipped with an electric (E) or a magnetic (H) field probe. The E probe was used to measure mean squared electric field strength in volts squared per meter squared (V^2/m^2) and responded to frequencies ranging between 0.5 and 6000 MHz. The H probe, with a frequency response range of 5 to 300 MHz, was used to measure magnetic field strength in amperes squared per meter squared (A^2/m^2). The minimum detectable reading for the E and the H probe was $500 V^2/m^2$ and $0.005 A^2/m^2$, respectively. The overall accuracy of both probes was ± 2 dB. The applicability of each probe was determined by its frequency response range relative to the operating frequency of the equipment being tested.

With the exception of measurements taken on the TV monitors, RF measurements were taken at all accessible equipment surfaces. The only surface of the TV monitor tested was the picture tube screen. All tested surfaces were slowly scanned with the probe as close to the surface as possible. In cases where radiation was detected, the probe was removed from the surface to a distance where it was no longer detected, and this distance was noted.

X-ray measurements of the TV monitors were taken with a calibrated Stoms meter.⁽¹⁾ The TV screens were slowly scanned with the instrument held as close to the surface as possible. Several background measurements were also taken in the areas where the TV monitors were located. The Stoms meter is very sensitive and specifically designed to locate small diameter, low energy X-ray beams of the type potentially emitted from television sets. This instrument was designed by the Food and Drug Administration's Bureau of Radiological Health (BRH) for use in enforcing the television receiver performance standard. It utilizes four Victorian Model 1B85 Geiger-Mueller tubes as the detectors and is calibrated electronically with a Tektronix Model 7603 oscilloscope and a pulse generator.

Medical

A list was obtained of all deceased former employees of WCMH-TV since 1949. Prior to the time of the initial NIOSH visit, nineteen individuals had died. Personnel records were available at the broadcasting station for only five of the 19 deceased employees, and for one current and one former employee (who has subsequently died) being treated for cancer at the time of the initial NIOSH visit. Information on date of birth, date of death, place of death, probable cause of death, and work history was abstracted if available.

NIOSH also contacted the Avco Corporation, WCMH-TV's owner, in Greenwich, Connecticut for more information on previous employees, but this yielded no useful information.

Because of the limited information obtainable from the available personnel records of the deceased employees, it was necessary to limit this study to a listing of all former employees known to be deceased, with an attempt to verify the cause of death in as many cases as possible by obtaining death certificates. The two employees being treated for cancer were interviewed by phone, and their medical records were obtained from private physicians and hospitals in order to verify their diagnoses.

V. EVALUATION CRITERIA

Environmental

The radiation protection standards for occupational exposure to RF/microwave (non-ionizing) radiation and X-ray (ionizing) radiation are presented in Table 1. For non-ionizing radiation in the radiofrequency and microwave range of 10 MHz to 100,000 MHz, OSHA specifies a maximum power density of 10 milliwatts per centimeter squared (mW/cm^2), as averaged over any possible 6-minute period.⁽²⁾ Since power density cannot be measured at distances close to the various types of electronic equipment tested, separate measurements (as alluded to in Section IV) must be made of the electric and/or magnetic fields. In the far field equivalent values corresponding to a power density of $10 \text{ mW}/\text{cm}^2$ are a mean squared electric field strength of $4 \times 10^4 \text{ V}^2/\text{m}^2$ and a mean squared magnetic field strength of $0.25 \text{ A}^2/\text{m}^2$. The OSHA Permissible Exposure Limit (PEL) for ionizing radiation is 2.5 milliroentgens per hour (mR/hr) when averaged over a 40-hour workshift.⁽³⁾

The Bureau of Radiological Health has promulgated equipment performance standards for manufacturers and/or users of television receivers and microwave ovens. The emission standard for TV receivers, with respect to X-rays, is $0.5 \text{ mR}/\text{hr}$ (Stoms meter reading equivalent to about 3000 to 4000 counts per minute, CPM), which is one fifth of the OSHA PEL. The BRH performance standard for microwave ovens limits leakage (for consumer-operated ovens) to $5 \text{ mW}/\text{cm}^2$. This level is equivalent in the far field to a mean squared electric field strength of $2 \times 10^4 \text{ V}^2/\text{m}^2$, half of the OSHA PEL. In both cases, the respective BRH performance standard must be exceeded, by a factor of five for TV receivers or a factor of two for consumer-operated microwave ovens, before overexposure is considered to be occurring.

Medical

Microwave/radiofrequency (MW/RF) radiation consists of low frequency, long wavelength radiation whose principal biological effect is heating of tissues where the energy is absorbed (4). This health hazard is generally very small, since the intensity of the radiation is rarely great enough to cause a significant heating effect (5). Most parts of the body have sufficient blood supply to dissipate the heat resulting from absorption of microwave energy. However the lens of the eye lacks an efficient blood supply, and the heat from absorption of microwave energy may damage the transparent cells around the lens, resulting in cataracts. This effect has been demonstrated experimentally in rabbits (7), and the possibility that microwave radiation can cause cataracts in humans has been raised in the literature. Appleton (8) concluded that cumulative exposure to low levels of microwave energy probably has not resulted in lens damage in humans, but the subject remains controversial. Protective standards limiting exposure to microwave energy are based on the ability of microwaves to cause heating of tissues, and the susceptibility of certain tissues, such as the lens of the eye, testes, and skin to thermal damage.

Effects of long-term exposure to MW/RF radiation have been widely reported, primarily in the Soviet and Eastern European literature. Effects which have been described but poorly substantiated include those on the nervous system (headache, fatigue, irritability, altered memory function, emotional instability, altered EEG recordings, and sleep disturbances); and effects on blood (leukocytosis, thrombocytopenia). Also reported are sweating, hypotension, dyspnea, chest pain, cardiac arrhythmias, and changes in blood levels of histamine and a variety of enzymes, hormones, and immunity factors (4). However, these studies have been severely criticized for problems with subjective measurements and for lack of appropriate experimental design and statistical analysis of data. A recent large epidemiological study of U.S. Naval personnel exposed to microwave radiation from radar did not detect any adverse effects which could be attributed to potential microwave radiation exposure (9). The study design did not permit the investigation of the numerous behavioral changes and many of the ill-defined conditions reported in the Eastern European literature to result from MW/RF radiation exposure.

Only ultraviolet and ionizing radiation (gamma and X-rays) possess carcinogenic activity. Microwaves do not cause ionization, and hence do not cause the harmful effects of X-rays or gamma rays. Experimental and observational data from animal and human studies indicate no carcinogenic or mutagenic effects resulting from exposure to RF/MW radiation. Human studies indicate that no teratogenic effects occur, but are inconclusive as to whether reproductive effects occur. Animal studies have shown some reproductive and teratogenic effects, but the evidence is often contradictory. It appears that reproductive effects in animals correlate well with RF/MW-induced heat production. NIOSH is in the process of preparing a criteria document which will review in detail the potential health hazards of RF/MW radiation. In conclusion, the only well-documented hazard of microwave radiation is dielectric heating of tissues, which can present a thermal hazard (9,10).

VI. RESULTS AND DISCUSSION

Environmental

The data obtained from the radiation measurements for radiofrequency/microwave (RF/MW) and X-rays are presented in Tables 2-6. RF/MW measurements on equipment located in the transmitter building are presented in Table 3. Of the units tested, mean squared electric (E) and magnetic (H) field strengths were only detected at the visual and aural power amplifier (PA) components of the TV transmitter. The RF energy was detected at the front of these units (cabinet doors open) with the highest levels being measured directly in front of the visual PA transmitter tubes. E-field strengths ranged up to $4 \times 10^3 \text{ V}^2/\text{m}^2$, ten times below the OSHA PEL of $4 \times 10^4 \text{ V}^2/\text{m}^2$. H-field strengths ranged up to $0.8 \text{ A}^2/\text{m}^2$, about 3 times above the OSHA PEL of $0.25 \text{ A}^2/\text{m}^2$. No measurable radiation was detected with the cabinet doors closed.

Radiofrequency (E-field strength) measurements of selected and portable communications equipment are presented in Table 3. Of the equipment tested, the highest E-field strengths were obtained at the portable (hand-held) 2-way radios. E-field strengths at the antennas were 2.5×10^4 and $8 \times 10^4 \text{ V}^2/\text{m}^2$; while at the microphone, the part of the device closest to the user, it was 8 to 10 times lower, 2.5×10^3 and $1 \times 10^4 \text{ V}^2/\text{m}^2$. These latter values, which are applicable to personnel exposures, because of the proximity of the device to the user, were about one fourth of the OSHA PEL. No measurable E-field strengths were detected at the surface of the mobile 2-way radios or point-to-point microwave transmitter. With respect to the 2-way radio located in the van an E-field strength of $2 \times 10^3 \text{ V}^2/\text{m}^2$ was detected at the cab ceiling directly below the antenna. Measurements at the driver's head indicated an E-field strength of $0.5 \text{ V}^2/\text{m}^2$, about 1/80 of the OSHA PEL.

Mean squared electric field strength and X-ray measurements of the TV monitor located in the Master and Production Control Rooms are presented in Tables 4 and 5. E-field intensities at the screen surface ranged from 0.5×10^3 to $2 \times 10^4 \text{ V}^2/\text{m}^2$. The highest levels, in most cases, were emitted by the color sets. All E-field strengths were below the OSHA PEL. No measurable radiation was detected at distances greater than 4 to 6 inches from the TV screens.

Background readings for X-rays in the Master and Production Control Rooms were in the 30 to 80 counts per minute (CPM) range. X-ray measurements taken at selected TV monitor screens were not distinguishable from background levels.

Mean squared electric field strength measurements taken at the microwave ovens are presented in Table 2. Localized microwave leakage was detected at $0.5 \times 10^3 \text{ V}^2/\text{m}^2$ at the window and at the lower left corner door seal of the Magic Chef oven. This level is 1/40 of the BRH's emission standard of $2 \times 10^4 \text{ V}^2/\text{m}^2$ and 1/80 of the OSHA PEL of $4 \times 10^4 \text{ V}^2/\text{m}^2$. No measurable microwave radiation was detected at the Sharp microwave oven.

Medical

According to management representatives, twenty former employees of WCMH-TV have died since the station began operation. Cause of death could be verified in only eight cases, as follows:

<u>Cause of death</u>	<u>Number</u>
Accidents	3
Cancer	4
Stroke	1
Unable to verify	12

There was one death each from breast cancer, lung cancer, malignant melanoma, and lymphoma. In addition, one current employee has laryngeal cancer.

The fact that personnel records were not available for each deceased employee, and that those records which were available contained very limited information did not allow verification of the cause of death in each case. Since cause of death was verified in only approximately half of all cases, it is not possible to determine if the rate of cancer among employees at the broadcasting station is higher than expected.

The main concern of both union and management was that the cancer deaths might have been caused by a radiation hazard from the numerous sources that emit microwave/radiofrequency radiation at the broadcasting station. It should again be emphasized that, unlike ionizing radiation (X-rays or gamma rays), microwave/radiofrequency radiation has not been shown to be carcinogenic. The only clear hazard from this type of radiation is dielectric heating of tissues. From the radiation survey data, it is clear that the levels of radiation at the broadcasting station are far below levels which could cause concern about the heating effect of microwave/radiofrequency radiation.

VII. CONCLUSIONS

Workers operating or in the near vicinity of the various communications/electronic equipment are not exposed to a RF/MW or X-radiation hazard. While two electronic devices had RF emissions exceeding the OSHA RF standard, this does not pose an occupational exposure hazard, as workers have contact with this equipment on an infrequent basis, and the measured levels rapidly decreased to nondetectable about four to six inches from the surface. Employees at the broadcasting station have essentially no exposure to toxic chemicals. Since there is no convincing evidence to indicate that RF/MW energy can cause cancer in humans, and since there was no measurable X-radiation exposure above background, there is no evidence supporting a workplace exposure as an etiologic agent in the cancer deaths among WCMH-TV employees.

VIII. RECOMMENDATIONS

As a safety precaution, the microwave transmitter located in the news van should be equipped with an interlock device to prevent the unit from transmitting with the antenna in the down position.

IX. REFERENCES

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X. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared by:	Peter A. Boxer, M.D. Medical Officer Medical Section
	James M. Boiano Industrial Hygienist Industrial Hygiene Section
Environmental Assistance:	Jerome P. Flesch, M.S. Assistant Branch Chief Hazard Evaluations and Technical Assistance Branch
Originating Office:	Hazard Evaluations and Technical Assistance Branch Division of Surveillance, Hazard Evaluations, and Field Studies Cincinnati, Ohio
Report Typed By:	Stephanie M. Harris Clerk-Typist Medical Section Hazard Evaluations and Technical Assistance Branch Cincinnati, Ohio

XI. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

1. Business Manager, I.B.E.W. Local Union, No. 71, Columbus, Ohio.
2. WCHM-TV, Columbus, Ohio
3. NIOSH, Region V
4. OSHA, Region V

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1
Current Occupational Exposure Limits

WCMH-TV
Columbus, Ohio

Radiation Type	Units	Exposure Limit
Electric Field	V ² /m ²	40000*
Magnetic Field	A ² /m ²	0.25*
Ionizing	mR/hr	2.5**

* Far field equivalent of the power density limit of 10 mW/cm² averaged over any possible 6-minute time period.

** Averaged over a 40-hour workweek.

TABLE 2
Radiation Measurements of Communications Equipment Located
in Transmitter Building

WCMH-TV
Columbus, Ohio
February 17, 1982

Source	Manufacturer	Serial No.	Frequency MHz	Electric Field Strength V^2/m^2	Magnetic Field Strength A^2/m^2
TV Transmitter ^a	Harris				
Aural Power Amp A		90468	71.7	0.7×10^3	0.05
Aural Power Amp B		90467	71.7	N.D.	N.D.
Visual Power Amp A		90468	67.2	4×10^3	0.3
Visual Power Amp B		90467	67.2	0.5×10^3	0.8 ^b
V/A Exciter Driver A		90468	66 - 72	N.D.	N.D.
V/A Exciter Driver B		90467	66 - 72	N.D.	N.D.
Dual Control Cabinet		90727	66 - 72	N.D.	N.D.
Microwave Transmitter	Microwave Associates	1719	2000	N.D.	-
Paging Transmitter (base unit)	Motorola	DA0477	450	N.D.	-
Paging Transmitter	Motorola	MT5062	154	N.D.	N.D.
Evaluation Criteria:				4×10^4	0.25

N.D. - not detectable; dash (-) not measured, beyond frequency response of probe.

^a Results represent the maximum field strength obtained following probe scan of TV transmitter components.

^b Measurement decreased to $0.05 A^2/m^2$ following panel adjustment.

TABLE 3

Results of Radiation Measurements on Mobile and Portable Communications Equipment

WCMH-TV
Columbus, Ohio

February 17, 1982

Source	Location	Frequency MHz	Electric Field Strength V^2/m^2	Remarks
Microwave Transmitter	News Van	2000	N.D.	Measurements taken with antenna fully extended above van (approximately 25 feet)
Motorola 2-Way Radio	News Van	450	N.D. 2×10^3 $.5 \times 10^3$	At transmitter Van ceiling above driver At driver's head
Motorola 2-Way Radio	Blazer	450	N.D. N.D.	At transmitter Cab ceiling above driver
Video Tech Color TV Monitor	News Van	0 - 4	2×10^3	At TV screen
GE Portable 2-Way Radio (No. 633)	-	450	2.5×10^4 2.5×10^3	At antenna At microphone
GE Portable 2-Way Radio (No. 833)	-	450	8×10^4 1×10^4	At antenna At microphone
Evaluation Criteria:			4×10^4	

N.D. - not detectable

TABLE 4

Radiation Measurements of TV Monitors in Master Control Room

WCMH-TV
Columbus, Ohio

February 17, 1982

TV Monitor	Electric Field Strength V^2/m^2	X-rays CPM
Conrac*	2×10^4	BG
Conrac	3×10^3	BG
Tektronix*	0.5×10^3	BG
RCA No. 9	2×10^4	BG
RCA No. 7	0.5×10^3	BG
Tektronix No. 10*	0.5×10^3	BG
Tektronix No. 11*	0.5×10^3	BG
Setschell Carlson No. 15	0.5×10^3	BG
Setschell Carlson No. 16	1.0×10^3	BG
Ampex No. 12	1.5×10^4	BG
Ampex No. 13	3×10^4	BG
Conrac No. 7	4×10^3	BG
Evaluation Criteria:	4×10^4	2.5 mR/hr**

CPM - Counts per minute

BG - Background (30 - 80 CPM)

* Color TV

** A reading of 3000 - 4000 CPM is roughly equivalent to an exposure rate of 0.5 mR/hr, the BRH emission standard for television receivers. This emission standard is five times lower than OSHA's permissible exposure limit of 2.5 mR/hr.

TABLE 5

Radiation Measurements of TV Monitors
Located in The Production Control RoomWCMH-TV
Columbus, Ohio

February 17, 1982

TV Monitor No.*	Electric Field Strength V^2/m^2	X-rays CPM
1	-	-
2	0.5×10^3	-
3	-	-
4	0.5×10^3	-
5	0.5×10^3	-
6	0.5×10^3	-
7	0.5×10^3	-
8	0.5×10^3	-
9	0.5×10^3	-
10**	3×10^3	BG
11**	3×10^3	BG
12**	2×10^3	BG
13**	2×10^3	BG
14**	3×10^3	BG
15	0.5×10^3	BG
16	0.5×10^3	-
17	0.5×10^3	-
18	0.5×10^3	-
19	0.5×10^3	-
20	0.5×10^3	-
21	0.5×10^3	-
22	0.5×10^3	-
23	0.5×10^3	-
24**	2×10^4	BG
25**	1×10^3	BG
26	6×10^3	BG
27	6×10^3	BG
Evaluation Criteria: mR/hr***	4×10^4	2.5

Dash (-): measurements not made

CPM - Counts per minute

BG - Background (30 - 80 CPM)

* Locations of each of the TV monitors listed is presented in a schematic drawing in Figure 1.

** Color TV

*** A reading of 3000 to 4000 CPM is roughly equivalent to an exposure rate of 0.5 mR/hr, the BRH emission standard for television receivers. This emission standard is five times lower than OSHA's permissible exposure limit of 2.5 mR/hr.

TABLE 6

Results of Radiation Survey of Microwave Ovens

WCMH-TV
Columbus, Ohio

February 17, 1982

Manufacturer	Location	Frequency MHz	Electric Field Strength V ² /m ²
Sharp	General Lunchroom	2450	N.D.
Magic Chef	Engineering Lunchroom	2450	0.5 x 10 ³ *
Evaluation Criteria:			4 x 10 ⁴

N.D. - not detectable

* Measured at middle of window and at lower left corner of door at seal.

FIGURE 1

Schematic Indicating Location of TV Monitors
in the Production Control Room

WCMH-TV
Columbus, Ohio

February 17, 1982

