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Microwave News invites contributions to *From the Field*, our occasional column featuring news and opinions from the non-ionizing radiation community. Letters from readers are also welcome.

Hawaii Broadcast Radiation: EPA Finds Hot Spots

The levels of radiofrequency (RF) radiation from broadcast antennas in Honolulu, Hawaii, are the highest ever measured in an urban area. According to a recently released report by the Environmental Protection Agency (EPA), human exposures in 12 out of 21 locations exceeded the standards adopted by the state of Massachusetts and/or the limits recommended by the International Radiation Protection Association (IRPA). There are no U.S. federal standards governing non-ionizing radiation exposures for the general public.

Despite such high levels, EPA officials do not believe that RF radiation in Honolulu poses an "immediate risk," because most public exposures are "transient or intermittent." Nevertheless, Joseph Cannon, EPA assistant administrator for air and radiation, advised Mark Fowler, chairman of the Federal Communications Commission (FCC), that "it would be prudent for you to investigate how many people have access to areas with the highest fields, and how often and how long they are exposed." (See the full text of Cannon's letter in "From the Field" on p.8.)

Cannon also wrote that the EPA "intends to propose several options for limiting exposure to RF radiation" in 1985 and to issue a federal standard in 1986. (See related story on p.7.)

AM Levels Exceed ANSI Limits

Richard Tell of EPA's Office of Radiation Programs went to Hawaii with FCC's Dr. Robert Cleveland last May to measure radiation levels after years of public concern over possible health risks (see *MWN*, April 1984).

Tell identified the highest radiation levels near AM (550 kHz-1.6 MHz) radio towers. Next to a tower in Kaimuki, with one FM and three AM stations, he found maximum AM magnetic fields of 9 A/m (the plane-wave equivalent of 3,054 mW/cm²; AM fields cited below are given in terms of power densities) and FM levels of 830 uW/cm². Three AM stations at Ala Wai tower produced a field of up to 306 mW/cm² next to an access-limiting fence. In a parking lot at 331 Kamani where there are three AM stations and one FM station, levels as high as 3,261 mW/cm² were measured at the base of the tower — this area is closed to the public, however. AM levels inside a nearby clothing store were 23.9 mW/cm² near a floor fan and a machine that applies labels. The report notes that the machine caused RF burns.

The levels of very high frequency (VHF) (30-300 MHz) radiation associated with the FM and TV stations were generally below 1 mW/cm² in public areas. Four readings did exceed 1 mW/cm² in locations accessible only to maintenance personnel — the highest VHF reading, 20 mW/cm², was on the roof of the Ala Moana Hotel.

Tell also visited outdoor recreation and sun bathing areas on the top of high-rise apartment buildings that are near broadcast antennas. For instance, on the rooftop of the Villa on Eaton Square, opposite the Ala Wai tower, Tell measured AM levels greater than 24 mW/cm²; and at an

(continued on p.4)

Chromosomal Breaks Among Power Substation Workers

A team of Swedish researchers has identified unusually high rates of chromosomal abnormalities among power substation workers exposed to electromagnetic fields. Further laboratory research showed that spark discharge pulses caused chromosomal breaks, but that 50 Hz fields had no genetic effects on human lymphocytes.

Drs. I. Nordenson and S. Nordstrom of the University of Umea, Dr. K. Hansson Mild of the National Board of Occupational Safety and Health and E. Birke of the Swedish State Power Board in Vallingby observed an increased frequency of chromosomal breakage in a group of switchyard workers exposed to an EM field from a 400 kV system. Their *in vitro* study suggests "that exposure to electric fields (50 Hz, 1 mA/cm² current density in the blood sample) does not induce chromosomal damage in peripheral lymphocytes. However, when the exposure was in the form of repeated transient current (ten 3 usec-long pulses with 2.5-3.5 kV/cm peak [electric field] in the sample) a significantly increased frequency of chromosomal breaks was found."

Two of the co-authors, Nordstrom and Birke, have previously shown that the children of men who work in high voltage substations had an increased rate of congenital malformations (see *Bioelectromagnetics*, 4, 91, 1983, and *MWN*, March 1983). The new *in vivo* and *in vitro* investigations were designed to follow up that 1983 epidemiological study.

Analysis of the chromosomes of the substation workers' lymphocytes revealed no increase in gaps but highly significant increases in the rates of chromatid and chromosome breaks (p less than 0.0005), with a fivefold increase in chromosome breaks overall, compared to controls.

The frequency of chromosomal breaks in the *in vivo* study was similar to that induced in lymphocytes by ionizing radiation at a dose of 0.75 Gray (Gy), according to the researchers' paper, which appears in *Radiation and Environmental Biophysics*, 23, 191, 1984. (0.75 Gy is equivalent to 75 rads and is considered to be a large, though not a life-threatening, dose.)

A previous study, published in the same journal (19, 235, 1981) by a West German team headed by Dr. M. Bauchinger, failed to uncover any chromosomal changes in workers who had been exposed to 50 Hz fields in 380 kV switchyards for more than 20 years.

During a recent visit to the U.S., Dr. K. Hansson Mild told *Microwave News* that the Swedish team had also recently completed a well-controlled, follow-up study of 19 exposed non-smoking switchyard workers and that the results were the same as in the previous study.

"This constitutes a pretty clear case that spark discharges cause chromosomal damage," Mild said. It is not so much the fields, but the discharges that cause problems, he explained.

According to Mild, the discharges can easily be controlled through grounding.

Immunity Task Group: TVs, VCRs and Cordless Phones

An ad hoc working group is nearing completion of a report on its efforts to enhance the immunity of televisions and video cassette recorders (VCRs) to conducted and radiated interference. The group, which works under the aegis of the American National Standards Committee C63 on Electromagnetic Compatibility, formed a new subcommittee to study the immunity of cordless telephones, and plans are underway to broaden the group's inquiry to include security devices.

Don Heirman, chairman of the ad hoc group, said in a telephone interview that an interim status report describing voluntary standards for the immunity of TVs and VCRs will be presented to the IEEE Standards Board at its March meeting.

The public availability of the report will be decided by the board in March, according to Heirman, who is with AT&T Information Systems in Holmdel, NJ. The final report is due by the end of 1985.

The working group is keying its proposed immunity limits to those developed by the Electronic Industries Association (EIA). Three types of electromagnetic interference (EMI) are being addressed: (1) interference received along with the desired signal; (2) direct radiation; and (3) conducted interference by the power cord and other leads.

The first type is addressed in EIA Interim Standard No.10, *Immunity of TV Tuners to Internally Generated Harmonic Interference from Signals in the Band 535 kHz-30 MHz*, which is an expanded version of the 1980 EIA Bulletin No.8A, *Susceptibility of TV Tuners to Harmonically Generated Interference*. The 8A bulletin covered only CB radiation; No.10 includes AM radio up to 30 MHz. Eb Tingley of EIA's Consumer Electronics Group said that the new standard, which has already been published, will likely go into effect on January 1, 1986.

EIA's Proposed Interim Standard No.16, *Immunity of Television Receivers and Video Cassette Recorders to Direct Radiation from Radio Transmission, 0.5-30 MHz*, seeks to limit radiated EMI. Tingley said that this proposal, which is being voted on by the association's members, would require TVs and VCRs to withstand radiated fields of 1 V/m. (Last spring, EIA raised the possibility of using an immunity level of 3 V/m, but this was rejected by manufacturers as being too strict (see *MWN*, June 1984).

Conducted EMI from the power cord and other leads is being studied by the National Bureau of Standards (NBS) under an EIA contract. According to Tingley, the NBS will also evaluate proposed Special Committee on Radio Interference (CISPR) procedures for measuring conducted interference. The NBS report will not be ready until late 1985.

The ad hoc working group was set up to meet the Congressional mandate of reducing EMI to electronic equipment used in the home as defined in the Communications Act Amendments of 1982, P.L. 97-259 (see *MWN*, September and October 1982). The group is overseeing the development of voluntary immunity standards to forestall

mandatory FCC limits (see *MWN*, May 1983). The Federal Communications Commission's Frank Rose and Dan Yates are working with the ad hoc group.

Cordless Phones

The subcommittee on cordless phones is now trying to pick an independent laboratory to test the susceptibility of units to amateur radio signals. The phones operate at 46-49 MHz, and there is an amateur band at 50-54 MHz, which might cause objectionable EMI.

According to subcommittee member Jay Padgett of AT&T Consumer Products Labs in Neptune, NJ, no decision has yet been made on what data should be collected.

Padgett pointed out that the 49 MHz cordless phones have been on the market for some time, with virtually no interference complaints. Had there been a problem, the industry would have heard something by now.

Eric Schimmel of EIA's Information and Telecommunications Technologies Group agreed with Padgett: "We don't anticipate any problems showing up in the lab tests."

Heirman said that his ad hoc working group will begin addressing the immunity of burglar alarms and other security devices later this year.

VDTs and Problem Pregnancies: Research Underway

The possible link between video display terminals (VDTs) and miscarriages and birth defects is being intensively studied in the U.S. and Europe.

NIOSH Study

Researchers at the National Institute for Occupational Safety and Health (NIOSH) have eliminated half of a planned two-part study of VDTs and reproductive risks, and the remaining part of the project is in limbo while agency officials consider whether it can produce useful information.

NIOSH researchers originally designed the epidemiological study to include both prospective and retrospective components. For the prospective portion, which has been dropped, NIOSH had intended to follow the reproductive histories of approximately 4,000 female telephone operators for two years. The study population would have consisted of 2,000 women working with VDTs and a control group of women using single-line, light-emitting diode (LED) displays. In the retrospective part, NIOSH plans to ask the same women to describe their health and reproductive histories for the *last* two-and-a-half years.

NIOSH was forced to abandon the forward-looking component when representatives of the three telephone and telecommunication companies scheduled to participate announced that the LED operators would soon begin using VDTs, invalidating their role as controls. The announcement came at a meeting held at NIOSH offices in Cincinnati, OH, on December 17 to review the study protocol.

Teresa Schnorr, the lead researcher on the project, said

in a subsequent telephone interview that it would have been "preferable" to do both parts of the study and that the agency will now decide whether to do the historical component or nothing at all. But Dr. Jane Gordon, who headed the study until she left the agency in June, told *Microwave News* that the retrospective research "will be of very, very limited use" and will not add much to what is already known. Gordon is now a part-time consultant to the Communications Workers of America.

Meanwhile, the protocol for the retrospective part of the study has come under fire from both industry and labor groups. Industry groups are complaining that NIOSH should look at other occupations, not just telephone operators, to ensure that the results can be generalized to other VDT-based jobs. Union officials want more attention placed on stress and equipment design as possible causes of reproductive abnormalities.

NIOSH will not measure radiation levels or try to determine whether radiation emissions might affect pregnancies. Agency officials downplay possible health effects caused by VDT emissions, including very low frequency (VLF) fields.

Agency officials have not yet set a starting date for the study, but Schnorr hopes to begin distributing questionnaires by late summer.

Other Developments

Researchers elsewhere are also focusing on the VDT-problem pregnancy issue.

- Dr. William Butler, an epidemiologist at the University of Michigan at Ann Arbor, announced at the December 17 NIOSH meeting that he and Dr. Kelley Brix are planning a retrospective epidemiological study of VDTs and reproductive risks. Butler said that they "will cover different ground" than NIOSH. He would not comment on their funding sources or study populations.

- Researchers at Finland's Institute of Occupational Health in Helsinki found no evidence that VDT work can cause birth defects. Using listings in the national birth registry and a limited number of questionnaires, Drs. Kari Kurpa, Peter C. Holmberg, Kaarina Rantala and Tuula Nurminen concluded that working at VDTs produces no increase in the rate of reproductive abnormalities among exposed women. Thus, the authors report in the December 8, 1984 issue of *Lancet* that "our results do not give support to rumors that exposure to VDTs causes birth defects." Responding to this and other VDT research, *Lancet* editorialized on January 12 that continued research "will probably dissipate many of the general fatigue symptoms [reported by operators], and with them will go much of the anxiety about radiation. Much, but never all of the anxiety; where the health of so many is involved, unruffled vigilance is a good prescription."

- A statement has been issued from the first international conference on VDTs and reproductive risks, held November 29-30 in London, England. The meeting, which was closed to the public and the press, brought together re-

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searchers from Europe, Canada and the U.S. In a summary statement, conference organizers report that: "...there was general agreement among the panel of expert speakers that the investigations which have been carried out throughout the world — involving both the measurement of emissions from VDTs and the study of groups of operators to see if they have suffered any ill effects — have failed to confirm that the alleged harmful effects are attributable to VDT work. However, there was also general agreement that further surveys and research were justified given the complex and emotive nature of the allegations." A copy of the statement can be obtained from Humane Technology, PO Box 2, Quorn, Nr. Loughborough, Leicestershire LE12 8EG, England. Also available is a complete set of the papers presented at the meeting. It costs 15 pounds in Europe and 16.50 pounds elsewhere (prepaid, price includes postage).

• A NIOSH investigation of a problem pregnancy cluster at Southern Bell's offices in Atlanta, GA, confirmed that a cluster existed but did not find its cause (see *MWN*, April and May 1984). In a report released in late January (HETA 83-329-1498), NIOSH explained that maternal age, VDT use and time spent standing were ruled out as possible agents for the 43 percent miscarriage rate (6 of 14 pregnancies) that occurred among workers on the fifth floor of one of the company's buildings. This is one of three ongoing NIOSH investigations of possible problem pregnancy clusters and the first for which a report has been completed.

FCC Action on RF/MW Radiation Expected Soon

The Federal Communications Commission (FCC) is expected to reach a decision soon on its proposed rules on radiofrequency and microwave (RF/MW) radiation hazards. An FCC staffer said the commission may issue a ruling following its February 14 meeting or soon thereafter.

If the FCC decides to make radiation safety a factor in evaluating environmental risks, it will probably base its guidelines on compliance with either the American National Standards Institute (ANSI) or Occupational Safety and Health Administration (OSHA) standards.

Final action on Docket No. 79-144 has been pending since early 1982, when the FCC proposed a requirement that applicants for new facilities complete an environmental assessment, and possibly an environmental impact statement, if workers or the public could be exposed to radiation levels above 10 mW/cm². The rules are designed to meet the commission's obligations under the National Environmental Policy Act (see 47 *Federal Register* 8214, February 25, 1982 and *MWN*, March 1982).

The broadcast and communications industry used the proposal as an opportunity to urge the FCC to preempt state and local RF/MW radiation standards. Some commenters advised the commission to adopt the 1982 ANSI limits; others suggested staying with the more lenient 10 mW/cm² OSHA standard (see *MWN*, September 1982).

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(continued from p.1)

open access area on top of the Coty Tower he measured VHF power densities of up to 663 uW/cm².

Readings were generally lower inside buildings than in the open air because, EPA points out, walls and roofs attenuate the radiation. At VHF frequencies, the two highest indoor readings were 27-60 uW/cm² in an apartment on the 10th floor of Coty Tower and 40 uW/cm² in the restaurant at the Ala Moana Hotel. These power densities do not exceed any current guidelines used in the U.S., though they are higher than the Soviet Union's standard for the general population.

The radiation levels cited in the report are approximate. Tell cautions that they are accurate within a factor of plus or minus 2 decibel: "This corresponds to a possible uncertainty of +58 percent and -37 percent in the stated power densities and a possible uncertainty of +26 percent and -21 percent in the stated electric or magnetic field strengths. For example, a stated power density of 500 uW/cm² could in reality be as low as 315 uW/cm² or as high as 790 uW/cm²."

Reactions in Hawaii

The release of the EPA report caught most people in Honolulu by surprise. "I got no warning that they were going to release the report," said City Councilmember

Marilyn Bornhorst, who has expressed concern about radiation exposure.

The EPA report, *Radiofrequency Radiation Measurement Survey, Honolulu, Hawaii, May 14-25, 1984*, was handled with great sensitivity within the agency. Although it was completed last June, EPA delayed release until January while staffers wrote an accompanying "Background Information" fact sheet. Agency officials, one from Washington, DC, and one from the regional office in San Francisco, CA, went to Hawaii to hand deliver the report to key state and local officials and to answer questions.

"I wish we had better data on whether the ANSI standard is safe," Bornhorst said, referring to the guidelines set by the American National Standards Institute in 1982. She added that "I would feel a lot safer if we were following the Portland standard." The city of Portland, OR, has the strictest RF standard in the U.S.

Robert Hall of the Hawaii Institute for Biosocial Research in Honolulu said that he was "shocked" by the disparity between EPA's press release and the numbers in the actual report. He echoed Bornhorst's opinion of the ANSI standard: "We are not going to listen to ANSI." Hall had been pressing EPA to come to Hawaii to assess radiation risks since 1977.

(In its press release, EPA officials said that they do "not

believe that the levels of RF radiation measured at the Honolulu sites pose an immediate risk to the public because it is likely that most exposures are brief or intermittent and few, if any, people are likely to be exposed continuously to the highest levels." Similarly, an FCC press release said: "It was pleased to announce that the results of the study have shown that radio and TV signals in Honolulu do not pose an immediate danger to the public.")

(In its background paper, EPA concludes that heating is the primary health effect of RF radiation. With respect to low-level effects, the agency wrote: "The scientific literature also contains evidence intimating non-thermal effects from RF radiation, but this is unproven." And: "A recent study said to show a non-specific increase in tumors and adrenal effects in laboratory animals chronically exposed at 0.4 W/Kg of RF radiation needs to be analyzed in depth" (see *MWN*, July/August 1984).)

Congressman's AM Station

The family of Democratic Congressman Cecil Heftel owns KSSK-AM, which broadcasts from a tower that produces one of the hot spots reported by the FCC. The radio station is located at Ala Wai Tower, where EPA measured levels of 306 mW/cm² near the tower's access-limiting fence.

Ted Bornstein, the congressman's administrative assistant, refused to comment on Heftel's personal business affairs. According to the 1983 *Broadcasting Yearbook*, KSSK is owned by Heftel Broadcasting Corp., of which Cecil Heftel is president. The congressman's district includes Honolulu.

Earl McDaniel, KSSK's general manager, said that he had read the EPA report and that he was pleased to find out that no one is in danger. With respect to remedial actions, he said that the station would look to the FCC.

Councilmember Bornhorst said that her staff is looking into the possibility of proposing an exposure standard for Honolulu. In the meantime, she is urging EPA to set national limits. In addition, Hall said that he and his associates are preparing their own report on radiation exposures in Honolulu.

Both Bornhorst and Hall cited past government deception over pesticide contamination in the state and raised the possibility that EPA was repeating the same errors, thereby risking its credibility on the radiation safety question.

Current Standards

EPA had been planning to propose RF radiation limits of 100 uW/cm² for the VHF band and 10 mW/cm² for AM frequencies before internal agency disputes stalled the proposal in June of 1984 (see *MWN*, June and July/August 1984). These levels are ten times stricter than the 1982 ANSI limits for both occupational and public exposures — 1 mW/cm² and 100 mW/cm² at VHF and AM frequencies respectively (see *MWN*, September 1982).

In 1983, IRPA approved limits for the general public of 200 uW/cm² (VHF) and 2 mW/cm² (AM) (see *MWN*, March 1984). And in 1984, the Johns Hopkins University

Applied Physics Laboratory set occupational standards of 100 uW/cm² for VHF and 10 mW/cm² for AM frequencies (see *MWN*, December 1984).

The state of Massachusetts has its own standard: 200 uW/cm² for VHF and 20 mW/cm² for AM — designed to be five times stricter than the ANSI limits (see *MWN*, September 1983). In 1980, Portland, OR, set its own — and the strictest — standard: 100 uW/cm² for VHF and 500 uW/cm² for AM.

At the 21 Honolulu sites where measurements were made, 5 locations (3 AM, 2 VHF) were in excess of the ANSI standard, 11 would violate the Massachusetts standard (6 AM, 7 VHF), and 12 would exceed the IRPA limits (7 AM, 7 VHF). In some locations, both VHF and AM standards were exceeded. Most of the sites are publicly accessible, though only two of the AM readings that were above the ANSI limits were in public spaces. EPA points out that all the locations are near antennas and were picked because they were believed to have the strongest RF fields. EPA also notes that the fields fall off quickly with distance.

Based on previous field studies, EPA has estimated that less than one percent of the U.S. population is exposed to more than 1 uW/cm².

Remedial Work Underway

Steps have already been taken to limit exposures near the two publicly accessible AM towers where fields exceed the ANSI standard. William Hassinger, engineering advisor to the chief of the FCC's mass media bureau, told *Microwave News* that the commission is in contact with representatives of the owners of the radio stations and that remedial action is underway.

In one case, Hassinger said, the station owns the affected land and a fence probably will be erected to bar public access. In the second case, a solution may take

Other Radiation Hot Spots

While local zoning laws that force broadcasters to put their antennas in populated areas make downtown Honolulu a special case, there are many other locations in the United States where the public may also be exposed to radiation levels in excess of the ANSI standard.

EPA's Richard Tell said that there are "localized hot spots" throughout the United States. In a telephone interview from his office in Las Vegas, NV, Tell said that he had a computer printout listing about 200 FM stations which can, according to calculations, produce general public exposures greater than the ANSI standard.

Tell recommended that fences be built to block public access to some of these hot spots. "We should go out and identify the worst case exposure locations and tell people where the unacceptable levels are," Tell said.

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longer because the property is leased. Hassinger described the owners as "eager to help and resolve the problem."

An FCC press release stated that "any plans or proposals developed by the FCC likely will be highly individualized and will require a great deal of cooperation by all parties concerned."

The FCC has no formal rules governing occupational and public exposure to non-ionizing radiation. Hassinger said that the commission was gauging health risks on the basis of the ANSI limits.

The National Association of Broadcasters (NAB) also said that the stations involved were cooperating to resolve the problem. NAB President Edward Fritts called the Hawaii situation an "isolated and unique" case because broadcast towers are rarely located in inhabited areas.

In a press release, Fritts said that the NAB favored the ANSI standard and asked the federal government to adopt it to "assuage unwarranted public concern and eliminate unnecessary confusion at the state and local level." He noted that, "For more than 50 years, broadcasters have provided communications services...with absolutely no evidence of harm."

The Electromagnetic Energy Policy Alliance (EEPA) also urged the federal government to adopt the ANSI standard. In a press release, the trade group stated that, "The EPA survey results confirm that the Honolulu general public is in no danger from exposure to RF fields generated by radio and television broadcasting."

Beyond ANSI

While the two AM towers should be able to meet the ANSI limits without incurring large costs, Honolulu broadcasters would have more difficulty conforming to tougher limits, like the EPA's stalled 100 uW/cm² proposal.

Although EPA could set a standard as early as next year (it may not be 100 uW/cm²; indeed, EPA may decide a standard is not needed), very little planning is underway to meet limits which are stricter than ANSI's.

FCC's Hassinger believes that a long-term solution will probably be needed. "Wholesale relocation" of the antennas would be good, if feasible, he said, with the goal of "putting some distance between transmitters and people."

At the NAB, Tom Keller, vice-president for science and technology, said that he could not predict whether stricter standards than ANSI's would be adopted or how broadcasters would react to such measures. He said that it is in the

broadcasters' best interests to make the antennas more efficient, which would be the case if the towers were placed on the hills overlooking Honolulu.

At present, local laws prevent broadcasters from siting antennas on the adjacent hills, forcing the towers to be built in the middle of the city.

Shock and Burn Hazards

In the course of taking survey measurements, Tell responded to an FCC request to investigate accounts of window washers at high-rise buildings receiving RF burns from the long, metal cables that support their platforms. In one experiment, Tell measured almost one half ampere of current in a cable (extending from the roof of the Villa at Eaton Square), even though the ground level electric field strengths were only 1-2 V/m. According to the EPA report, "it was not possible to measure the open-circuit voltage on the cable, but the voltage was sufficient in strength to produce electrical arcs from the cable to grounded objects."

The report goes on: "Under these particular conditions, (the presence of conductors such as metal cables in low frequency fields), the RF burn phenomena is difficult to control...and shocks and burns present a real hazard for window washers using metal cables. Depending on whether metal cables are hung in close proximity to flammable materials (cloth awnings, grass, brush) or close to street level, fire hazards and/or shocks or burns to passersby inadvertently touching cables might be possible."

EPA has referred the matter to the Occupational Safety and Health Administration (OSHA). In a telephone interview, Bob Curtis of OSHA's Health Response Team in Salt Lake City, UT, acknowledged that metal cables create a shock risk, but explained that non-conducting cables cannot be used because of other OSHA rules.

(As noted earlier, in his report Tell cites a case of a label machine causing RF burns inside a store near a broadcast tower.)

There have also been reports of longshoremen receiving RF burns while working near cranes on docks half a mile from an AM radio tower. And Councilmember Bornhorst said that she knew of a report of sparks causing a fire in garbage at the bottom of an elevator shaft. Hall also said that he knew of a spontaneous fire near a broadcast tower.

Anecdotal stories of neurological disorders and other health complaints among residents of apartment buildings near broadcast towers are also circulating. These could not be confirmed and no health studies have been done.

OSHA's Curtis said that he had also been to Hawaii to take measurements last year but that he had not investigated commercial broadcast sources. He took readings near the Navy's Omega antenna and its communications station at Lualualei (see *MWN*, July/August 1982). Curtis said that his report would be completed in about six weeks.

For a copy of the Hawaii report, contact: Office of Radiation Programs, EPA, 401 M Street, SW, Washington, DC 20460. ●

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EPA Plans To Issue RF/MW Standard in 1986

The Environmental Protection Agency (EPA) now plans to issue federal limits in 1986 for public exposure to radiofrequency and microwave (RF/MW) radiation. The agency's schedule is cited in a letter from Joseph Cannon, EPA Assistant Administrator for Air and Radiation, to Mark Fowler, chairman of the Federal Communications Commission, which accompanied the release of an EPA report on radiation levels in Honolulu, Hawaii (see story on p.1 and the complete text of the letter on p.8).

In his January 22 letter, Cannon wrote that in 1985 EPA will "propose several options for limiting exposure to RF radiation." Among the listed possibilities are a 100, 200 or 1,000 uW/cm² standard. The agency may also decide that public exposure can be controlled without a standard.

Cannon also said that he anticipated reaching a decision on a national RF/MW radiation standard in 1986.

David Janes, of EPA's Office of Radiation Programs (ORP) in Washington, DC, confirmed this schedule in a

telephone interview with *Microwave News*.

EPA plans to propose limits last summer were stalled by dissent within the agency, principally from the Office of Policy Planning and Evaluation (see *MWN*, June and July/August 1984). In the fall, ORP Director Sheldon Meyers said that EPA would go to the *Federal Register* to obtain more information in an effort to decide on a preferred course of action (see *MWN*, October 1984).

EPA has now combined two steps: the agency will ask for outside opinions and propose a standard at the same time. Janes explained that the agency could save a year using this approach.

Informed sources note, however, that there is little chance a standard could emerge without a strong commitment from the new EPA administrator, Lee Thomas, because of longstanding opposition from the agency's policy office.

Cannon also told Fowler that later this year EPA would issue an economic analysis of the costs to broadcast sources of complying with RF/MW standards. The analysis is being prepared by the Lawrence Livermore National Laboratory (see *MWN*, January/February 1984).

CONFERENCES

March 5-7: **6th Symposium & Technical Exhibition on Electromagnetic Compatibility**, Zurich, Switzerland. Contact: EMC Symposium & Exhibition, ETH Zentrum-IKT, 8092 Zurich, Switzerland, 256-27-90.

March 20: **Symposium on Vision in the High Tech Society**, Sheraton Washington Hotel, Washington, DC. Contact: American Optometric Association, 243 N. Lindbergh Blvd., St. Louis, MO 63141, (314) 991-4100.

March 21-22: **IMTC/85: Instrumentation/Measurement Technology Conference**, Hyatt Regency, Tampa, FL. Contact: Dr. Robert Ashley, Sperry Corp., PO Box 4648, Clearwater, FL 33518, (813) 577-1900, ext. 2228.

March 22-26: **3rd Annual Meeting of the Society for Magnetic Resonance Imaging**, Town & Country Hotel, San Diego, CA. Contact: SMRI, 1340 Old Chain Bridge Rd., Suite 300, McLean, VA 22101, (703) 790-1745.

April 3-4: **21st Annual Meeting of the National Council on Radiation Protection and Measurements**, Washington, DC. Contact: NCRP, Suite 1016, 7910 Woodmont Ave., Bethesda, MD 20814, (301) 657-2652.

April 14-17: **63rd Annual Convention of the National Association of Broadcasters**, Las Vegas, NV. Contact: NAB, 1771 N Street, NW, Washington, DC 20036, (202) 293-3570.

April 16-17: **8th International Colloquium on the Prevention of Occupational Risks due to Electricity**, London, UK. Contact: International Fire Security & Safety Exhibitions & Conferences Ltd., Cavendish House, 128/134 Cleveland St., London W1P 5DN, UK, (01) 387-5050.

April 16-19: **4th International Conference on Antennas and Propagation (ICAP 85)**, Coventry, UK. Contact: Institution of Electrical Engineers (IEE), Savoy Place, London WC2R 0BL, UK, (01) 240-1871, ext. 222.

April 17-19: **3rd International Conference on Developments in Power System Protection**, London, UK. Contact: IEE, see April 16 above.

SHORT COURSES

March 18: **Electrostatic Discharge (ESD) Control**, Dallas, TX. Fee: \$295. Contact: R&B Enterprises, 20 Clipper Rd., West Conshohocken, PA 19428, (215) 825-1960.

March 18-20: **Dielectric Resonators**, Oxford, MS. Fee: \$550. Contact: Division of Continuing Education, University of Mississippi, University, MS 38677.

March 18-21: **Elements of Phased Array Radar System Design**, Atlanta, GA. Fee: \$750. Contact: Dept. of Continuing Education, Georgia Institute of Technology, Atlanta, GA 30332, (404) 894-2400.

March 18-22: **TEMPEST-Design, Control & Testing**, Washington, DC. Fee: \$1175. (Secret Security Clearance Required.) Contact: DWCI, Star Route 625, PO Box D, Gainesville, VA 22065, (703) 347-0030.

March 20-21: **Electromagnetic Pulse (EMP) Design and Test**, Dallas, TX. Fee: \$595. Contact: R&B, see March 18 above.

March 25-26: **Lightning Protection**, Orlando, FL. Fee: \$650. Contact: Continuing Engineering Education, George Washington University (GWU), Washington, DC 20052, (800) 424-9773 or (202) 676-6106 in DC. Repeated August 12-13: Washington, DC.

April 1-4: **Computational Methods in Electromagnetics**, Monterey, CA. Fee: \$750. Contact: Ann Beekman, SCEEE, 11th & Massachusetts Ave., St. Cloud, FL 32769, (305) 892-6146.

April 15-18: **Modern Microwave Measurements**, Palo Alto, CA. Fee: \$895. Contact: Continuing Education Institute (CEI), 10889 Wilshire Blvd., Los Angeles, CA 90024, (213) 824-9545 or (301) 596-0111. Repeated May 13-16: Alexandria, VA.

April 15-19: **Laser Microwave Hazards Course**, Aberdeen Proving Ground, MD. Fee: NA. Contact: Mrs. Donley, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD 21010, (301) 671-4158.

May 6-10: **Radiation Safety**, Evanston, IL. Fee: \$895. Contact: Continuing Engineering Studies, 2804 Technological Institute, Northwestern University, Evanston, IL 60201, (312) 492-3365.

FROM THE FIELD

EPA Letter to FCC on Hawaii Broadcast Radiation

Reprinted below is the complete text of the January 22 letter from Joseph A. Cannon, assistant administrator for air and radiation at the Environmental Protection Agency (EPA) to Mark S. Fowler, chairman of the Federal Communications Commission (FCC), accompanying the EPA report on the levels of broadcast radiation in Honolulu, Hawaii.

Dear Mr. Fowler:

At your request, a joint EPA and FCC study was conducted in May 1984 to measure the intensity of radiofrequency (RF) radiation fields in the vicinity of broadcast stations in Honolulu, Hawaii. I am happy to provide you with the enclosed report that summarizes the results of these field measurements.

In the study, measurements were made only in areas near antennas, and almost all of the broadcast towers in Honolulu were included. The survey locations are representative of places in Honolulu where public exposures to RF radiation fields are believed to be highest. The results show that public exposures in 12 out of the 21 survey locations exceed limits currently proposed, recommended, and/or adopted by several scientific and technical advisory organizations or regulatory bodies. Because of the combination of exposure levels and public accessibility, at least two of the locations may warrant further evaluation. The measurements and various exposure guidelines are discussed in the report.

RF radiation can produce various biological effects. Most studies use experimental animals exposed for relatively short periods of time, rather than long-term continuous exposures, and few health studies of people have been done. At relatively high levels, health effects are due to heating of cells and tissues, and increases in temperature are dependent on duration of exposure. At lower levels of exposure, the public health significance of experimentally observed effects is not well understood.

Although there are many uncertainties in our current understanding of how exposure to RF radiation affects human health, it is possible to interpret the meaning of the observed biological effects in terms of the potential for adverse health effects in exposed people and to identify subgroups in the population who may be particularly sensitive. Such an interpretation is presented in the enclosed fact sheet. The fact sheet also gives other background information on the survey, and it will be distributed to the public and members of the press who may request the report from us.

We do not believe that the levels of RF radiation measured at the Honolulu sites pose an immediate risk for the following reasons. Field intensities tend to drop off rapidly as distance from the source increases. In general, beyond about 100-150 feet from the base of antenna towers, people are exposed to low levels, typically below 100 microwatts per square centimeter or about 0.04 watts per kilogram of body mass.... The highest levels measured in this survey were outdoors in close proximity to the towers, on rooftops, or in areas with access normally limited to maintenance personnel or other workers. Indoor fields are generally low because of shielding by the walls and roofs of buildings. Consequently, it is likely that most exposures are transient or intermittent, and few people are likely to be exposed continuously to the highest fields. However, it would be prudent for you to investigate how many people have access to areas with the highest fields, and how often and how long they are exposed.

I understand that the Commission, in cooperation with local

authorities, will decide if and what corrective actions may be needed in Honolulu. I recognize that the results of this study are difficult to interpret in the absence of the Federal Guidance you have requested from EPA. In 1985, EPA intends to propose several options for limiting exposure to RF radiation. The options encompass the range of limits recommended or adopted by various advisory groups such as the International Radiation Protection Association (IRPA) and the American National Standards Institute (ANSI), and include:

1. Controlling public exposure by limiting whole-body average specific absorption rates (SAR) to 0.04 watts per kilogram (W/Kg) for frequencies above 3 Megahertz (MHz) and to 87 volts per meter (V/m) or 0.23 Amperes per meter (A/m) at frequencies below 3 MHz.
2. Controlling public exposure by limiting whole-body average SARs to 0.08 W/Kg for frequencies above 3 MHz and to 275 V/m or 0.73 A/m for frequencies below 3 MHz.
3. Controlling public exposure by limiting whole-body average SARs to 0.4 W/Kg for frequencies above 3 MHz and to 614 V/m or 1.63 A/m for frequencies below 3 MHz.
4. Other possible options, including not establishing Federal Guidance for RF radiation.

I anticipate that we will reach a decision on establishing Guidance in 1986. But, in the absence of formal EPA Guidance, you should at least consider evaluating the two publicly accessible locations in Honolulu where the measured exposure levels exceed the third option level listed above. In addition, we will be glad to help you with additional analyses you may undertake such as calculating exposures at various distances from the towers or identifying techniques (fencing, posting, and/or shielding, etc.) that can be used to limit public access to the higher fields near antenna towers.

We have just published a review of the biological effects of radiofrequency radiation, and various other background documents will also be made available to the public in 1985:

- Radiofrequency radiation in the environment — sources and levels of exposure (Office of Radiation Programs, EPA).
- An estimate of the potential costs of guidelines limiting public exposure to RF radiation from broadcast sources (Lawrence Livermore National Laboratory).
- Assessing the potential impact of Federal radiation safety regulations on AM, FM, and TV broadcast sources (Office of Radiation Programs, EPA).

If you have any questions about the report, please feel free to call me at 382-7400.

Sincerely,

Joseph A. Cannon

VDT Radiation Measurements at SRI International

The following communication was sent to Microwave News by Jane Clemmensen, a research engineer at SRI International. Clemmensen's letter is dated October 11.

We would like to provide additional data relative to the article on VDT flyback radiation (MWN, September 1984). Our comments will be restricted to Dr. Guy's data since the EPA measurements were peak rather than rms average fields. We did not measure rise and fall times of the horizontal sweep oscillator. We measured the vertical component of the electric field (Ez) and one or more components of the magnetic field (Bx, By, Bz). Unless

otherwise noted B-field values given are for the total B vector.

Our data on VDTs are consistent with Guy's range of rms magnetic fields (25-175 nT [nanotesla] or 0.02-0.14 A/m) which he measured 25-30 cm from the screen. We measured fields 30 cm in front of the screen of an old Heathkit terminal and found the magnetic field at the flyback frequency, 15.5 kHz, to be 63 nT (0.05 A/m). The B-field 40 cm away from the rear of the VDT was 13 nT (0.01 A/m). Our electric field data are not in agreement with Guy's generalization that E-fields measured 25-30 cm from the screen are typically 5 V/m for new VDTs and 50 V/m for older VDTs. We measured a 1.5 V/m electric field at 15.5 kHz at a distance 30 cm from the front of the screen of an old Heathkit terminal. More measurements on a number of different VDTs are clearly indicated before generalizations can be made.

Any discussion of fields from VDTs should also include television sets because they display similar spectral features and produce VLF emissions. The horizontal sweep frequency is standard-

ized in TV sets at 15.7 kHz. In VDTs the flyback frequency varies with make and manufacturer. The electric and magnetic fields originating from the flyback transformers of VDTs and TV sets are also accompanied by strong electric and magnetic fields at harmonics of the 60 Hz power line frequency. The magnitude of harmonic fields is approximately equal to the fields from the flyback transformer. 60 Hz harmonic fields therefore must be measured in addition to VLF radiation.

Our measurements of TV sets were made 1 m in front of the set at the height of a sitting child's head, 0.7 m above the floor. Electric fields at 1 m ranged from 1 V/m for a Sony TV to 3 V/m for an RCA. The single-axis magnetic field 1 m in front of the Sony was 1 nT (8×10^{-4} A/m) for the By orientation. The magnetic field from the RCA TV was 0.5 nT (4×10^{-4} A/m) for the By orientation and 1.5 nT (1.2×10^{-3} A/m) for the Bx orientation.

Jane M. Clemmensen, Research Engineer
Radio Physics Laboratory, SRI International
333 Ravenswood Ave., Menlo Park, CA 94025

UPDATES

BIOLOGICAL EFFECTS

ELF Research at Tulane...A group at the Electrosience and Biophysics Research Lab at Tulane University in New Orleans, LA, has been studying the effects of chronic exposure to high intensity electric fields for EPRI. The experiments were completed in 1982; shortly thereafter, the principal investigator, Dr. Y.J. Seto, died. The other members of the research team are Drs. William Dunlap, S.T. Hsieh, John Lymangrover, Deborah Majeau-Chargois and Cedric Walker. They have published a number of papers describing the results of their multi-generation study. In general, they did not identify any gross effects, though they did find a number of subtle interactions. Exposing rats to 80 kV/m unperturbed 60 Hz electric fields for 42-240 days (a mean of 125 days) resulted in enhanced growth in the long bones, causing both increased length and mass (*Journal of Bioelectricity*, 1, 339, 1982). Exposure for 120 days from conception caused no changes in food and water intake, but there was a statistically significant effect on the pattern of growth, "suggestive of a slight initial developmental delay" (*Journal of Bioelectricity*, 2, 197, 1983). The same 120-day exposure period caused no changes in body chemistry metabolism, as measured by 17 serum chemistry assays (*Journal of Environmental Science and Health*, A19, 865, 1984). Exposing four generations of rats to 80 kV/m did not affect the incidence of gross malformations or resorptions, nor did it change fetal orientations or the offsprings' sex ratios (*IEEE Transactions on Biomedical Engineering*, 31, 693, 1984; this paper also describes the exposure facility.) Still to come are the results on hematology. Some of these findings were presented at the 1982 BEMS meeting in Los Angeles, CA. In that paper, Majeau-Chargois reported a very significant decrease in white blood cells, as well as significant changes in spleen, kidney, adrenal and testes weights (see *MWN*, July/August 1982). According to Hsieh, the hematology results will appear in *Environmental Research*, 37, in August 1985. One

of the most interesting findings from the EPRI project was the demonstration of intensity windows at 60 Hz. The team discovered that exposure for five-and-a-half hours to a 10 kV/m 60 Hz field caused a highly significant, threefold elevation in the production of steroids by the rat's adrenal cortical tissue after in vitro administration of adrenocorticotrophic hormone (ACTH), but that 5, 100 and 1000 kV/m fields had no effect (*Life Sciences*, 32, 691, 1983). Hsieh said that additional papers are planned.

COMPATIBILITY & INTERFERENCE

ISM EMI to Aircraft...In 1982, the FAA signed a \$40,000 contract with the Avionics Engineering Center at Ohio University to determine, through calculations and measurements, the risks of EMI to aircraft avionics, especially with respect to instrument landing systems (ILS) and automatic direction finding (ADF) receivers (see *MWN*, September 1983). A final manuscript was sent to the FAA in the spring of 1984 and has been under review ever since. Last May, after the work had been completed, the center's James Nickum told *Microwave News* that he had turned up some interesting findings. For instance, he said that the ground-to-air propagation of ISM radiation is "significantly different" from ground-to-ground propagation. "There is certainly a need to address the issue of radiation interference to aeronautical services," Nickum said. While he did not advocate setting new standards, he did indicate that thought should be given to the advisability of siting ISM equipment near airports. (Last September, Nickum left Ohio to join the Collins Division of Rockwell International in Cedar Rapids, IA.) The FAA now estimates that the Ohio University report will be issued in May.

GOVERNMENT

FCC Steps Up Enforcement...The FCC seized electronic equipment valued at \$500,000 late last year, ending a

two-year investigation into the import of "non-type accepted" devices. In a raid on Granada Electronics of Brooklyn, NY, the commission confiscated more than 2,700 items illegally imported from the Far East, including CB radios, walkie-talkies and FM receivers, all of which are potential sources of RF interference. The CB radios, for example, are capable of operating at unauthorized frequencies and at power levels exceeding commission limits. Lawrence Wallach of L.W. Sales in Lynbrook, NY, was arrested for the unlawful sale of illegal CB transceivers. If convicted, the 27-year-old Wallach faces a maximum of 5 years in prison and \$5,000 in fines....In a separate action, in January the commission fined three distributors \$2,000 each for the repeated sale of cordless telephones that failed to meet the FCC's radiated power limitation. Those fined were TAD Avanti, distributor of the Record-a-Call CAT-100 and CAT-300; Dynascan, distributor of the Cobra CP915B; and Uniden, distributor of the Uniden EX-3100. The 46/49 MHz units were tested as part of the commission's upgraded sampling program.

LITIGATION

VDT Cataract Ruling...The New York State Workers' Compensation Board has ruled in favor of a secretary in what is believed to be the first successful claim of VDT-induced cataracts. Because the board ruled that the woman's cataracts "constitute an occupational disease arising out of and in the course of her employment," the January 2 decision may set a precedent for future claims. In its ruling (Case 0810 8929), the board found that "there is a recognizable link between the claimant's occupation and her disability." The decision was made on appeal after a workers' compensation law judge rejected the secretary's initial claim on August 26, 1983. No financial award was made, but Richard Spillane, the secretary's attorney, told *Microwave News* that the woman plans to file for compensation for lost work time and reduced earnings due to her condition. The secretary, Eileen Maguire of Staten Island, NY, was first diagnosed as having cataracts in August 1980, just seven months after she began working at a VDT. Four months after the diagnosis, she submitted a doctor's note to her employer, Shroder Bank and Trust Co. of New York City, stating that she could no longer work at a terminal. As a result, the company fired her in 1981.

Overviews...Microwave and VDT litigation were the subjects of two long articles in *The National Law Journal*. In the December 10 issue, John Parry advises law firms to do everything possible to integrate terminals properly into their office or risk the legal consequences. On the subject of radiation, he writes: "With regard to allegations of radiation injuries, the need for proximate causation makes recovery highly unlikely, except, perhaps, where a faulty VDT terminal is emitting radiation that exceeds federal limits. Even if scientific opinion in this country were to change and links were established, for example, between VDTs and cancer or birth defects, other elements of proof and employer defenses would substantially limit a firm's

liability." Parry is the staff director of the American Bar Association's Commission on the Mentally Disabled and the editor of the *Mental and Physical Disability Law Reporter*. The *Law Journal* article is an abridged version of a 19-page article published in the July-August 1984 issue of the *Reporter*: "Are VDTs Hazardous to Your Legal Health?" Reprints are available for \$5.00 (prepaid) from the *Reporter* at 1800 M Street, NW, Washington, DC, 20036, (202) 331-2240. In the January 28 *National Law Journal*, Kirk Victor describes the current state of microwave-related litigation: "Microwaves Stir New Generation of Battles." He writes: "Plaintiffs' lawyers have had their hopes set back by scientific studies that have not uncovered hard evidence of harm....But that lack of hard evidence has not stopped the speculation about the danger of microwaves or the continuing quest by plaintiffs' attorneys to probe the issue through a variety of pending suits — many of which are ultimately resolved by secret settlements."

MEDICAL APPLICATIONS

Kidney Stone Buster...The FDA has approved a shock wave device for the treatment of kidney stones. The "lithotripter" machine focuses shock waves, produced by an underwater high voltage condenser spark discharge, that shatter the brittle stones. Unlike ultrasound, the shock waves are single, sharply peaked impulses in the nanosecond range. The pulverized stones are then easily passed through the urine. A typical treatment involves up to 1,500 shock waves, given in a single session lasting about an hour. FDA estimates that this non-invasive technique could save \$2,000 per patient, compared to the \$6,700 cost of surgical removal. The treatment could be effective in 80 to 90 percent of the 100,000 cases now treated surgically in the U.S. each year. The \$1.7 million lithotripter was developed by Dornier System of West Germany.

MEETINGS

Tokyo EMC Meeting...The 1984 *International Symposium on EMC*, held in Tokyo, Japan, October 16-18, attracted more than 500 participants from 23 countries. Nearly 70 percent of the attendees were from Japan, with 15 percent from the U.S. The two-volume conference proceedings of close to 200 papers include the keynote address of Fumio Minozuma of the Ministry of Posts and Telecommunications: an historical review of radio noise activities in Japan. The 956-page proceedings will be available in the U.S. from the IEEE. They have not yet arrived from Japan and their U.S. price has not yet been set. (In Japan, the price is 10,000 yen, approximately \$40.00.) For more information, contact the IEEE conference office, 345 East 47th St., New York, NY 10017, (212) 705-7895.

MIT Goes to Scotland...Each year, Professor P. Lele of MIT's Department of Mechanical Engineering has been offering a summer course on the applications and hazards associated with microwaves, UV, ultrasound, lasers and

magnetic fields. This year, MIT is taking its summer school to the University of Stirling outside Edinburgh, Scotland, and Lele is going along. The course will be given from June 10-14; the cost for the week is \$1400, which includes tuition, food and lodging (golf may be extra). The deadline for applications is April 15. For those who want to take the course but would prefer not to travel so far, Lele will also offer it at MIT, August 5-9, for \$1050. Contact: Director of the Summer Session, MIT, Room E19-356, Cambridge, MA 02139, (617) 253-2101.

POWER LINES

Florida Tumor Cluster...Five girls living near 69 kV power lines developed an extremely rare type of ovarian cancer, endodermal sinus tumors, between 1974 and 1978. Four of the five, who were 1.5 to 18 years old and lived in Jacksonville, FL, died. Writing in *Oncology*, 41, 233, 1984, Drs. T.E. Aldrich, A. Glorieux and S. Castro note that these malignancies are "so rare that virtually no information has been compiled concerning their etiology" and that the cluster "is too remarkable to go unreported." The researchers argue that magnetic fields from the power line may have had a "mutagenic or promoter effect," complementing initiation by lead or polycyclic hydrocarbons from a nearby lead smelter plant and highway. They also raise the possibility that genetics, or some combination of genetic and environmental factors, played a role. (The five girls were black.) They conclude that "the power line hypothesis is only one interpretation and further research is obviously needed."

STANDARDS

IEC on Industrial Equipment EMC...The International Electrotechnical Commission (IEC) has issued two new standards on *Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment*. Publication 801-1, *Part 1: General Introduction*, which is a very brief overview of the problem, notes that the dominant source of industrial EMI is the walkie-talkie. Publication 801-2, *Part 2: Electrostatic Discharge Requirements*, applies to ESD generated by operators touching industrial equipment and ESD occurring between charged objects near the susceptible equipment — in both industrial and power generating plants. Part 2 establishes a reference test procedure and recommends severity levels. The documents are available from the International Sales Office of the American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018, (212) 354-3300. Part 1 costs \$10.00 and Part 2 costs \$29.00, plus postage.

Resources...NBS has released *Standards Activities of Organizations in the United States*, (SP-681). The directory summarizes the work of more than 750 organizations in the U.S., including federal and state agencies and more than 400 private groups. It is available, prepaid, for \$13.00 (\$16.25 foreign) from the Government Printing Office, Washington, DC 20402. Order No. 003-003-02602-

6....The January 1985 issue of the *IEEE Communications Magazine* features a number of articles on the standards work of the CCITT, IEC, IEEE, ISO and CEPT, with special reference to the structure and operation of these international groups.

VDTs

Legislation...Massachusetts State Senator Gerard D'Amico has introduced the first VDT bill of the new year in the U.S. The measure, which has not yet been assigned a number, requires periodic rest breaks, adjustable furniture and equipment, glare and noise control and semi-annual inspections of computer equipment. Under the bill, an employer would be required to provide, upon request, non-VDT work for a pregnant operator. If alternative work is not available, however, an employer can lay off the worker, who then becomes eligible for unemployment insurance. For more information, contact Barry Berman, Senator D'Amico's office, Room 413A, State House, Boston, MA 02133, (617) 969-7177....In Oregon, Senate Bill 57 would instruct the director of the state Workers' Compensation Department to develop voluntary purchasing and usage rules for VDTs as well as an educational program for VDT workers. The legislation was introduced by the standing Committee on Labor, chaired by Senator Margie Hendriksen, who sponsored Oregon's first VDT bill in 1983. The committee was acting on the recommendation of an interim labor committee, which held a series of meetings in 1984 and issued a report late last year (see *MWN*, November 1984). For copies of the bill and the report, contact Ms. Cheyenne Chapman, Committee on Labor, 331 State Capitol, Salem, OR 97310, (503) 378-5720....A Rhode Island study commission established last fall held a series of public hearings in January. The commission, which includes labor, industry and state representatives, as well as legislators, is planning to report its recommendations to the state assembly in February.

ETC

In the News...The January 14 issue of *The New Yorker* has a short piece on the New York Academy of Sciences' *Conference on Medical and Biological Effects of Light* (see *MWN*, December 1984). The anonymous author focuses on the pineal gland....The February *Omni* features a long article by science writer Kathleen McAuliffe on "The Mind Fields." McAuliffe begins by describing her tour of Dr. Jose Delgado's lab in Madrid, Spain, and goes on to delve into the scientific, medical and political controversies surrounding electromagnetic radiation from power lines, radar, VDTs, etc....Eric Lerner reviews the potential use of pulsed electromagnetic fields (PEMFs) for the treatment of osteonecrosis, osteoporosis and other bone ailments in the January *Esquire*. In the same issue, the magazine's editors present one of *Esquire's* Dubious Achievement Awards for 1984 to Professor Leonard Taylor of the University of Maryland for developing a way of shucking oysters with microwaves.

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VDT Legislative Report

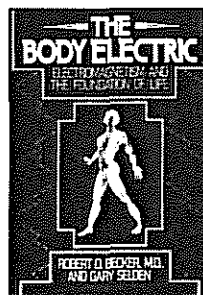
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