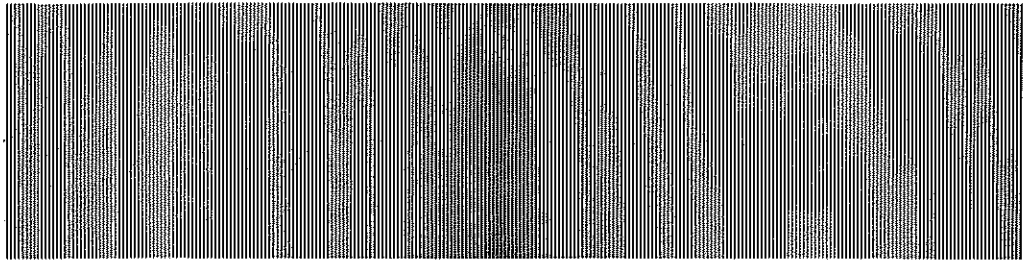


MICRO WAVE NEWS



Vol. I No. 9

A Monthly Report on Non-Ionizing Radiation

October 1981

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Satcom Siting: The Search for Radiation Safety Assurance

The satellite communications industry is booming, and the demand for earth stations is brisk. Federal Communications Commission (FCC) records show that 911 transmit and 4,862 receive stations have been licensed or have applications pending. According to an informal survey of government agencies and earth station manufacturers, these numbers will grow sharply in the 1980s. This bullish forecast is bolstered by several major suppliers reporting annual sales growth of up to 50 percent.

Proposed stations have sparked community opposition, a common reaction to the siting of major facilities like power plants and highways. The technology of the communications revolution, however, has added a new dimension to these disputes: radiation health hazards. Potential neighbors of transmitting stations are worried and confused about microwaves. Industry and citizens would welcome a federal radiation standard clarifying what levels are safe, but rule making has been slow. The Environmental Protection Agency (EPA) is not expected to propose guidelines until 1983 or 1984.

The FCC is also examining radiation safety. Efforts toward a policy statement were begun in June 1979 with a notice of inquiry (44 *Federal Register* 37008). Expected for several months, the commission's statement may finally be released this November, according to the FCC's Robert Cleveland.

The following three case studies, involving rural, urban and farming com-
(continued p. 2)

Disagreement Over Microwaves at IEEE

Members of two committees of the Institute of Electrical and Electronic Engineers (IEEE) are at odds over microwaves. At issue is a draft position paper on human exposure to radiofrequency and microwave (RF/MW) radiation prepared by the IEEE's Committee on Man and Radiation (COMAR). COMAR wants the statement adopted by the IEEE as a whole, but has run into opposition from members of another IEEE group, the Committee on Social Implications of Technology (CSIT). An editorial in the CSIT newsletter has sharply criticized the COMAR paper and wants it changed. Relations between COMAR and CSIT are now strained.

The COMAR statement seeks to reassure a wary public that there is little to fear from RF/MW radiation. For instance, it states that "clearly the known benefits of EM [electromagnetic] technology outweigh even the most speculative risks to the general population," and that a large body of data indicate that "moderate levels of EM fields (average power densities of 1 to 5 mW/cm²) are easily tolerated by human beings, at least for short periods, while prolonged whole-body exposure at high intensities (above 100 mW/cm²) is dangerous at frequencies for which significant energy is coupled to the human body." It goes on to endorse the new ANSI standard.

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SATELLITE COMMUNICATIONS

(continued from p. 1)

munities, reveal how the safety issue can affect satcom station siting.

RCA in Bainbridge Island

RCA Corp.'s plans for a satellite communications station in a rural community on Bainbridge Island, WA, are currently stalled. A local group, the Bucklin Hill Neighborhood Association (BHNA), which opposes construction of the \$3-5 million facility, has won its fight for an environmental impact statement (EIS). On August 21, the Kitsap County Office of Community Development, which has jurisdiction in Bucklin Hill, ruled RCA must prepare an EIS under the State Environmental Protection Act. According to the written ruling, "an objective survey of current information of the short and long term impacts on human health" is of particular concern.

Possible radiation health hazards were the main issue in the BHNA push for the EIS. The association's lawyer, Roger Leed of Seattle, argued that very little is known about potential radiation levels from the proposed station and that "this lack of information is further compounded by the general lack of knowledge about human health hazards generated by microwave radiation."

Because of the safety debate, Bainbridge Island may take on larger proportions than an isolated challenge for RCA. According to Howard Johnson, RCA staff vice president for product safety, the decision to spend the time and the money on an EIS rather than to look for another site was influenced by the company's desire to resolve this issue: "If we leave this one, next time we could face the same problem."

Johnson cited Home Box Office's (HBO) bid for a station in Rockaway, NJ, to make his point. (See *MWN*, January 1981.) Faced with continuing delays caused by community opposition, HBO scrapped its proposal. He believes HBO's decision "gave people ammunition" to fight other projects.

Indeed, BHNA member Jerry Hellmuth has drawn a parallel between Rockaway and Bainbridge Island. A school 1,000 feet from the proposed HBO site was a major concern to Rockaway residents. Hellmuth, the director of a Bucklin Hill boarding school directly across from the 7.9-acre RCA site, is also worried about the long-term effects of microwaves on children.

BHNA members do not know what radiation levels are safe, and they question the validity of the voluntary ANSI safety standard. Among queries submitted for a community meeting on radiation issues, the association asked: "How can we, who live next to the RCA proposed microwave facility, be guaranteed any safety to our health when no US standard exists that could protect us?"

Calculated power levels near the proposed station are currently being revised. Worst case figures, developed by RCA, were as high as 32 $\mu\text{W}/\text{cm}^2$ in one location. The regional EPA office's review of these calculations, however, found that they were unrealistically high and that normal levels would be a factor of ten lower. In an August 12 letter to the Kitsap development office, EPA's Elizabeth Corbyn wrote that, based on ANSI's proposed standard, "we do not believe construction and operation of the proposed communications satellite earth station will create an exposure hazard from microwaves."

The EIS is being prepared by the Seattle office of C H.M Hill, Inc., an international consulting firm, and should be completed by mid-October. Professor A.W. Guy from the

University of Washington, Seattle, and Dr. Don Justesen of the VA Medical Center in Kansas City, MO, are assisting with the radiation bioeffects portion of the statement.

The Bainbridge Island station would be the eighth in RCA's national network providing private channel communications service in large cities. Two 43-foot-diameter satcom antennas would be built on the site.

Cylix in Haverford

The zoning board of Haverford, PA, has rejected a station proposed by Cylix Communications Network, Inc. of Memphis, TN. After an emotionally charged hearing in this heavily populated, working class neighborhood near Philadelphia, the board ruled against Cylix on September 21.

Cylix is appealing the decision to the Court of Common Pleas of Delaware County. Company vice president of operations, Dick Furnival, told *Microwave News* that "there were no grounds for turning us down." Finding another site would be difficult and could cost the company \$100,000, Furnival said, because of the heavy microwave congestion in the Philadelphia area.

Judging by the initial community reaction to the Cylix proposal, it is likely that residents of Haverford and the adjacent township of Lower Merion will continue their opposition to the station.

Philadelphia lawyer John Trevaskis, a zoning law expert representing Cylix, is confident the appeal will be successful. In a telephone interview, Trevaskis questioned the need to hold a hearing on the Cylix request in the first place. He said hearings are held for satellite stations because "most zoning code enforcement officers just don't know what to do with these applications." His computer check found no earth station zoning cases on the books.

Haverford is slated to join the company's rapidly expanding national network of small, 0.7-watt data communications stations. Now over halfway toward a year-end goal of 25 stations, the company plans to operate over 100 by mid-1985.

COMSAT in Western PA

This summer the Cleveland Township, PA, zoning board approved the Communication Satellite Corporation's (COMSAT) application to build a \$50 million earth station on a 107-acre farmland tract. People Questioning COMSAT, a small but active group, has fought the station and wants to appeal the decision. Lack of funds, however, may prevent it from taking further action.

According to People Questioning COMSAT member David Bensen, the group's challenge would be based on zoning law rather than radiation safety issues. "Although we are not convinced the installation is safe," he explained, "we could not prove it is unsafe to the satisfaction of a court of law." The appeal must be filed by mid-October.

COMSAT has described its project in a detailed two-volume application to the FCC. The installation, with three 105-foot-diameter antennas transmitting in the 6 GHz and 14 GHz bands, will join two existing East Coast stations at Etam, WV, and Andover, ME. The Pennsylvania station is designed to help meet an anticipated quadrupling of the region's communications traffic in the next decade.

COMSAT's radiation hazard analysis consists of two pages

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out of over two hundred in the application. Company spokesman Roger Cochetti said that clarifying material, including EPA's evaluation of potential radiation levels near the station, will be sent to the FCC soon. These calculations, he points out, are "less conservative" than COMSAT's.

At the company's request, Norbert Hankin from EPA's Non-Ionizing Radiation Surveillance Branch calculated maximum possible microwave levels based on a minimum elevation angle of 5 degrees above the horizon and a maximum power per antenna of 5 kilowatts. (The actual elevation angle would be 26 degrees.) Maximum radiation levels for locations 1,000 feet from the 14 GHz and 6 GHz antennas would be less than 8.7 $\mu\text{W}/\text{cm}^2$ and 14.6 $\mu\text{W}/\text{cm}^2$ respectively and much lower for the area beyond 2,000 feet. (The third antenna could operate at either frequency and would function as a backup.) Upper limits rather than expected values were estimated because the near field—an area for which exact calculations are impossible—extends 7 miles for the 14 GHz antenna and 3 miles for the 6 GHz antenna.

In a letter to COMSAT, Hankin concluded that, on the basis of an analytical model and his own experience, "exposure power densities at distances beyond approximately 2,000 feet will be less than 1 $\mu\text{W}/\text{cm}^2$. . . The anticipated microwave exposures which would be produced by the operation of the proposed facility under 'worst case' conditions of power and antenna orientation . . . should not have any environmental impact; i.e., should not affect the health of humans or animals, nor affect vegetation."

If no appeal is initiated and FCC approval comes through in the next few months, construction could begin next year and the station could be in operation some time in 1983.

BRIEFS

Satellite Communications has published its September directory issue, listing regulatory agencies, satellite carriers, satellite services and hardware and component suppliers. . . . *Star Signals*, a monthly magazine for the earth station receiver industry, was launched this September by Interstar Satellite Systems, Inc. The magazine is the descendant of *Interstar Signals*, the company's widely distributed newsletter. For information, write *Star Signals*, 21708 Marilla Street, Chatsworth, CA 91331. . . . The National Telecommunications Conference, sponsored by the IEEE's Communications Society Conference Board, will be held in New Orleans, LA, November 29–December 3. Contact: NTC '81, Dale Caston, 365 Canal Street, Box 45, New Orleans, LA 70130. . . . The First International Space Communications Workshop will immediately follow NTC '81 in New Orleans on December 3–4. Topics include NASA's 30/20 GHz technical program and spatial frequency reuse techniques. Contact: Dr. A.S. Acampora, Bell Telephone Laboratories, Inc., Room 4E-336, Holmdel, NJ 07733; (201) 949-5692 or Dr. P.A. Kullstam, 6565 Arlington Blvd., Falls Church, VA 22046; (703) 533-8877. . . . Antennas are the feature topic in the September *IEEE Communications Magazine*. . . . Over 260 people attended "Space Communication in the '80s," the Sixth Annual Conference on Satellite Communications held September 23–25 in Washington, DC. The meeting was sponsored by the Public Service Satellite Consortium. . . . Scientific-Atlanta, Inc. is holding a satellite communications symposium in Atlanta, November 2–4. Over 700 participants from all aspects of the industry are expected to attend. For information, contact Betsy Crawley, (404) 449-2274. . . . Lockheed is developing a space antenna for extending the range of mobile communications units. According to *Science News*, August 29, the collapsible antenna would be 300 meters in diameter and weigh 200 pounds.

NCRP: Biophysics and Bioeffects

The National Council on Radiation Protection and Measurements (NCRP) has issued its first report on non-ionizing radiation. *Radio-frequency Electromagnetic Fields—Properties, Quantities and Units, Biophysical Interaction, and Measurements* is the product of eight years of work by a seven member committee, chaired by George Wilkening of Bell Labs.

The 119-page report includes a brief review of basic electricity and magnetism, a discussion of the interaction of microwaves with biological systems with special emphasis on specific absorption rates (SARs), a description of different types of monitoring instruments, a glossary and a definition of units.

Among the six technical appendices, there is a short discussion of natural background levels of non-ionizing radiation. An index and list of references are included.

The other members of Scientific Committee 39 that prepared the report were: Frank Barnes, Department of Electrical Engineering, University of Colorado, Boulder; Ronald Bowman, Electromagnetic Fields and Antennas Section, National Bureau of Standards; Arthur Guy, Department of Rehabilitation Medicine, University of Washington, Seattle; Karl Illinger, Department of Chemistry, Tufts University; the late Curtis Johnson, Department of Biophysics and Engineering, University of Utah, Salt Lake City; Saul Rosenthal, Department of Electrical Engineering, Polytechnic Institute of New York; and Charles Susskind, Department of Electrical Engineering and Computer Science, University of California, Berkeley.

The report (NCRP No. 67) is available for \$10.00 from NCRP Publications, PO Box 30175, Washington, DC 20014. There is a small reduction in price for bulk orders of more than 100 copies.

Another NCRP scientific committee (No. 53) is preparing a report on the biological effects of radiofrequency and microwave radiation. At work since 1977 under the chairmanship of Arthur Guy, the report is nearing completion. According to Dr. Constantine Maletskos, a consultant in biophysics to NCRP and MIT, it is due out at the end of next year.

The members of the committee held a working meeting October 1–2 in Oregon. In addition to Guy, the other committee members are: Ross Adey, VA Hospital, Loma Linda, CA; Edward Alpen, University of California, Berkeley; Stephen Cleary, Medical College of Virginia; Don Justesen, VA Medical Center, Kansas City; Mary Ellen O'Connor, University of Tulsa; and Richard Phillips, Battelle Pacific Northwest Labs, Richland, WA.

OTA: Solar Power Satellites

The Office of Technology Assessment (OTA) has concluded that "too little is currently known about the technical, economic and environmental aspects of SPS to make a sound decision whether to proceed with its development and deployment." The just-released, 300-page OTA report evaluated three alternative systems for beaming solar energy from an orbiting satellite to Earth: microwave, laser and mirror transmission.

The OTA did not recommend a stop to SPS funding, as did the National Academy of Sciences in its own recent SPS report. (See *MWN*, July/August 1981.)

Among the major conclusions related to microwave radiation were:

- "Too little is known about the biological effects of long-term exposure to low-level microwave radiation to assess the health risks associated with SPS microwave systems."
- "The potential for interference with other users of the electromagnetic spectrum could constitute a severe drawback for the microwave option."

A copy of the report, *Solar Power Satellites*, is available from the US Government Printing Office. GPO stock number: 052-003-00848-3. The price is \$7.50. A copy of the report's summary is available at no cost from OTA, US Congress, Washington, DC 20510, (202) 224-0885.

GOVERNMENT

Radiation Policy Council Closes Down

The Radiation Policy Council (RPC) went out of business at the end of September. The council, a victim of the Reagan-Stockman budget cuts, had all its funds deleted for the 1982 fiscal year which began on October 1.

Carl Gerber, the director of the RPC, said that the council would be ending its work prematurely but that he was glad he had been able to complete its first phase, issue identification. "It wasn't all a waste," he said, "but I wish I could have taken the issues on directly."

The RPC was set up by President Carter in February 1980 under Executive Order 12194 on the recommendation of an interagency task force chaired by Peter Libassi, the former general counsel of the Department of Health, Education and Welfare, now the Department of Health and Human Services. The task force itself was established after public disclosures that servicemen had been exposed to ionizing radiation from nuclear weapons testing. Under the original order, the council was given a four year mandate, ending in 1984.

The council never addressed non-ionizing radiation issues, though a number of groups had urged it to do so. (See *MWN*, January 1981.)

Gerber said that the council had won the support of the participating federal agencies, industry and professional societies, but that they had not created enough pressure to restore the lost funds. The original Carter FY82 budget had allocated \$980,000 for the RPC. In addition to cutting this to zero, the Reagan administration reduced the FY81 budget from \$942,000 to \$300,000, limiting Gerber to a staff of two part-time consultants and a secretary.

A report on issue identification and analysis is now under review and should be released by the end of the year. Gerber is also writing a final report, which he hopes will one day provide the basis for a continuation of the council's work.

OSHA's Auchter Says RF Radiation is "Serious Hazard"

Thorne Auchter, the administrator of the Occupational Safety and Health Administration (OSHA), has listed radiofrequency radiation as one of the hazards "which OSHA believes merit consideration at this time." In an affidavit required by the Court of Appeals' decision in a suit brought by farm workers seeking a field sanitation standard,* Auchter stated: "The radiofrequency radiation standard addresses a serious hazard to an extremely large number of employees, and Congress indicated that it should be examined."

Auchter described first and second order priorities for OSHA's health standards staff. RF is in the lower category. These priority standards are to be the focus of the agency's work over the next two years. Auchter outlined the RF problem in his timetable:

NIOSH has estimated that 20 million workers could be exposed to significant levels of radiofrequency radiation. Radiofrequency radiation has a heating effect on the body, and may raise body temperature and cause tissue damage. It may also affect the nervous system. OSHA is gathering information and considering amendment of its current standard (29 CFR §1910.97 Nonionizing radiation). On May 13, 1981 the Subcommittee on Investigations and Oversight of the House Committee on Science and Technology held a hearing on this hazard, and requested that OSHA move more rapidly in its efforts to minimize worker exposure to harmful levels of radiofrequency radiation. The project currently requires the work of two staff members on a part time basis.

**National Congress of Hispanic American Citizens (El Congreso), et al. v Ray Marshall, Secretary of Labor, et al.*, 626 F. 2d 882 (DC Cir 1979).

RF Sealer Meeting

The Bureau of Radiological Health (BRH) is hosting an all-day meeting on RF sealers, October 7 in Rockville, MD. Representatives from the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH) and BRH will explore strategies to deal with the RF sealer radiation problem.

Though the agenda is open to all possible control techniques, BRH does not favor performance standards for heaters and sealers. At last May's congressional hearing, chaired by Congressman Albert Gore, Jr., BRH Director John Villforth said that he did not think such emission standards would be effective because the agency did not have the authority to regulate old machines and because many users substantially modify the machines on delivery, thus undoing any built-in shielding. (See *MWN*, June 1981.)

EPA Plan Would Delay Release of Data

A new plan to control the release of research results from the Environmental Protection Agency (EPA) threatens to delay their publication, according to an article in *Science* magazine. Writing in the September 18 issue, R. Jeffrey Smith reports that, under the proposed policy, "scientific manuals and reports would have to follow a circuitous path through the agency involving as many as 30 steps before their conclusions become known to the general public." And "at five different steps, the material can be returned to the author for revision, whereupon the review process begins anew."

In a telephone interview from Research Triangle Park, NC, Daniel Cahill, director of the Experimental Biology Division in EPA's Office of Research and Development, confirmed that, if the proposal goes through, reports from his lab, which is responsible for EPA's research on radiofrequency and microwave bioeffects, could be held up. This would apply even to papers submitted for publication to peer reviewed journals.

With respect to the forthcoming criteria document on non-ionizing radiation, Cahill did not think the new review procedures would cause any extra delays. "This kind of document would normally go through extensive review in Washington," he said.

The criteria document should be ready for review by EPA's Office of Radiation Programs and Scientific Advisory Board (SAB) by mid-October. Cahill would also like to have a round of external reviews after the SAB has completed its work.

BRIEFS

It does not look as if NIOSH will be moving down to Atlanta. As we go to press the House Appropriations Committee has voted to block the use of CDC-NIOSH money to pay for the move. On the Senate side, the appropriations subcommittee has also voted against the plan. Darlene Christian, vice president of the American Federation of Government Employees Local 41, which represents NIOSH, said that "although no formal statement has been made by NIOSH or CDC, I'm 99 percent sure the move is a dead issue."...OSHA is re-evaluating its enforcement policy for RF/MW radiation. The Office of Field Coordination is in the process of weighing various options for Administrator Auchter....The medical surveillance report prepared by the Rocky Mountain Center for Occupational and Environmental Health at the University of Utah, under contract to OSHA, is now being revised by the center. (See *MWN*, February 1981.) A new draft is expected soon....The FCC staff has prepared a report on radiofrequency interference. A summary of the report was printed in the *Federal Register*, August 13, p. 40900.

ELF Literature Review

Jack Bridges and Dr. Maurline Preache of the IIT Research Institute in Chicago have published a detailed summary of the biological effects of 50-60 Hz electromagnetic fields. "Biological Influences of Power Frequency Electric Fields—A Tutorial Review from a Physical and Experimental Viewpoint," appears in the September issue of the *Proceedings of the IEEE*. The 19-page review covers the literature through 1979, with 145 references selected from some 3,000 publications.

In their abstract, the authors state:

....While considerable data exist on this subject major problems were found in much of the literature. It was found that electric field induces about the same body current into humans as that experienced by individuals touching household appliances. As a consequence, the electric field environment from EHV [extra high voltage] lines is only a subset of the ubiquitous 50-60 Hz electromagnetic environment found throughout industrialized communities. The omission of such environmental considerations has limited the usefulness of a number of studies.

A lack of understanding of how electric fields couple energy into animals has resulted in inconclusive research or inappropriate interpretation of results. A common misinterpretation has been to extend experimental results observed for fish or quadrupeds to erect humans on a simplistic volts-per-meter exposure basis.

While some of the studies reviewed noted potential deleterious effects at likely field levels for animal subjects, none of these reported effects could be unequivocally attributed to direct efforts of the electric fields....

BRIEFS

Martha Piana, David Hellums and William Wilson of Rice University have found that the response of human blood platelets to 2-hour exposure to 40 mW/cm² of 2.45 GHz microwaves is consistent with that predicted by a thermal model. They conclude that the work "yielded no evidence of adverse effects of microwaves on human blood platelets other than those associated with temperature increase in the specimens." *IEEE Transactions on Biomedical Engineering*, September 1981, p. 661.... The Smithsonian Science Information Exchange is offering a digest of on-going research projects in government, private and foreign labs on "Hazards of Microwaves." The package (No. AR04) consists of 291 different summaries covering the years 1979-1981. The cost is \$55. For more information, contact: SSIE, Room 300, 1730 M Street, NW, Washington, DC 20036, (202) 634-3933.... In contract news, the Office of Naval Research has awarded a \$217,500 grant to the University of Colorado, Boulder, for research on electromagnetic neural effects. And the R&D Directorate at Wright-Patterson AFB has awarded a \$135,281 contract to the Georgia Institute of Technology in Atlanta to study RF radiation effects on excitable tissues.

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IRPA

The International Radiation Protection Association's (IRPA) International Non-Ionizing Radiation (NIR) Committee has prepared an assessment of the biological effects of radiofrequency and microwave radiation as a first step toward developing an exposure standard. Environmental Health Criteria Document No. 16 also covers sources of radiation in use as well as levels of exposure. It is at the printer and should be available soon. The IRPA standard, which will cover the frequency range between 100 kHz and 300 GHz, is still under discussion. Another criteria document on extremely low frequency (ELF) radiation should be ready by 1982-83. In addition, the International Labour Office has asked IRPA to prepare an overview of occupational hazards from NIR.

In Washington, DC, for the Bioelectromagnetics and URSI meetings, Annette Duchene, the secretary of the IRPA NIR committee, said that the primary objectives of the committee are:

- to collect all available background data relevant to health protection against NIR
- to establish the basic principles of non-ionizing radiation protection and to develop appropriate internationally acceptable recommendations in this field
- to explore with other international organizations ways for furthering protection against the different types of NIR.

The other members of the committee are: H. Jammet (chairman, France), B.F.M. Bosnjakovic (Netherlands), P. Czerski (Poland), M. Faber (Denmark), D. Harder (F.R. Germany), J. Marshall (United Kingdom), M.H. Repacholi (Canada), D.H. Sliney (USA), J.C. Villforth (USA). The committee also has three consultants: G. Kossoff (Australia), G. Nimtz (F.R. Germany), and G. Wilkening (USA).

Jammet and Duchene can be reached at the Commissariat à l'Energie Atomique, Institut de Protection et de Surete Nucleaire, Departement de Protection, 92260 Fontenay-aux-Roses, France.

UK Postal Workers Want More Research

The Post Office Engineering Union has accused the British government of not doing enough research on the health effects of microwave radiation, according to the *London Times*. A September 9 news item reported that the union had leveled the charge at the Trade Union Congress meeting in Blackpool.

The piece went on to note that the National Radiological Protection Board (NRPB) had the only on-going research program in the country. Professor Edward Grant of Queen Elizabeth College at the University of London had applied to do some bioeffects research but failed to win a grant. A spokesman for the NRPB told the *Times* that a set of safety standards would be proposed next year. (Speaking at last August's URSI meeting in Washington, DC, NRPB's Frank Harlan said that the United Kingdom was presently using a 10 mW/cm² radiofrequency and microwave radiation safety standard.)

Meanwhile the *New Scientist* (September 17) reports that the NRPB has a new director. John Dunster had been named to replace Andrew MacClean, who died two months ago. Dunster was the NRPB's assistant director for operations until 1976, when he joined the Health and Safety Executive.

UPDATE

VDTs . . . Bill Shea, a typesetter with Local 226 of the International Typographical Union in Vancouver, British Columbia, has filed a workman's compensation suit alleging radiation induced cataracts as a result of working with VDTs . . . The Ontario Public Service Employees Union (OPSEU) has signed a contract with Dayton T. Brown of Bohemia, NY, to test the VDTs used by Darleen Weiss, a VDT operator seeking workers' compensation for alleged radiation induced cataracts. (See *MWN*, March and May 1981.) Under the \$65,000 contract, Dayton Brown will check the units for radiofrequency, microwave, ultraviolet and X-ray radiation, as well as static fields. Similar tests will be performed in gas discharge displays, possible alternatives to CRTs . . . OPSEU, the Southern Ontario Newspaper Guild and the Ontario Institute for Special Education are sponsoring a three-day conference on VDTs, October 16-18 in Toronto. Paul Brodeur and Jeanne Stellman are among the scheduled speakers . . . The American Optometric Association has issued recommendations for VDT operator eye care. Eye examinations for new workers and rest breaks are among the association's suggestions, based in part on NIOSH's Bay Area VDT study. For a copy, contact the association at 243 North Lindbergh Blvd., St. Louis, MO 63141 . . . Additional coverage of the National Academy of Sciences (NAS) symposium on VDTs and vision held this August in Washington, DC, appeared in the August 27 issue of *New Scientist* and the August 29 issue of *Science News*. (See *MWN*, September 1981.) In the September 5 issue, *Science News* continued its VDT coverage with a detailed report on a Norwegian study linking facial rashes among VDT operators with static electric fields. A report on this work was presented at the NAS symposium . . . Scientific measurements of fatigue among various types of VDT workers are being performed at the Institute of Ophthalmology at Moorfields Hospital, London. According to a September 23 report in the *London Times*, researchers are monitoring physiological signals in an attempt to establish objective measures for worker fatigue.

Medical Applications . . . The IEEE MTT-S and COMAR are sponsoring a one-day workshop on medical applications of electromagnetic energy on June 18, 1982, following the International Microwave Symposium (see Conference Calendar p. 8). Invited and contributed papers as well as panel discussions are scheduled. Topics to be covered include hyperthermia, NMR imaging, and radiometry. For more information contact one of the workshop's co-chairmen: Dr. J. Gordon Short, BSD Medical Corp., 420 Chipeta Way, Salt Lake City, UT 84108, (801) 582-5550; or Dr. Gideon Kantor, BRH, 12721 Twinbrook Parkway, Rockville, MD 20857, (301) 443-3840 . . . The proceedings of the symposium on *Bio-medical Thermology*, held in Strasbourg, France, last June 30-July 4 (see *MWN*, July/August 1981) are being edited by Dr. Michel Gautherie and Professor Ernest Albert and will be published early next year by Alan Liss, Inc., 150 Fifth Avenue, New York, NY 10011. If you order by November 15, you will receive a 20% discount on the yet-to-be-set publication price . . . The June 1981 issue of the *Journal of Microwave Power* is devoted to the use of RF and MW hyperthermia for cancer therapy . . . According to an article in the September 7 *New York Times*, Intermagnetics General Corp. is the first US

company to win a contract to deliver magnets for an NMR imaging system. Columbia Presbyterian Medical Center in New York City has ordered two from the Guilderland, NY, company. According to one market analyst quoted in the article, the NMR market may one day equal and perhaps surpass that of CAT scanners, which now runs about \$450 million a year.

Technology . . . The FCC anticipates a "great demand" for Digital Termination Systems (DTS) radio systems and is now proposing to authorize the 17.7-19.7 GHz band for DTS, in addition to the already allocated 10.55-10.68 GHz band. The commission is also acting favorably on a petition by Farinon Electric to "rechannelize the 18 GHz band to permit narrower bandwidth channel assignments than are currently provided for." (46 *Federal Register* 45635, September 14) . . . Robert Lagace of Arthur D. Little, Cambridge, MA, presented a paper at last August's URSI conference on a theoretical model to predict "the most favorable operating frequencies and maximum communication ranges for portable radios with loop antennas" in coal mines. The range turns out to peak between 300 and 700 kHz, and is "highly dependent" on the electrical conductivity of the coal seam and its surrounding rock . . . The Bureau of Mines in Pittsburgh is negotiating a contract with R.A. Isberg, a communications engineer in Berkeley, CA, to design, construct, test and build a mine-wide monitoring system . . . Rome Air Development Center at Griffiss AFB, NY, is looking for a company to develop a portable, direct current, miniature, multiplexed microwave link for simultaneous transmission and receipt of six color video signals (*Commerce Business Daily*, September 17) . . . The US Army Mobility Equipment Research and Development Command at Fort Belvoir, VA, is negotiating a contract with Aerodyne Research of Bedford, MA, for additional work on an "advanced microwave pumped laser."

Military Systems . . . The Air Force will prepare an environmental impact analysis on its proposal to build a third PAVE PAWS radar at Robins AFB, GA. The EIS will also evaluate Moody AFB, GA, as an alternative site. No contractor has yet been selected to do the work . . . The AF's Electronic Systems Division is looking for a contractor to develop and produce a very low frequency (VLF) miniature receiver, operating between 14 and 60 kHz, for its FB-111 and B-52 bombers (*Commerce Business Daily*, September 1) . . . Janet Raloff reports on the use of lasers for military communications, especially the blue-green system, which might replace Project ELF, in an article on laser research in the September 19 issue of *Science News* . . . The Naval Electronic Systems Command in Washington, DC, has awarded the IIT Research Institute in Chicago a \$465,535 contract for "technical support for ELF environmental compatibility assurance program."

Litigation . . . Jill Jonnes's article "Microwave Suits Heat Up" appeared in the September 14 issue of the *National Law Journal*.

Radar and MM Waves . . . A team from the Department of Atmospheric Sciences at the University of Washington, Seattle,

STANDARDS

have concluded that 8.6 mm radar "can provide a unique and powerful tool in evaluating the effects of cloud seeding." (*Science*, September 11)...The IEEE's Microwave Theory and Techniques Society is planning a special transactions issue on *Millimeter Waves* to be published in February 1983. For more information contact: V.G. Gelnovatch or Harold Jacobs, US Army Electronics Technology & Devices Lab, ATTN: DELET-M, Fort Monmouth, NJ 07703...The US Army Communications-Electronics Command at Fort Monmouth is looking for a contractor to review near mm wave communications technology (*Commerce Business Daily*, September 18)...A collaboration between anthropologists and a radar scientist has thrown new light on ancient Mayan land use. In an article in the September 25 *Science*, the group describes their use of 1225 MHz synthetic aperture radar...The Army's Harry Diamond Labs in Adelphi, MD, is negotiating with the Environmental Research Institute of Michigan in Ann Arbor to develop and demonstrate synthetic aperture radar technology.

EMP...The General Accounting Office (GAO) has issued a report, *Countervailing Strategy Demands Revision of Strategic Force Acquisition Plans* (MASAD-81-35, August 5, 1981), which concludes in part: "If the United States is to maintain deterrence until new weapons are deployed in significant numbers, the current [command, control and communications] network must be rapidly improved." The GAO is worried about the C³ network's vulnerability to EMP...William Broad outlined the DOD's plans to deal with the EMP threat in "Military Grapples with the Chaos Factor," in the September 11 *Science*. One strategy is to place greater emphasis on satellite communication systems. Broad concluded, "The EMP threat looms larger as the electronic revolution moves forward"...In response to some of Broad's earlier articles on EMP, UCLA's W.D. Hershberger presented some history of the early strategic work on EMP during the 1960s. His letter appeared in the August 21 *Science*...The Defense Nuclear Agency will host a closed meeting of its Scientific Advisory Group on the effects of nuclear weapons, October 20-22. On the agenda is the survivability of missiles and strategic weapons (46 *Federal Register* 45408, September 11)...The Naval Air Systems Command in Washington, DC, is seeking a contractor for EMP management and technical advisory support (*Commerce Business Daily*, September 21).

Ovens... Magic Chef has laid off 250 workers at its microwave factory in Anniston, AL. In a telephone interview from his office in Cleveland, TN, company spokesman Clyde Whitfield said that the reduction was only temporary—an attempt to reduce inventory. "The current rate of orders has not been up to expectations," he continued. He blamed the downturn on the economy and interest rates. The microwave oven industry as a whole remains strong however. According to the American Home Appliance Manufacturers' monthly report, factory shipments through this August are up 33% over last year: 2,670,000 over 2,003,000 for the first eight months of the year.

ANSI

Health Standard

A couple of negative ballots have been filed on the latest draft of the American National Standards Institute (ANSI) C95.1 safety standard for radiofrequency and microwave (RF/MW) radiation. Consumers Union voted against the proposed revision again, as did Leo Birenbaum of the Polytechnic Institute of New York. Since only negative votes were invited, there is no count of those affirming the new standard.

The Electronic Industries Association (EIA), which has consistently opposed the standard in the past, abstained because it did not have a chance to meet to discuss the changes. Although the trade association passed up this opportunity to vote, individual companies will submit comments in the next round of public review, when ANSI itself requests comments. Howard Johnson of RCA said that his company would probably oppose the standard at that stage, not because of objections to the proposed numerical limits but because of the process by which they were selected. Johnson wants the government rather than a voluntary organization to set a standard.

The Environmental Protection Agency (EPA) did not submit a negative vote, although it too does not approve of the standard. EPA's Dave Janes did not think his silence would be interpreted as approval: "My position has already been made clear, and it has not changed," he said.

The Bureau of Radiological Health (BRH) has dropped its objections and is now willing to support the standard. "While it does not answer all our concerns, we consider it an improvement over the old standard," said BRH's Henry Rechen. Rechen intends to file an official letter, citing the BRH position in the near future.

New Warning Symbol

The new ANSI symbol to warn the public and workers of potentially hazardous RF/MW fields has been approved. The symbol can be placed in a variety of signs but when used separately it must be enclosed in a triangle, as shown in the figure below. The triangle should be yellow. The new abstract symbol replaces the old sign, which was adopted in 1966 and reaffirmed in 1974. The C95.2 standard is now at the printer, and will soon be available from ANSI, 1430 Broadway, New York, NY 10018.



CONFERENCES

CALL FOR PAPERS

- 10th Annual *Northeast Bioengineering Conference*, March 15-16, 1982. Dartmouth College, Hanover, NH. Contact: Professor Eric Hansen, Thayer School of Engineering, Dartmouth College, Hanover, NH 03755, (603) 646-2205.
- *International Microwave Symposium*, June 15-17, 1982. (See calendar.) One or two sessions are planned on bioeffects and medical applications. Contact: Professor Om Gandhi, Department of Electrical Engineering, University of Utah, Salt Lake City, UT 84112, (801) 581-7743. Papers are also being sought for the workshop on medical applications to be held June 18. See Update on p. 6.
- *IMPI Symposium*, July 25-30, 1982. (See calendar.) Papers on non-communication aspects of microwaves. Contact: Gandhi, address given above.

CALENDAR

- October 26-27: *Microwaves and Thermoregulation: A Symposium*, hosted by the John B. Pierce Foundation, New Haven, CT. Contact: Office of Graduate and Continuing Education, Yale School of Medicine, 333 Cedar Street, New Haven, CT 06510.
- November 9-11: 1st Annual Meeting of the *Bioelectrical Repair and Growth Society*, Philadelphia, PA. Contact: Executive Secretary of the Society, 425 Medical Education Building, 36th and Hamilton Walk, Philadelphia, PA 19104.
- December 7-12: 6th *International Conference on Infrared and Millimeter Waves*, Carillon Hotel, Miami Beach, FL. Contact: K.J. Button, MIT National Magnet Laboratory, Cambridge, MA 02139.

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- January 13-15: *National Radio Science Meeting*, University of Colorado, Boulder, CO. Contact: S.W. Maley, Dept. of Electrical Engineering, University of Colorado, Boulder, CO 80309.
- March 15-18: *International Workshop on Physics and Engineering in Medical Imaging*, Asilomar Conference Grounds, Pacific Grove, CA. Contact: University Extension, University of California, PO Box AZ, Irvine, CA 92716.
- March 29-April 2: 3rd *International Congress of Thermology*, Bath, England. Contact: Congress Secretariat, Martlet Conference Services, 24 Preston Street, Brighton, Sussex BN1 2HN, England.
- May 24-28: *International IEEE/APS Symposium, National Radio Science Meeting and Nuclear Electromagnetic Pulse Meeting*, University of New Mexico, Albuquerque, NM. Contact: Dr. Kendall F. Casey, Dikewood Corp., 1613 University Blvd., NE, Albuquerque, NM 87102.
- June 15-17: IEEE MTT-S *International Microwave Symposium*, Hyatt Regency Hotel, Dallas, TX. Contact: J.R. Griffin, Texas Instruments, Mail Stop 3432, PO Box 405, Lewisville, TX 75067.
- June 29-July 2: 4th Annual *Bioelectromagnetics Society Meeting*, Beverly Wilshire Hotel, Los Angeles, CA. Contact: BEMS, PO Box 3651, Arlington, VA 22203.
- July 25-30: 17th Annual Symposium of the *International Microwave Power Institute*, Town and Country Hotel, San Diego, CA. Contact: IMPI, 211 East 43rd Street, New York, NY 10017.
- September 6-10: 7th *Colloquium on Microwave Communication*, Budapest, Hungary. Contact: Secretariat of the 7th Microcoll, H-1525, Budapest 114, POB 15, Hungary.

SHORT COURSES

- November 16-20: *Principles of Modern Radar*, Georgia Institute of Technology, Atlanta, GA. Fee: \$475. Contact: Department of Continuing Education, GIT, Atlanta, GA 30332, (404) 894-2400.
- December 7-9: *Millimeter-Wave Radar*, George Washington University, Washington, DC. Fee: \$575. Contact: Continuing Engineering Education, GWU, Washington, DC 20052, (202) 676-6106 or (800) 424-9773.

Disagreement at IEEE

(continued from p. 1)

Writing in the September issue of the CSIT newsletter, *Technology and Society*, Dr. Norman Balabanian, its editor, found the COMAR document marred by inconsistencies, logical fallacies and inaccurate implications. He specifically objected to COMAR and ANSI's failure to recognize the risks of non-thermal, long-term and partial-body effects. Balabanian feared that the IEEE, and engineers in general, will be viewed as just another special interest group unless its public statements are "factual, objective and unbiased."

In an interview, Balabanian said it was not his intention to comment on the technical content of the COMAR position paper: "I only used it as an example of what IEEE position papers should be like, and the COMAR statement falls short of the desired characteristics."

Some of the language in the COMAR statement, as published side-by-side with the Balabanian editorial, has already been toned down due to pressure from the IEEE. COMAR President Om Gandhi admitted that certain phrases were "unnecessarily abrasive," and these have been edited out. Otherwise, he maintained that "COMAR was sticking by its position paper."

"We are the technical expert committee of the IEEE," Gandhi said, "and we don't see how there can be two expert committees in the field." He referred to "the large number of knowledgeable people on the committee: Professor Carl Durney, the president of the Bioelectromagnetics Society (BEMS), Dr. Donald McRee, of the National Institute of Environmental Health Sciences and the president-elect of BEMS, and Dr. Elliot Postow of the National Naval Medical Center, the editor of the BEMS journal." And "we have obviously looked at low-level phenomena," Gandhi added.

Robert Bogumil, the chairman of CSIT, said that while he is encouraged by some of the changes made by COMAR, "they do not go as far as I would like." He stressed that the purpose of Balabanian's editorial was not to offer an official CSIT position but to stimulate a response from the newsletter readership in order to develop such a position and to make suggestions to COMAR.

Dr. Irving Engelson, director of Technical Activities for the IEEE, said that the solicitation of views from a wide variety of people is a common procedure: "This is the process we go through with all our position papers."

The COMAR statement will be on the agenda of the IEEE's US Activities Board at its October 20-21 meeting in Rapid City, SD, and will be presented for approval at the IEEE's Technical Activities Board's (TAB) December 3-4 meeting in Savannah, GA, according to Gandhi. By then, reactions from CSIT and other IEEE members should be apparent. Engelson would not predict how the 60 TAB members would vote. If approved by TAB, the position paper must still win the endorsement of the full IEEE board of directors.

COMAR is also working on a position paper on "Health Aspects of Video Display Terminals." The first draft, written by John Osepchuk of Raytheon Corp. and Maria Stuchly of Health and Welfare, Canada, is now being reviewed by the COMAR membership. COMAR's plans to make a movie about microwaves are also continuing.