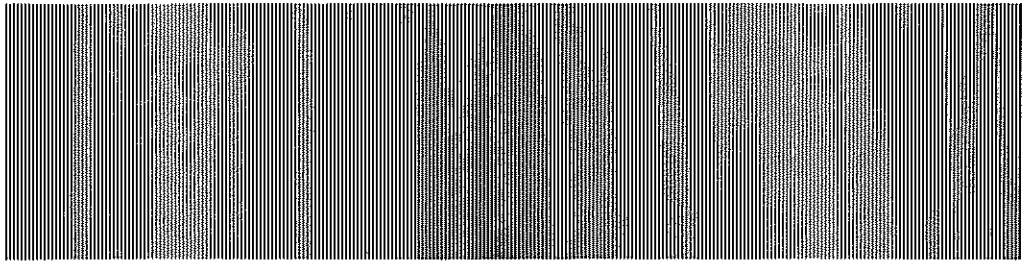


# MICRO WAVE NEWS



Vol. II No. 1

A Monthly Report on Non-Ionizing Radiation

Jan./Feb. 1982

## INSIDE...

### HIGHLIGHTS

pp. 4-5

Microwaves Dismissed in Embassy Case  
Another VDT-Related Cluster  
DoD Budget: PAVE PAWS & ELF  
Medical Devices: Rules & Research  
Oregon County RF/MW Action  
Portland Cancer Study  
US-USSR Measurement Plan  
New Findings at Hopkins Lab  
Behavioral Effects Workshop  
Changes at EPA

### OCCUPATIONAL HEALTH

p. 3

NIOSH RF Sealer Surveys

### UPDATES

pp. 6-8

Biological Effects  
Communications  
Compatibility & Interference  
Government  
IEEE  
Litigation  
Measurement  
Medical Applications  
Military Systems & Radar  
Ovens  
Power Lines  
Satellite Communications  
Technology  
VDTs

### LETTERS

p. 8

### CONFERENCE CALENDAR

p. 8

Microwave News invites letters from its readers. We ask writers to be brief, and we reserve the right to edit contributions for length.

## ERMAC-FMAC To Issue Statement on RF/MW Safety

### Briefings on Regulations and Standards

The Electromagnetic Radiation Management Advisory Council (ERMAC) and the Frequency Management Advisory Council (FMAC) intend to issue a statement to assure the public that low levels of non-ionizing radiation are not hazardous. The councils decided to release a statement at a joint meeting in Washington, DC, on December 18. ERMAC chairman Donald Jansky of the National Telecommunications and Information Administration (NTIA) hopes the document will be ready by late March.

Council members, responding to growing public apprehension over non-ionizing radiation, agreed that some type of formal assurance is needed before the Environmental Protection Agency (EPA) proposes a federal guideline in 1983. They were split, however, over whether or not to cite a number for safe population exposure in the statement—and if so, what number.

Jansky asked everyone on the councils to submit a proposal for a statement by mid-January. Dr. Samuel Koslov of the Johns Hopkins University Applied Physics Laboratory and FMAC's Sidney Metzger of the Communications Satellite Corp. were charged with editing these drafts.

As of the end of January, Koslov had received six drafts representing a wide range of views.

### Federal Agency Actions

EPA's David Janes told the meeting that his agency's schedule cannot be speeded up; it will need until at least September 1983 to propose a population exposure guidance. When asked what the guideline might be, he would only say that EPA is considering numbers bounded on the low side by the Soviet standard (0.005 mW/cm<sup>2</sup>) and on the high side by levels slightly lower than the new American National Standards Institute (ANSI) standard (1.0-5.0

(continued p. 2)

## A Proposed ERMAC-FMAC Statement by Professor Charles Suskind

Whereas no regulatory arm of the US government is likely to adopt a maximum permissible level of non-ionizing radiation exposure for the general public in the next two years;

Whereas several existing and proposed US standards have been set at this level variously between 100 uW/cm<sup>2</sup> and 10 mW/cm<sup>2</sup>;

Whereas further research is needed to determine where this level should be set; Whereas no health hazards have been demonstrated below 100 uW/cm<sup>2</sup>;

Therefore, the ERMAC and the FMAC declare that the state of the art enables them to say that no health hazard can result from total incident radiation lower than 50 uW/cm<sup>2</sup>.

This statement is issued without prejudice toward any level that may be adopted, and in the knowledge that this level is likely to be well above 50 uW/cm<sup>2</sup>.

# ERMAC-FMAC MEETING

(continued from p. 1)

mW/cm<sup>2</sup>). Janes estimated the guidance will require one million dollars to complete. The agency's Environmental Biology Division in Research Triangle Park, NC, is now circulating its criteria document for the guidance.

Briefings at the meeting from other federal agencies provided the following updates on standards actions:

- Paul Strudler of the National Institute for Occupational Safety and Health (NIOSH) would not say what standard the institute will propose in its long-awaited criteria document. But he did note that thinking at NIOSH is "not that different" from that at EPA, ANSI and the American Conference on Governmental Industrial Hygienists (ACGIH).
- The Federal Communications Commission's (FCC) Robert Cleveland announced that the agency's response to a 1979 notice of inquiry (NOI) on potential radiation hazards was imminent. At a January 28 meeting, the commission did act on the staff recommendation; it intends to apply its environmental rules to radiofrequency/microwave (RF/MW) transmitters. The details are in the FCC's advanced notice of proposed rule making, which had not yet been released. Observing that times have changed since the commission issued its NOI, Cleveland reported that the National Association of Broadcasters (NAB) has reversed its initial position and now supports radiation guidelines—possibly because inquiries from the general public on radiation hazards have risen sharply. (For other NAB news, see updates on communications, p. 6.)
- Two staffers at the Occupational Safety and Health Administration (OSHA) are still working on an advanced notice of proposed rule making for a new RF/MW standard, but the agency has no schedule for issuing it.
- A spokesman for the Bureau of Radiological Health (BRH) said the bureau intends to abandon proposed plans for a performance standard for diathermy products. (See p. 4.)
- A settlement has been reached between BRH and the American Home Appliance Manufacturers on amending BRH's microwave oven standard. (See updates on ovens, p. 7.)

## Other News

Summaries of non-governmental standards activities, state and local rule making, international actions, litigation and siting problems filled the rest of the busy morning agenda. Items from these briefings included:

- A scientific committee of the National Council on Radiation Protection and Measurement (NCRP) hopes to complete its report on the bioeffects of RF/MW radiation at a March meeting. Disagreement over the general population standard continues, however, with proposals ranging from 0.1 mW/cm<sup>2</sup> to 1 mW/cm<sup>2</sup>.
- The BRH's Dr. Zory Glazer said the ACGIH would discuss its proposed standard in January; at that meeting in Cincinnati, final consideration of the RF/MW threshold limit value (TLV) was postponed until an April 21-23 meeting in San Antonio, TX. The ACGIH's rationale has been published in *Supplemental Documentation 1981* to the ACGIH TLV book.
- Filmways, Inc. of Syracuse, NY, has taken the town of Onondaga, NY, to court over its moratorium on construction of broadcast stations. The company wants the building ban lifted and is seeking more than five million dollars in damages for the delay of its proposed station on channel 43.
- The new ANSI standard is in galleys and will be published soon.
- The military does enforce national RF/MW exposure standards in Poland, according to Dr. Przemyslaw Czernski, a visiting scientist at BRH. Enforcement is separate, though, for security reasons. Czernski believes that the same holds true for the Soviet Union.

• Koslov reported that preliminary results of work at the Johns Hopkins University Applied Physics Laboratory suggest tissue damage occurs at about 10 mW/cm<sup>2</sup> at high frequencies. (See p. 5.)

## ERMAC-FMAC Statement

Much of the debate on the proposed ERMAC-FMAC statement on public safety focused on citing a safe level of RF/MW exposure. Many members feared a number could become a de facto standard and urged that no specific levels be set. Metzger suggested avoiding a number by issuing a general assurance that population exposures from current RF/MW equipment are safe. A general statement on the state of the art in bioeffects research was also proposed.

Other members favored citing a low number that would cover normal population exposures. ERMAC's Professor Charles Susskind of the University of California at Berkeley offered a proposal which assured that exposures below 50 uW/cm<sup>2</sup> are safe (see p. 1 for complete text). According to electronics engineering consultant Jules Cohen, AM transmitters might exceed the 50 uW/cm<sup>2</sup> level; he suggested adding some type of frequency dependency.

ERMAC's Dr. Ross Adey of the Veterans Hospital in Loma Linda, CA, argued that ERMAC and FMAC "should not get involved with contingencies" and should produce a simple document with one number. Adey also asked that the statement acknowledge the need for more study before a final standard is set. He urged that "we must not sweep under the rug the low-level effects that are now understood... if we wish to enjoy credibility in the eyes of the public."

Both EPA's Janes and Dr. Nicholas Steneck from the University of Michigan told the councils that guidelines require public participation. Janes, defending EPA's lengthy rule-making process, said that given the public's concerns, "I don't see how any group can issue a guidance without a chance for public review and comment." Steneck asserted that the public will question the ERMAC-FMAC statement. "You end up nowhere, official statements from above are not effective," he said. Jansky quickly replied that "it would be irresponsible not to do anything."

Whatever the final form of the statement, FMAC's Judge Ann Aldrich of the US District Court in Cleveland stressed that it could provide long-term benefits to industry. Comparing non-ionizing radiation to asbestos, Aldrich advised industry to weigh the costs of enforcing a standard against the potential costs of future litigation.

ERMAC and FMAC considered several courses of action in addition to issuing a statement. ERMAC's Professor A.W. Guy from the University of Washington, Seattle, suggested using the ANSI standard as an interim guideline, but council members rejected endorsing this or any current or proposed standard. When model state regulations came up for review, Aldrich warned that they present "thorny jurisdictional issues." Cleveland said the FCC has not addressed the issue of local preemption. Facilitating an interim federal guideline was also on the list of possible actions, but representatives from EPA, NIOSH, OSHA and the FCC ruled out any chance of such a policy statement coming from government.

NTIA is waiting for the proposals for a statement to come in before scheduling another meeting. In a speech before a meeting at the Bell Labs in Whippany, NJ, Bill Mumford of ERMAC came out in support of the Susskind proposal.

The minutes for the December 18 meeting will be ready soon and will go out to all attendees. Others can request a copy from Janet Healer, Office of the Chief Scientist, NTIA, 1325 G Street, Washington, DC 20005.

MICROWAVE NEWS is published monthly, except in January and July • ISSN 0275-6595 • PO Box 1799, Grand Central Station • New York, NY 10163 • (212) 794-9633 • Editor: Louis Slesin, Ph.D., Associate Editor: Martha Zybko • Subscription: \$165 per year (overseas \$200) • Copyright © 1982 by Louis Slesin • Reproduction in any form is forbidden without written permission.

## OCCUPATIONAL HEALTH: RF SEALERS

The table below summarizes 19 of 21 field surveys of worker exposure to radiofrequency (RF) heaters and sealers made by the National Institute for Occupational Safety and Health (NIOSH) between 1978 and 1981.

The machines operate in the ISM (industrial, scientific and medical) bands at frequencies between 10 and 50 MHz, with power outputs ranging from 0.8 to 75 kilowatts. All measurements are corrected for the duty cycle (the on/off schedule) of the units.

Most of the surveyed units sealed plastic on products such as binders, luggage and handbags, though the devices are used in a broad range of applications.

In 17 work places at least one tested machine exposed workers to radiation exceeding the equivalent of the Occupational Safety and Health Administration (OSHA) 10 mW/cm<sup>2</sup> standard. Because exposure occurs in the near field of the power source, the standard should be cited in terms of the electric field and magnetic field intensities: for 10 mW/cm<sup>2</sup>, these are 200 V/m and 0.5 A/m respectively.

### *Occupational Exposure to RF Radiation from Heat Sealers: Summary of NIOSH Work Place Surveys*

Work Place	Survey Date	# Units At Site	# Units Tested	# Units Emitting		Highest Reading/Location‡
				≥200 V/m	≥0.50 A/m	
Hazel, Inc., Washington, MO	11-20-78	~33*	6	3	1	>1461 V/m N >0.53 A/m K
Standard Plastic Products, Inc., South Plainfield, NJ	11-29-78	~10	3	3	1	>1259 V/m N,W,K 0.60 A/m K
Henry Richards Company, Inc., Hamden, CT	12-6-78	~64*	11	10	3	>823 V/m C 1.03 A/m C
Tag-A-Long Handbags & Ac- cessories, Inc., East Haven, CT	12-6-78	9	4	4	1	445.1 V/m C 0.58 A/m C
Jaclyn, Inc., West New York, NJ	12-7-78	~33*	6	4	1	1493 V/m K, 1363 V/m E 1.40 A/m E
Celebrity Inc., New York, NY	12-8-78	~41*	5	5	3	595 V/m C, 566 V/m E 0.60 A/m E
Chrysler Trim Plant, Lyons, MI	2-14-79	13	5	2	1	2700 V/m E,C 1.21 A/m E
General Motors Fisher Body Trim Plant, Grand Rapids, MI	2-15-79	33	11	0	0	ND
Ford Motor Utica Trim Plant, Utica, MI	2-15-79	28	5	1	0	867 V/m W 0.184 A/m W
Dielectrics, Inc., Chicopee Falls, MA	3-14-79	~49*	4	2	0	222 V/m W 0.06 A/m E
Blair Industries, Chicago, IL	4-5-79	28	5	1	2	400 V/m E 0.54 A/m E
Fabrico Manufacturing Corp., Chicago, IL	4-6-79	64*	8	4	4	563 V/m E 6.52 A/m C
Holum and Sons, Inc., Westmont, IL	6-25-79	14	6	2	•••	247 V/m W
Wilson Jones Company, Chicago, IL	6-26-79	7	5	2	•••	391 V/m K
S.I. Jacobson Manufacturing Company, Chicago, IL	6-27-79	22	9	5	•••	390 V/m K
Georgia-Pacific Corp., Ste. Genevieve, MO	8-29-79	20*	7	1	0	263 V/m E 0.12 A/m C,K
Georgia-Pacific Corp., St. Louis, MO	8-30-79	~29	7	0	0	191 V/m W 0.46 A/m K
National Blank Book Company, Inc., Holyoke, MA	2-11-80	22*	9	8	7	506.5 V/m W 2.01 A/m A 0.005
Beaverite Products, Inc., Beaver Falls, NY	2-14-80	8*	8	6	4	896.2 V/m W,G 2.40 A/m A 0.005

ND—Not detected.

\*Some or all machines located in wire mesh enclosed room to eliminate RF interference with other devices to comply with FCC regulations.

•••Magnetic field measurements not taken.

‡E-Eye, C-Chest, W-Waist, G-Gonad, K-Kneec, A-Ankles

---

## HIGHLIGHTS

---

### Microwave Charge Dismissed in Watson Case

A federal judge in US District Court in Los Angeles has dismissed the charge that microwave radiation played a role in causing birth defects to the child of a marine who served at the US embassy in Moscow, according to Peter Danelo of the Seattle firm, Carmody, Syrdal, Danelo & Klein. A second charge of medical malpractice by navy doctors is still pending.

Marine Sergeant George Watson's son was born with a hydrocephalic condition soon after Watson returned from a tour of duty in Moscow. He sued the government for not taking fast enough action to limit the injury to his son and for his exposure to microwaves while at the embassy—the exposure, he claimed, was responsible for his son's condition. (No. CV-80-5737)

District Court Judge Cynthia Hall, who has recently taken over the case, based her dismissal on a decision in the Ninth Circuit Court of Appeals. In that case, *Monaco v U.S.* (No. 79-4787, decided November 9), the court affirmed an earlier decision that the government had immunity from claims by those serving in the armed forces under the *Feres* doctrine.

### Another VDT-Related Cluster Reported

A new cluster of problem pregnancies among VDT workers has been reported by a Communications Workers of America (CWA) local in Renton, WA. In the last 18 months, three out of three pregnancies of women working at Pacific Northwest Bell have had adverse outcomes. A 23-year-old woman gave birth to a mongoloid child a year ago last July. Since then, one woman's child was born with an open spine and another was stillborn—both women are in their 20's. No other pregnancies have come to term during this period, but one woman is two months pregnant and another is five months pregnant. Both are still among the 100 women working on 38 VDTs at the company.

According to Carl Rude of CWA Local 9103, the union is negotiating with Pacific Northwest Bell and Washington's Department of Labor and Industries for a joint epidemiological study at Renton. If no agreement is reached, the union will ask the state to do a compulsory on-site inspection for ionizing and non-ionizing radiation. Rude admitted that the chances for a thorough epidemiology are "very slim."

Rude has contacted other locals around the state and advised them of the potential problem.

A number of miscarriage and birth defect clusters among clerical workers have been reported; in each case, however, no cause for the adverse outcomes has been identified (see *MWN*, November 1981).

### DoD Budget: PAVE PAWS Loses, ELF Wins

The final \$199.7 billion FY82 defense budget cleared Congress in December. Funds to begin building the new SE and SW PAVE PAWS radars did not make it through the conference committee, though it did allocate \$3.8 million for continued R&D on the warning system. The conferees agreed to consider a supplemental request for the \$71 million in procurement funds, but a DoD spokesperson said the Air Force will probably ask for the money in the FY83 budget. The \$3.8 million will allow the environmental assessments for the two radars to proceed and, as the Senate Appropriations Committee suggested, the improvement of the "overall system detection and performance."

The conferees sided with the Senate on Project ELF; the submarine communications program will receive the full \$34.8 million; Senator William Proxmire (D-WI) registered his disapproval in the conference report. In arguing against the project, the House Appropriations Committee noted: "The Committee concludes that ELF is an outmoded concept in search of a mission and should be discontinued."

Other budget decisions include: \$79.6 million to buy AN/TPQ-37 artillery locating radars developed by Hughes Aircraft Co.; \$82.1 million for the AF's EHF satcom system; and \$30.2 million for DARPA's blue-green communications system. There was also a special \$200,000 allocation for hardening White House communications to EMP.

### Medical Devices: Rules & Research

The Bureau of Radiological Health (BRH) has decided to withdraw its proposed rules for performance standards for diathermy products. The decision is now under review at the Food and Drug Administration (FDA) and will probably be approved. The rationale for abandoning the regulation, proposed in July 1980 (45 FR 50359), is that no equipment is now being manufactured in the US and that the standards would not cover existing equipment. Hyperthermia researchers had told BRH that they were worried the rules would interfere with their work. (See *MWN*, February 1981.)

The Bureau of Medical Devices (BMD) is circulating a draft policy for Class II devices. The new policy statement was the subject of a meeting in Washington, DC, on January 26. Hyperthermia units and NMR imagers are in Class III and are therefore not affected. Diathermy devices used for heat treatment are Class II, but it is not yet clear how the policy will apply to them. The policy statement will now be published in the *Federal Register* to solicit further public comment.

BMD and BRH are in the process of working out new arrangements to handle applications for radiation-emitting equipment. The new agreement promises more autonomy for BRH. It is on the FDA's commissioner's desk and is almost sure to be signed.

Research on hyperthermia is receiving more funds. The National Cancer Institute (NCI) is soliciting proposals for another five-year project, a hyperthermia quality assurance program (*Commerce Business Daily*, December 16). According to the institute's Dr. David Pistenmaa, this new effort will complement the study, already underway at five teaching hospitals, that is assessing the performance of microwave, RF and ultrasound systems (see *MWN*, November 1981).

### Oregon County Plans RF/MW Standard...

Multnomah County, outside Portland, OR, has extended its moratorium on new building applications for broadcast facilities to May 25, and will consider adopting a radiofrequency/microwave (RF/MW) standard after a study on the possible biological effects of this radiation is completed. The Board of County Commissioners imposed the freeze on December 3 after station KLRK's proposal for a radio transmitter raised questions about potential radiation hazards at a public hearing last year. The moratorium was originally slated to end March 30, but was extended at a January 26 board meeting.

This January, the county hired Nero and Associates of Portland to evaluate the RF/MW bioeffects literature and to recommend an appropriate safety standard for the county. The

county has contracted another firm, Cogan and Associates, to evaluate land use and develop a siting standard. A total of \$11,500 has been allocated for the two studies.

Independent of the studies, County Health Officer Dr. Charles Schade has formed a blue ribbon committee to review the work of Dr. William Morton of the University of Oregon's Health Sciences Center in Portland. Several years ago, a study by Morton revealed a significantly higher incidence of uterine cancer in Portland's West Hills section, which has the highest RF/MW radiation levels in the city. Neighborhood opposition to adding a transmitter to an antenna farm in this area eventually led to the city's adoption of an Interim Radiofrequency Emission Standard in 1980.

### ... Unexpected Results Found in Portland Cancer Study

A study on the incidence of certain cancers among Portland, OR, residents has found a significant correlation between three types of cancer and radiofrequency/microwave (RF/MW) radiation levels, according to Dr. William Morton of the University of Oregon's Health Sciences Center in Portland. Morton recently submitted a preliminary report on the study, which began in 1978, to the Environmental Protection Agency's (EPA) Experimental Biology Division.

Acting Division Director Dr. Joe Elder has just taken over and said he had not had a chance to study the report.

Morton indicated that RF power density levels positively correlated to the number of reported cases of lymphatic leukemia, adenocarcinoma of the uterus and breast cancer. No correlation was found for non-lymphatic leukemia and cancer of the pancreas.

Morton said that he had not anticipated these results. He was particularly surprised that for the three frequency bands examined, the correlations occurred with the low and high VHF TV bands (54-88 MHz and 176-216 MHz respectively), and not with the FM radio band (88-108 MHz) where power density levels are relatively much higher. Calculated radiation levels ranged from under 0.004 to under 0.018  $\mu\text{W}/\text{cm}^2$  for low and high VHF TV and from under 0.013 to under 0.44  $\mu\text{W}/\text{cm}^2$  for FM radio. These averages were extrapolated from EPA measurements taken in 1977.

Now that the preliminary report is complete, Morton will seek EPA funding for another year of work. His last EPA grant ran out at the end of 1980.

### US-USSR Tentatively Agree on Measurement Work Plan

Members of the US-USSR Working Group for Metrology have agreed on a provisional work plan for cooperation during a visit by three Soviet scientists last December, according to Dr. Arthur McCoubrey, associate director for measurement services at the National Bureau of Standards (NBS). The plan, which is still subject to formal approval, would result in the exchange of technical information—including the measurement of non-ionizing radiation fields. Later, there would be an exchange of visits by research scientists.

Dr. Donald McRee of the National Institute of Environmental Health Scientists participated in the talks and said that he was pleased with their outcome. "This could give us the opportunity to learn about the Soviets' capability to measure fields in bioeffects research," he said.

Ric Tell of the Environmental Protection Agency's radiation lab in Las Vegas, NV, one of the labs on the Soviets' tour,

said that he felt the trip was more of a fact-finding mission and that he hoped there would be an opportunity for technical discussions at later meetings. Tell was particularly interested in comparing radiation hazard instruments and field survey data with the Soviets.

The microwave expert on the Soviet delegation was A.I. Mekhanikov, who is the deputy director of VNIIFTRI—the All Union Scientific Institute for Physico-Technical and Radio-Technical Measurement—north of Moscow. The institute is akin to the NBS labs in Boulder. The head of the delegation was L.K. Isayev, who is the chief of metrology administration at Gosstandart.

### New Findings at Hopkins Lab

Preliminary research indicates a new type of tissue damage from exposure to 2.45 GHz radiation at 10  $\text{mW}/\text{cm}^2$ , according to Dr. Samuel Koslov of the Johns Hopkins University's Applied Physics Lab. Koslov announced the new findings at last December's ERMAC meeting (see page 1). While 1  $\text{mW}/\text{cm}^2$  may be a safe level at GHz frequencies, he said, 5  $\text{mW}/\text{cm}^2$  may not be safe for prolonged exposures.

The Hopkins researchers are not ready to publish the results, nor was Koslov willing to be more specific about the type of effect or susceptible organ. Koslov did express his concern that, if this effect is confirmed, it would mean that the new ANSI standard, which allows exposures of 5  $\text{mW}/\text{cm}^2$  above 1.5 GHz, would not provide enough protection for the public. "I would have violent objections to the application of the ANSI standard in the upper frequency range if applied to the general population," he warned.

### Workshop on Behavioral Effects

An interdisciplinary workshop on *Behavioral Effects of Microwave Radiation Absorption* is tentatively scheduled for March 16-19 at the Homestead Lodge near Salt Lake City, UT. The first day of the meeting will be devoted to a literature review; the second to contemporary topics, including drug-microwave synergy, chronic exposure studies, dosimetry and extrapolation among target systems; and the third to future directions for research.

The workshop is open to all; there will be a \$50 registration fee. For more information contact Professor John D'Andrea at the Department of Electrical Engineering, University of Utah, Salt Lake City, UT 84112, (802) 581-8590 or 851-6943.

### Changes at EPA

Dr. Daniel Cahill has left the Environmental Protection Agency (EPA) to go work for Carolina Light and Power (CP&L). Dr. Joe Elder is filling in as acting director of the agency's Experimental Biology Division in the Office of Research Development in Research Triangle Park, NC. In an interview, Cahill said that the change was a "career move: I just ran out of room."

Meanwhile back at the agency's headquarters in Washington, Dr. Gordon Burley is still the acting director of the Office of Radiation Programs. Burley replaced Dr. David Rosenbaum, who left EPA to start his own consulting firm: Technical Analysis Corp. of Arlington, VA. Rosenbaum said that he had decided to leave as a result of the budget cuts and lay offs. "I could see it was only going to get worse," he said. Burley had been chief of the environmental standards branch and moved up when Rosenbaum and three division directors all left.

## UPDATES

**Biological Effects** . . . NASA has issued a new literature review, *Electromagnetic Field Interactions with the Human Body: Observed Effects and Theories*. The report, prepared for NASA by Dr. Jeremy Raines of Techovators of Rockville, MD, is available from the National Technical Information Service, Department of Commerce, Springfield, VA 22161. It can be ordered by its NASA document number: N81 25668; \$12 for a paper copy and \$4 for microfiche . . . Professor Edward Grant of Queen Elizabeth College, London, has published a short article on the "Biological Effects of Microwaves and Radio Waves," in the *Proceedings of IEE (UK)*, 128, Pt A, 602, December 1981. Grant sums up with "the 10 mW/cm<sup>2</sup> standard, although adequate at frequencies in excess of 1 GHz, is too high in respect of lower frequencies, and needs revision." . . . Dr. Ewa Manikowska-Czerska, a visiting scientist at BRH, is scheduled to present a seminar on "Meiotic Chromosome Aberrations and their Biological Significance Following Microwave Exposure" on February 2 in Bethesda . . . BRH's Dr. Whit Athey has raised some objections to a model devised by EPA's Drs. William Joines and Carl Blackman which allows them to scale the internal electric fields that induce calcium efflux from chick brain tissue. Athey thinks that the uncertainties are too large to allow conclusions to be drawn from the model. Joines and Blackman reply with a new and more detailed version of the model; this too is consistent with the data. In an interview, Blackman said that, while he agrees that the model is not thoroughly validated, he thinks it has less uncertainty than Athey indicates in his paper. For both points of view, see *Bioelectromagnetics*, 2, 407-413, 1981 . . . Drs. Ernest Albert and James Kerns of George Washington University describe their recent experiments on the effects of microwaves on the blood brain barrier (BBB) in *Brain Research*, 230, 153, 1981. Two-hour exposure with 2.45 GHz CW at 10 mW/cm<sup>2</sup> resulted in reversible permeability of the BBB to horseradish peroxidase. . . . EPA's Claude Weil proposes a terminology system for dosimetry in the December issue of the *Bioelectromagnetics Newsletter*. . . . A group headed by Albert Friend, Jr. of the Naval Electronic Systems Command in Washington has published a paper in the *IEEE Transactions on Microwave Theory and Techniques*, MTT-29, 1271, December 1981, which indicates "no hemolysis in red blood cells exposed *in vitro* to large microwave pulse with peak SAR's of more than 1 kW/g." . . . The NY Overhead Power Lines Project is still scheduling a meeting for February 19-21 in New York City. For more information contact: Dr. Maria Reichmanis at (518) 474-3215 . . . Some have speculated that Russian radar is responsible for the increased incidence of heart disease among Finns living in North Karelia. Beginning in 1972 a program was initiated to try and control the risk of disease. A five-year report of the North Karelia Project is described in the *American Journal of Public Health*, 72, 43, January 1982. While the data show some encouraging results, they are far from conclusive. Microwaves were not included in the discussion. . . . Linda Garmon reviews research on the effects of ions in the December 5 *Science News*.

**Communications** . . . The National Association of Broadcasters' (NAB) Advisory Committee on Radiation and Regulation has informed the EPA that it supports a national population exposure standard for non-ionizing radiation. In a December 14 letter to Kathleen Bennett, assistant administrator for air, noise and radiation, the NAB urged sufficient funding be provided to complete a guidance and stated "there are sound economic, scientific and policy reasons for our position." Citing increasing state and local rule making, a December NAB memo to its state officers carried the same message. . . . A public forum for users of the Private Operational-Fixed Microwave Service, sponsored by the Private Radio Bureau, will be held in Washington, DC, on March 31. Topics on the agenda include interference analysis and public access to microwave applications and data base information. Contact: John Small, FCC, Room 8202, Washington, DC 20554, (202) 632-7197. . . . The FCC affirmed its earlier ruling giving AT&T half of each new cellular communications market on December 17. (See *MWN*, May 1981.) Twenty-five potential competitors to AT&T had petitioned the commission to reconsider its April ruling. . . . Now the commission has begun an inquiry on the future needs of private land mobile radio users, a group including

police, doctors, utility crews and taxi drivers (NOI No. 82-8). Contact: FCC's Joseph Levin, (202) 254-3301. . . . In another inquiry, the FCC is asking for comments on the allocation of the 40.5-400 GHz spectrum to comply with the 1979 WARC actions (46 *Federal Register* 60221, December 9). . . . Air-to-ground telephones will enable American Airlines passengers to make calls while airborne. Airfone, Inc. is installing the one-way system on some planes this year. . . . Arthur D. Little, Inc., of Cambridge, MA, is developing a search scenario for detecting and locating trapped miners using radio transmitters under a \$108,000 contract from the US Bureau of Mines. According to ADL's Robert Lagace, the system's ability to transmit detectable rescue signals to the surface in the 500-3,000 Hz frequency range has been recently tested in some 94 mines in US coal fields. The bureau has sponsored the development of both seismic and electromagnetic trapped miner location systems since 1970. . . . RCA plans to build nationwide communications networks among 50 cities. RCA Network Services, Inc. has joined 11 other applicants seeking FCC permission to start microwave digital termination systems.

**Compatibility & Interference** . . . The FCC has issued a rule that will allow the commission to shut down any source of electromagnetic interference which could peril human safety or damage property (47 *Federal Register* 1392, January 13, 1982). The regulation is a result of EMI from TV news equipment, which affected the space shuttle's tracking and communications equipment during last April's flight. Now the FCC's Chief of Field Operations can order broadcasters or cable operators to shut down interfering equipment. . . . Comsearch, Inc., of Falls Church, VA, and Chomerics, Inc., of Woburn, MA, have set up measurement laboratories for EMI and EMC tests. . . . The Navy has awarded BE&C Engineers, Inc., of Tukula, WA, a subsidiary of Boeing, more than \$4 million to deliver an electronic warfare and EM environmental effects test facility. . . . And the Naval Surface Weapons Center in Dahlgren, VA, has issued a \$902,000 contract to Eldyne of San Diego, CA, for engineering design support for EMC. . . . The Naval Sea System Command intends to ask for EMI services next month (*Commerce Business Daily*, January 25). . . . The Rome Air Development Center is looking for a contractor to assess EMC in C<sup>3</sup> systems which use microelectronics. . . . The National Association of Broadcasters' Radio Board is trying to secure government help to stop interference to AM stations from Cuba.

**Government** . . . Everyone is waiting for the president to unveil his FY83 budget. Among the leaked items are OMB proposals to phase out the Public Health Service Commissioned Corps, to further cut the EPA budget, to close down some FDA labs and to kill the NASA 30/20 GHz program (see satcom updates). . . . Barry White, a former OSHA regional administrator, has been named to head OSHA's directorate of Safety Standards Programs. . . . After the *New York Times* ran a story about the antennas on the Soviet embassy in Washington, DC being used for surveillance (December 11), the embassy issued a denial. In a follow-up piece on December 21, a spokesman for the FBI reaffirmed the accusation. . . . About a hundred people attended the Technical Electronic Product Radiation Safety Standards (TEPRSSC) meeting in Rockville, MD, December 9-10. RCA's Howard Johnson, a member of TEPRSSC, proposed that BRH consider a generic regulatory approach to reducing leakage from all electronic products which emit non-ionizing radiation. BRH Director John Villforth replied that he did not agree with such an approach. . . . BRH has issued a new subject index for its publications, dated October 1981 (No. FDA 82-8070). . . . The FAA has issued final rules prescribing minimum standards for microwave landing systems (MLS) not operated by the federal government (46 *FR* 61560, December 17). . . . And at the end of January, the FAA unveiled a 20-year, \$9-billion plan to modernize the air traffic control system. . . . The Department of Commerce is looking for someone to review NTIA's Spectrum Management Program (*Commerce Business Daily*, December 18).

**IEEE.**... The responses to the IEEE's Committee on Social Implications of Technology's (CSIT) editorial on the Committee on Man and Radiation's (COMAR) draft position paper on human exposure to RF/MW appear in the December issue of *Technology and Society*, the CSIT newsletter. (See *MWN*, October 1981.)

**Litigation.**... A defense motion to dismiss Nettie Yannon's suit against RCA in the New York State Supreme Court, Richmond County, was denied this January.

**Measurement.**... The Department of Commerce has approved a request to develop a voluntary laboratory program (LAP) for electromagnetic calibration services. The request was made some six years ago by Dr. Bruno Weinschel of Weinschel Engineering in Gaithersburg, MD, who said that while he was pleased with the decision, he felt it had been a long time coming. The next step is to set up a workshop, probably in Washington, DC, to consider criteria for evaluating labs. ... Meanwhile NBS's MAP is growing. The measurement assurance program recently approved five labs on the West Coast, those at Boeing, Hewlett-Packard, Hughes, Rockwell and TRW. NBS is now looking at five labs back East and will be making a final selection in the spring.

**Medical Applications.**... A team from Harvard reports hyperthermia can inhibit the activity of natural killer cells *in vitro* in the January 2 *Lancet*. The authors speculate that "fever may act as an immunoregulatory mechanism by decreasing NK activity." ... A group from UCLA compares ways of heating deep-seated tumors, including with the Magnetron unit, which failed to win FDA pre-market approval last year (see *MWN*, May 1981), in the *IEEE Transactions on Biomedical Engineering*, January 1982. They express a preference for sources which produce an electric field parallel to skin/fat/muscle interfaces. ... BRH's Christian Hochuli and Dr. Gideon Kantor describe temperature measurements with a minimally disturbing probe in microwave diathermy in the December issue of the *IEEE Transactions on Microwave Theory and Techniques*. ... Dr. Robert Balaban of the National Heart, Lung and Blood Institute in Bethesda, MD, arranged the session on the application of NMR in biology and medicine at this year's AAAS meeting. Many of the papers described work using P-31 NMR. ... The January 23 *Science News* reports from the AAAS meeting that scientists from the University of Hawaii and the California Institute of Technology have found that a rotating magnetic field appears to significantly retard the growth of a mouse tumor that contains magnetite. Human cancer cells are not known to contain such particles. ... Electro-Biology, Inc., is planning to offer one million shares of common stock to the public. ... A team from Finland describes the use of magnetic measurements—magnetic susceptibility plethysmography—to measure changes in total cardiac volume in the January *IEEE Transactions on Biomedical Engineering*.

**Military Systems & Radar.**... The Navy Electronic Systems Command has awarded two \$3.5 million contracts for studies on the design of submarine laser communications, one to Lockheed Missiles and Space Co. in Palo Alto, CA, and one to TRW in Redondo Beach, CA. ... And the Office of Naval Research is negotiating with Sanders Associates of Nashua, NH, for research on blue-green noise measurements. ... *Discover* ran a piece on Project ELF in the January issue. ... In December, DoD won one of Senator Proxmire's Golden Fleece awards for the Navy's handling of a research program on the health effects of ELF radiation. A bull was kept at the Wisconsin Clam Lake facility as part of a program that even Vice Admiral G.R. Nadler acknowledged was useless from a scientific point of view. Cost: \$13,000. ... In other contract news, the Navy awarded \$1.6 million to GE in Syracuse, NY, and \$920,000 to Calculon of Philadelphia, PA, for work on the AN/TPS-59—a D-band, long-range, 3-D air surveillance phased array radar. ... The Office of Naval Research is negotiating with Comsearch of Falls Church, VA, for below deck electromagnetic surveys and has awarded Ohio State University \$350,000 for research on electromagnetic radiation and scatter and \$1 million to SRI in Menlo Park, CA, for work on the over-the-horizon backscatter radar. ... The armament division at Eglin AFB wants to upgrade and modernize the DoD radar scatter facility at the White

Sands Missile Range, NM. ... And the AF wants to build an RF anechoic chamber at Wright-Patterson AFB, OH.

**Ovens.**... The Association of Home Appliance Manufacturers (AHAM) has withdrawn its objection to BRH's proposed amendments to the microwave oven performance standard (see *MWN*, May 1981). In a November 24, 1981 letter to BRH, AHAM said it was satisfied by a FDA Advisory Opinion on the amendments released November 20. BRH will now republish the amendments in the *Federal Register*, where they appeared on November 28, 1980 (45 *FR* 79028). ... Microwave oven manufacturers had a good year in 1981, and AHAM forecasts an even better one for 1982. Shipments grew by 20% last year; a total of 4.3 million units were produced or imported. As of last November, AHAM expected factory shipments to increase to more than 4.7 million units in 1982, up almost 10%—the largest projected growth for any appliance. ... The *Washington Post* reports that DOE is in the process of canceling proposed rules that would have set minimum efficiency standards for major appliances including ovens. According to the December 21 item, OMB must still approve the DOE analysis. ... Raytheon's John Osepchuk writes that "there is almost vanishing probability of interference of today's pace-makers by today's microwave ovens," in an article in the November/December 1981 issue of *Microwave World*: "Debunking a Mythical Hazard." ... The Cooking Appliance Section of the International Microwave Power Institute (IMPI) has assembled a ten-year bibliography on microwave cooking. The cost of the report has still to be set. Contact: Ms. Diane Ellison, IMPI, 301 Maple Avenue West, Tower Suite 520, Vienna, VA 22180, (703) 281-1515. ... Cober Electronics, Inc., of Stamford, CT, has introduced a new, 6 kW microwave batch pre-heater (Model BPH-6000). ... And Cober has released a new brochure to describe its continuous microwave dewaxers for the precision casting industry. For a free copy, contact: Casting Industry Brochure, Cober Electronics, Inc., 102 Hamilton Avenue, Stamford, CT 06902.

**Power Lines.**... Most of the recent issue of *Bioelectromagnetics* (Volume 2, Number 4) is devoted to studies of the biological effects of 60-Hz power lines. ... The third symposium on *Environmental Concerns in Rights-of-Way Management* is scheduled for February 15-18 at the Hyatt Islandia Hotel in San Diego, CA. Among the sessions is one on the health and safety of high power transmission lines and the siting of new energy facilities. Dr. Gus Tillman of the Cary Arboretum of the New York Botanical Gardens is chairing the session, which will feature speakers from Western Electric, Bonneville Power and Georgia Power. Contact: Lisa Lava-Kellar, 215½ S. Main Street, Ann Arbor, MI 48104, (313) 996-2696.

**Satellite Communications.**... Alascom, Inc.'s request to build a satcom station on Vashon Island, WA, was denied by the King County zoning adjuster on December 31. (See *MWN*, December 1981.) The company has appealed the ruling and a public hearing is scheduled for March 2 to review the decision. ... National Satellite Service, Inc., a Hughes Aircraft Company subsidiary, wants to build a satcom station in the Spring Creek area of Brooklyn, NY. A draft environmental impact statement for the proposed facility is being reviewed by the city before proceedings on a land use variance can begin. ... NASA is contracting Arthur D. Little, Inc. of Cambridge, MA, for a profile of the domestic satellite communications industry. ... OMB wants to cut NASA's 30/20 GHz program from the FY83 budget, according to the December 21 *Aviation Week and Space Technology*. NASA is reportedly appealing the cancellation. The funding picture may be looking better with the recent appointment of Dr. Burt Edelson, formerly of COMSAT, as NASA's head of science applications. ... Meanwhile, NASA has recently awarded close to one million dollars in contracts to ITT, General Electric and Western Union Telegraph for 30/20 GHz studies. ... During a review of its satellite services policies this January, the FCC invalidated RCA's November auction for transponder leases. (See *MWN*, December 1981.) At the same meeting, the commission decided to solicit public comment on whether satellite owners should be allowed to negotiate private sales of transponders. Under current FCC rules, use is allocated at fixed rates on a first-come, first-serve basis. ... *Compendium of Communication and Broadcast Satellites: 1958-1980*, edited by Martin P. Brown Jr., has been published by the IEEE Press. Cost: \$34.95, \$26.20 for IEEE

members. Order prepaid from the IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854.

**Technology...** Research on electromagnetic launcher technology, or railgun, continues. The Defense Advanced Research Projects Agency has awarded the Rand Corp. in Santa Monica, CA, nearly \$300,000 to continue their work on it. The Air Force has its own program and is looking for a contractor to design and produce a railgun which can launch a projectile weighing ten grams with a muzzle velocity of 3 km/sec. For more information contact: AF's Bill Lucas, (904) 882-8240. Both projects are classified Secret. Nevertheless, *Science News* ran a progress report on the railgun in its December 12 issue. . . . Companies making anti-shoplifting devices are jockeying for new markets, especially supermarkets, according to a January 28 article in the *New York Times*. The industry is dominated by a few companies, including Sensormatic Electronics Corp. of Deerfield Beach, FL, Knogo Corp., of Hicksville, NY, and Checkpoint Systems, Inc., of Thorofare, NJ. . . . Raytheon's William Brown details the status of the microwave power transmission component for solar power satellites in the December *IEEE Transactions on Microwave Theory and Techniques*. . . . DOE's Laramie Energy Technology Center has awarded the University of Wyoming a \$75,655 contract to study the basic principles involved in RF retorting of oil shale. . . . In other contract news the Air Force has awarded the Polytechnic Institute of New York in Brooklyn \$277,000 for research on "Microwaves, Electromagnetic Theory and Information Processes," and NASA is negotiating with Ball Aerospace of Boulder, CO, for a "Shuttle Active Microwave Experiment."

**VDTs...** *Health and Ergonomic Considerations of Visual Display Units*, a two-day seminar sponsored by the Ergonomics and Non-Ionizing Radiation Committees of the American Industrial Hygiene Association (AIHA) will be held March 1-2 in Denver, CO. Contact: J.R. Conti, AIHA, 475 Wolf Ledges Parkway, Akron, OH, 44311, (216) 762-7294. . . . The Ontario Ministry of Labor's advisory task force on video display terminals (VDTs) has finished its review of potential non-ionizing radiation health effects and is moving on to ionizing radiation. (See *MWN*, December 1981.) According to task force chairman Dr. Gordon Stopps of the University of Toronto's Occupational and Environmental Health Unit, no recommendations will be made before late spring or early summer. . . . The Newspaper Guild (TNG) and the International Typographical Union have published *Humanizing the VDT Workplace*, a 48-page health manual for local officers and shop stewards. The booklet is designed to help identify and eliminate VDT-related health and safety problems. . . . TNG has published its constitution, adopted at last year's guild convention, which includes its collective bargaining program and bargaining recommendations for VDT health issues. Copies are available from TNG, 1125 15th Street, NW, Washington, DC 20005.

## LETTERS

*To the Editor:* I would like to draw your attention to an incorrect piece of news reported at the bottom of page 5 in your October issue. The London *Times* article did indeed imply that the National Radiological Protection Board (NRPB) had the only on-going microwave bioeffects research program in the UK, and that I had failed to obtain grants to carry out research in this area. You were quite entitled to draw these conclusions but in fact both are untrue.

I have a research team of eleven people and am supported financially in the UK by the NRPB itself, as well as by the Cancer Research Campaign. Generous support has also been provided by all three of the United States Armed Services and in addition I receive money from the NATO Scientific Affairs Division. I certainly would not like the impression to be given that my research team is short of funds and personnel; it would also be unfair to those organizations which support the research.

Professor E.H. Grant

Physics Department, Queen Elizabeth College, Campden Hill Road, London W8 7AH, United Kingdom.

## CONFERENCE CALENDAR

- 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.
- April 21-23: *Biomedical Engineering Society Annual Meeting*, New Orleans, LA. Contact: Dr. Yoram Ruby, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH 44106.
- April 26-28: *1982 Microwave Power Tube Conference*, Naval Postgraduate School, Monterey, CA. By invitation only, DoD Secret clearance required. Contact: Bill Lin, Litton Industries, 960 Industrial Road, San Carlos, CA 94070.
- 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 7-8: *1st Southern Biomedical Engineering Conference*, Louisiana State University Medical Center, Shreveport, LA. Contact: Dr. S. Saha, Department of Orthopaedic Surgery, Louisiana State University Medical Center, PO Box 33932, Shreveport, LA 71130.
- 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. On June 18 immediately after the conference, there will be a one-day workshop on *Medical Applications of Electromagnetic Energy*. Contact: Dr. Gordon Short, BSD Medical Corp., 420 Chipeta Way, Salt Lake City, UT 84108.
- June 28-July 2: *4th Annual Bioelectromagnetics Society Meeting*, Beverly Wilshire Hotel, Beverly Hills, CA. Contact: BEMS, 1 Bank Street, Suite 307, Gaithersburg, MD 20878.
- July 20-22: *IEEE Annual Conference on Nuclear and Space Radiation Effects*, Caesars Palace, Las Vegas, NV. Contact: A. Ochoa, Jr., Div. 2144, Center for Radiation-Hardened Microelectronics, Sandia National Laboratory, Albuquerque, NM 87185. This meeting will be followed on July 23 by the *Hardened Electronics and Radiation Technology Conference* hosted by the Defense Nuclear Agency. A Secret security classification is required to attend. Contact: Director, DNA, Attn: ISSO/Barbara Perkins, Washington DC 20305.
- July 25-30: *17th Annual Symposium of the International Microwave Power Institute*, Town and Country Hotel, San Diego, CA. Contact: IMPI, 301 Maple Ave. W., Tower Suite 520, Vienna VA 22180.
- August 11-13: *4th Annual Satellite Communications Users Conference*, Regency Inn, Denver, CO. Contact: Satellite Communications Magazine, 3900 S. Wadsworth Blvd., Denver, CO 80235.
- September 5-11: *World Congress on Medical Physics and Biomedical Engineering*, including the 13th *International Conference on Medical and Biological Engineering* and the 6th *International Conference on Medical Physics*, Congress Center, Hamburg, Germany. Contact: MPBE 82, Congress Organization, PO Box 302360, D-2000 Hamburg 36, Federal Republic of Germany.
- September 6-10: *7th Colloquium on Microwave Communication*, Budapest, Hungary. Contact: Secretariat of the 7th Microcoll, H-1525, Budapest 114, POB 15, Hungary.
- September 8-10: *International Symposium on Electromagnetic Compatibility*, Marriott Hotel, Santa Clara, CA. Contact: Dr. Andrew Nalbandian, 20617 Debbie Lane, Saratoga, CA 95070.
- September 20-21: *4th Annual Conference of the IEEE Engineering in Medicine and Biology Society*, Marriott Hotel, Philadelphia, PA. Contact: Dr. Alfred R. Potvin, Department of Biomedical Engineering, PO Box 19138, University of Texas, Arlington, TX 76019.
- September 20-22: *2nd Annual Meeting of the Bioelectric Repair and Growth Society*, Oxford, England. Contact: Dr. B.F. Siskin, Wenner Gren Research Laboratory, University of Kentucky, Lexington, KY 40506.
- September 22-24: *35th Annual Conference on Engineering in Medicine and Biology*, Marriott Hotel, Philadelphia, PA. Contact: ACEMB, 4405 East-West Highway, Suite 210, Bethesda, MD 20814.