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Major U.S. Cancer Lawsuit Ends: An EMF Era Comes to a Close? Plaintiffs Cite Lack of Clear Evidence

A major lawsuit over childhood cancer and electromagnetic fields (EMFs) was withdrawn on October 14, a move that may represent the end for such litigation in the United States. Citing "the uncertain state of the scientific evidence," plaintiffs Melissa and Suzanne Bullock of Guilford, CT, announced that they had decided to drop their suit against Connecticut Light & Power Co. and its parent company, Northeast Utilities in Hartford, CT. The case had been scheduled to go to trial in January 1999.

After a key expert witness pulled out, the Bullocks concluded that they could not go forward with the case. The Bullocks' lawyer, James Horwitz of Koskoff, Koskoff & Bieder in Bridgeport, CT, told *Microwave News* that the withdrawal of Dr. Dennis Spencer was "the straw that broke the camel's back." Spencer, the head of the neurosurgery department at the Yale School of Medicine in New Haven, CT, was slated to testify that EMFs played a role in causing Melissa Bullock's brain tumor.

This left only three of the Bullocks' original five EMF-cancer witnesses. Dr. Carol Westbrook, a research oncologist at the University of Chicago, pulled out last year.

Lawyers who have been involved in other EMF suits expressed differing views on the Bullock case and the future of EMF litigation. "The present state of the science just does not support a claim like this," said utility lawyer Tom

(continued on p.10)

Corporate Interference Charged over Disclosure of EMI to Pacemakers

Sensormatic Electronics Corp. has repeatedly tried to prevent a Florida cardiologist from disseminating research indicating that one of its anti-theft systems can interfere with cardiac pacemakers.

In a study partly funded by Sensormatic, Dr. Michael McIvor found that an acousto-magnetic system caused electromagnetic interference (EMI) among 48 of 50 pacemaker patients (see *MWN*, S/O97). Two other types of electronic article surveillance (EAS) technology caused EMI rarely or not at all. Sensormatic makes products with all three types of technology, but it is the only manufacturer of acousto-magnetic devices.

Last spring, Sensormatic lawyers demanded that McIvor not discuss his work at medical conferences or with the press. The company then tried to discourage a journal from publishing McIvor's study. After the journal hired its own lawyer, Sensormatic relented, and the paper was published in October (see *MWN*, S/O98).

(continued on p.6)

« Wireless Notes »

Researchers at a workshop at Austria's **University of Vienna** released a statement on RF/MW safety, declaring that, "Biological effects from low-intensity exposures are scientifically established" (see p.5). They called for the development of mobile phones that emit less radiation. Of all those present at the close of the workshop in late October, only Dr. **Michael Repacholi** of the WHO EMF project declined to sign the statement. But he did give an interview to the **Austrian Press Agency (APA)**. WHO EXPERT: THERE IS NO DANGER FROM HAND-HELD TELEPHONES was the headline of the APA dispatch. "We are not aware of a single case in which mobile phones or base stations have harmed human health," said Repacholi, according to the APA. Referring to studies of cancer, memory, behavior, blood pressure and cardiac rhythm, he declared, "So far, we have not found signs that there are links." The article did not mention Repacholi's own study, carried out in Australia, which showed a doubling of cancer risk among mice exposed to a GSM signal (see *MWN*, M/J 97). Repacholi was escorted to the interview by the director of an Austrian telecom industry group, **Forum Mobilkommunikation (FMK)**. The FMK's Michaela Reeh also sat in on the interview. The next day FMK put out a press release titled WHO

EXPERT SOUNDS THE 'ALL-CLEAR' SIGNAL FOR MOBILE COMMUNICATION. Repacholi told *Microwave News* that the FMK press release was too "black and white," and added, "It is absolutely not possible to rebut all the misquotes the press makes about my statements."

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A two-year animal study on the effects of the **Iridium** signal will soon be under way. **Motorola** has signed a contract with **Battelle Pacific Northwest Labs** in Richland, WA, to expose rats to 1616-1626 MHz radiation with TDMA modulation (11 Hz), which is used by the satellite-based phone system. Dr. **Larry Anderson** will lead the study at Battelle. This chronic bioassay "will be not unlike the studies that have been carried out in the past by Dr. Ross Adey in Loma Linda, CA, and by Dr. Joseph Roti Roti in St. Louis," said Norman Sandler, a Motorola spokesperson based in Schaumburg, IL (see *MWN*, J/A95). Sandler explained that Battelle will use an exposure system developed by Motorola and not the one designed by Dr. **C.K. Chou** for WTR (see *MWN*, M/J95). Chou now works for Motorola. Sandler declined to reveal the cost of the study or the number of animals to be exposed. "This gets into information about study design, and the precise details are still to be worked out," he said, adding that, "These details are routinely treated as confidential." Anderson did not respond to repeated requests for comment.

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"There is no evidence, study or causative link between RF radiation and any cancer, disease, malady or condition against the human (or animal) body, other than cell and tissue heating due solely to high-intensity fields." In July, **James Kaplan** of **EDX Engineering Inc.** in Eugene, OR, offered "a month's pay" to anyone who could disprove the previous statement (see *MWN*, J/A98). But faster than you can say "weasel," Kaplan changed the rules. In response to an inquiry from Dr. **Paul Heroux** of the Faculty of Medicine of **McGill University** in Montreal, Canada, Kaplan added a variety of conditions, including, "Human cases only. No mice, please." Heroux told *Microwave News*, "This 'brave' mentality is typical of some engineers, who think they are doing a service by debunking science that they do not really understand."

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Residents of **McLean, VA**, an upmarket Washington suburb, have succeeded in keeping a communications tower out of their neighborhood. On September 30, Judge Claude Hilton of the federal district court in Alexandria, VA, upheld the denial of a permit for the tower. Hilton found the decision to be a lawful use of zoning: to "facilitate the creation of a convenient, attractive and harmonious community," according to the October 8 *Washington Post*. **AT&T Wireless Services** designed the 100-foot structure to resemble a tree to make it less objectionable, but that was not good enough. In July 1997, the Fairfax County Planning Commission turned down the company's request for a permit. AT&T Wireless spokesperson Chris Doherty told *Microwave News* he is convinced that the decision was made in response to pressure

Do Cell Phone Towers Interfere with Homing Pigeons?

Large numbers of homing pigeons have been disappearing during races, and enthusiasts are suggesting that signals from cellular phone towers may be responsible for the birds flying astray. Others point to heightened geomagnetic activity as the cause.

When 700 of 900 birds failed to complete a race from western Pennsylvania to suburban Philadelphia last October 5, the *Washington Post* (October 8) cited a race organizer's suggestion that cell phone towers were to blame.

The next day's *Post* reported that most of the birds released in two other local races in early October failed to return to their lofts. Similar losses occurred in races in Ohio and in the Netherlands, according to recent postings on the Internet (see, for example, the site of Pigeons Worldwide at: <www.pww.nl>).

Last year, the *Irish Times* reported that many Irish pigeon racers had become discouraged after heavy bird losses in recent years. There again, mobile phone towers were a suspected cause.

Asked whether RF/MW radiation could interfere with the birds' homing sense, Dr. Robert Beason of the State University of New York, Geneseo, told *Microwave News*, "No one knows." But Beason, a neurobiologist, noted that flocks of migratory birds have been observed to veer off course in order to avoid radar beams.

Others are more skeptical. Dr. Philip Walton, a physicist at Ireland's University College, Galway, told the *Irish Times* (July 21, 1997) that he considers this type of interference to be "very unlikely"—although, he suggested, communications towers might be visually distracting to the birds.

from the proposed tower's prominent neighbors, who would have included **Edwin Meese**, attorney general under Ronald Reagan, and **Dr. Zbigniew Brzezinski**, national security advisor to Jimmy Carter. In September 1997, the carrier sued, arguing that the county's decision violated the 1996 Telecommunications Act, an assertion Judge Hilton did not accept. In winning its battle with AT&T Wireless, McLean beat the odds; more often, carriers have overcome local opposition to towers by threatening legal action or by invoking the Telecom Act in court. Another exception is **Medina, WA**, the affluent Seattle suburb that is home to software mogul **Bill Gates**. In 1996, Sprint Spectrum challenged the town's moratorium on new wireless towers, but a federal judge upheld the ordinance (see *MWN*, M/J96). The McLean dispute has attracted considerable attention: This summer and fall, the trade magazine *Wireless Week* featured it in a series of four articles on tower siting. No word yet on whether AT&T Wireless will appeal Judge Hilton's ruling.

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In 1994, *Fortune* magazine poked fun at cell phone mogul **Craig McCaw** for suggesting "that the FCC should reserve [part of the broadcast] spectrum for telepathic communications to be made possible by **brain implants** that he thinks will exist one day" (see *MWN*, N/D94). It may turn out that McCaw was once again ahead of the curve: A paralyzed stroke patient in Atlanta is now

using a brain implant to send wireless signals to a computer. By moving a cursor on the computer screen from one icon to another, he is able to communicate—despite being unable to move almost any part of his body. Drs. **Roy Bakay**, of **Emory University School of Medicine** in Atlanta, and **Phillip Kennedy**, an Atlanta physician, implanted a small glass cone containing tiny electrodes into the man's motor cortex. Chemical growth factors in the glass encouraged brain cells to grow and connect with the electrodes. The electrodes can then pick up electrical signals from the man's brain and transmit them to a receiver and amplifier on his scalp. No batteries needed—the device is powered by an induction coil placed over his head. "The trick is teaching patients to control the strength and pattern of the electric impulses," commented Dr. Bakay. "After some training, they are able to 'will' a cursor to move and then stop on a specific point on the computer screen." Results from implanting the electrode in a previous patient, disabled by ALS, appear in the June issue of *NeuroReport*. The woman was able to control computer signals in an "on/off" fashion only, but did so for 76 days, until she died from the disease. The stroke patient has done better. He can move the cursor from one icon to another, choosing the one that will make the computer say a particular phrase. Bakay explained that this is just the beginning, saying, "If you can move the cursor, you can...send e-mail, turn on or off a light and interact with the environment."

Talking Wireless Safety in the U.K.

From conference materials distributed at Mobile Phones—Is There a Health Risk?, held in London (U.K.), October 14-15, 1998.

Press releases and information to and contact with the media is very important so as not to be caught in an information trap; asbestos and some other incidents still linger....If there is a risk, the risk is, with a very high degree of probability, very small. Other factors are more important, lifestyle, eating and drinking habits and smoking.

—Arne-Egil Moen, Telenor Mobil, Norway,
"A Mobile Operator's View on Possible Risks"

Manufacturers of cellular telephones should consider whether it is possible to reduce the user's exposure to microwaves by changing the design of mobile telephones. Manufacturers might also wish to consider whether it would help if mobile telephone users were provided with earphones instead of there being direct contact between the telephone and the ear. One thing manufacturers, employers and insurers should not be is complacent. If commercial considerations are given priority over health and safety, then significant liabilities may [lie] ahead. Asbestos was known as the "magic mineral." Indeed it was. There was a thriving and very profitable asbestos industry. However, the more sinister properties of the magic mineral proved to be the sting in the tail which crippled the insulation industry's profits and those of the insurance industry. Eventually, the asbestos industry was statutorily regulated out of business. Let us hope that history does not repeat itself.

—Kieron West, Edward Lewis Solicitors, London, U.K.,
"Lessons from Another Industry: The Asbestos Legacy"

No clear scientific evidence of a health problem with mobile phonesPressure groups can easily create attention in current media environment....Irrespective of the science, there is a public perception which needs to be addressed....The industry must get its side of

the story out through trade associations and by direct company actions to achieve a more balanced media environment....The industry must continue to be financially committed to *good quality* research.

—Mike Short, Cellnet and Federation of Electronic Industries, U.K.,
"An Industry Response"

Because of the work of WTR the tools and data necessary to protect the health of wireless phone users for the next 25 years are in place.

—Rebecca Steffens, WTR, Washington, "Wireless Technology Research, LLC: The Foundation for Public Health Protection"

Ultimately, mobile phone producers will be unable to fool all the people all the time, with resulting expensive public litigation and private tragedy in families bereft of breadwinners. With the benefit of present scientific knowledge, anyone who habitually still uses a mobile phone for more than 20 minutes at a time needs his or her head examined.

—Roger Coghill, Coghill Research Labs, Gwent, U.K.,
"Consumer Concerns: Fooling All the People, All the Time?"

Discussion about biological impacts of electromagnetic fields are *highly emotional*. As a result, anxiety and bad feelings dominate the discussions.

—Gerd Friedrich, Forschungsgemeinschaft Funk (FGF),
Bonn, Germany, "Research Initiatives,"

How on earth does any health problem manifest itself in the first place without anecdotal evidence?

—John Simpson, Microshield Industries, Luton, U.K.,
"Anecdotal Evidence—Ignore It at Your Peril"

Norwegian Navy's Cover-Up of Birth Defect Cluster Unravels

An investigation by *Bergens Tidende*, the daily newspaper in Bergen, Norway, has prompted renewed concerns over a cluster of birth defects among the children of sailors who served on the torpedo boat *Kvikk*.

In a report released earlier this year, the Norwegian navy dismissed a possible link between exposures to radiofrequency and microwave (RF/MW) radiation aboard the *Kvikk* and an apparently high rate of birth defects (see *MWN*, M/J98). But in a series of articles in October and November, a team of reporters led by Inge Sellevåg, *Bergens Tidende's* science editor, documented a number of inconsistencies and omissions in the Norwegian navy's report.

"There is now a great deal of attention on the possible health risks associated with electromagnetic radiation," Trond Kathenes, the leader of the *Kvikk* parents' association, told *Microwave News*. He added that the Norwegian Parliament has taken an interest in the investigation. Kathenes is a former commanding officer of the *Kvikk*. The parents' association had charged that the navy was actively covering up any possible link between serving on the torpedo boat and the cluster (see *MWN*, M/J98, and also J/A96 and S/O97).

Among the findings of Sellevåg's reporting are:

- The 200 kW "Tori Search" tracking radar mounted above the deck often became loose, spraying the deck with radiation in the 8.5-9.6 GHz frequency band. This was well-known to the *Kvikk* sailors and happened frequently—not just in rough seas, according to Kathenes. In contrast, the navy's report maintained that, unless sailors climbed the masts, they were not exposed above exposure limits from this high-power radar.
- While the navy report disclosed very few details on the radiation levels aboard the *Kvikk*, a number of appendixes to the report obtained by *Bergens Tidende* include detailed surveys carried out by a team of American, British, Dutch and Norwegian engineers. Their measurements were largely limited to the radiation from a 750 W high frequency transmitter, however. There appear to have been no radiation surveys of the 200 kW radar or of a second radar with an output power of 25 kW.
- A 1979-1980 radiation survey indicated that there were high RF/MW levels on the *Kvikk*. "The ship can best be described as an electronic mess," said Roald Zweidorff, who made the measurements for the navy. He noted that, while he could not remember the specific exposure levels, he had a clear and strong recollection that he had uncovered "serious conditions" on board the *Kvikk*. Surveys of torpedo boats of the same class as the *Kvikk* yielded similar high readings. A report detailing Zweidorff's measurements could not be found in the navy's files. After 1990, the navy stopped filing reports on radiation surveys aboard the *Kvikk*.
- *Bergens Tidende* reporters visited all the *Kvikk* parents and found that there were 16 children with birth defects among the fathers who served aboard the boat between 1987 and 1994. The navy's report identified only 11 children with birth defects. The newspaper's detailed investigation of the children of the *Kvikk* families appeared on November 21.
- Some of the mothers of the children with birth defects fre-

Cell Phones Still Stir British Press

Cellular phones continue to be a hot topic in the British press. The wave of coverage that began last summer (see *MWN*, J/A98) has continued into the fall, with articles in almost every major newspaper.

A lawsuit by Roger Coghill, a consultant based in Gwent, Wales, got widespread attention. The suit, which demanded that wireless phones be sold with warning labels, was dismissed on November 10 after a two-day hearing. Coghill told the BBC he had spent more than £20,000 (approximately \$33,000) on the court action.

Also in the news were the patents for lower-radiation phone designs held by various wireless manufacturers (see *MWN*, N/D96). In a Page One story on October 25, *The Independent* described these as a "smoking gun" admission that wireless phones pose health risks. The Federation of the Electronics Industry responded that the patents "are not an admission that phones are unsafe."

quently traveled with their husbands aboard the *Kvikk*. One of these women lost two children soon after they were born, and her third child was born with severe brain damage. "We cannot exclude the possibility that the damage of the fetus in [the case of one of the babies who died after birth] was caused by radiation," said Dr. Lorentz Irgens, the head of the Norwegian Birth Defect Registry in Bergen. None of these women were included in the navy's report. Irgens said that the birth defect registry may include the mothers in a follow-up study. He argued that an independent team should be appointed to investigate the cluster.

• Dr. Jan Helge Halleraker, the chief medical officer at Haakonsværn Naval Base, discounted a 1971 study by Dr. Peter Peacock which identified a cluster of birth defects among the children of U.S. helicopter pilots at Fort Rucker, AL. But Halleraker conceded that he had never actually read the original Peacock paper. The navy report dismissed the study by noting that, "[T]he U.S. Air Force conducted a follow-up study that could not confirm any such connection as the one suggested by Peacock." No such study was included in the references listed in the report.

• Dr. Gro Harlem Brundtland, the director-general of the World Health Organization (WHO), has expressed interest in reviewing the *Kvikk* report. For the present, she has reserved judgment as to the adequacy of the navy's investigation. Brundtland, a physician, is a former prime minister of Norway. Dr. Michael Repacholi of WHO's EMF project in Geneva told *Bergens Tidende* that he had not heard of the *Kvikk* cluster or the navy's report.

The Norwegian Radiation Protection Authority in Oslo is reviewing the navy's report. The radiation office's evaluation, which will include a recommendation as to whether further investigation is needed, is due to be completed in mid-December.

The association of *Kvikk* parents has set up a Web site to disseminate information about the investigation: <home.sol.no/~esbenk/kvikk.htm>. A copy of the Norwegian navy's report is posted on the site, both in Norwegian and in English.

Sellevåg told *Microwave News* that *Bergens Tidende* was committed to following the *Kvikk* story. "We will use every resource to pursue this issue," he said.

Activists Launch New Group As EMR Alliance Fades Away

There is a new national grassroots organization to voice concerns about public exposures to electromagnetic radiation. A group of activists from across the country founded the EMR Network over the weekend of November 14-15 in Fairlee, VT.

"We're going to concentrate on RF/MW radiation issues," Libby Kelley, the executive director of the network, told *Micro-wave News*. She explained that the group would address public health issues related to cellular phones and towers, radio and TV broadcasting and radar.

Power line issues will also be on the network's agenda. "We're not abandoning EMFs," said Blake Levitt of New Preston, CT. Levitt, a journalist and the author of *Electromagnetic Fields: A Consumer's Guide to the Issues and How To Protect Ourselves*, helped organize the Vermont meeting, along with Kelley and Janet Newton of Cabot, VT, a cell tower opponent.

The network has emerged as the EMR Alliance in New York City, a group established by power line opponents, has become

dormant over the last year. Cathy Bergman, the alliance's president, was invited to the Vermont meeting but did not attend.

In recent months, phone calls and E-mail to the alliance have often gone unanswered. *Network News*, its quarterly newsletter, has not appeared since the fall of 1997. Bergman declined to be interviewed, but in a press release issued by the network, she said, "I pass the torch" to the new group.

Kelley already heads the Citizens of Marin for Sensible Communications Planning (COMSENSE) in Novato, CA, which has opposed cell towers. In addition, she is the executive director of the Ad Hoc Association (AHA) of Parties Concerned About the FCC RF Health and Safety Rules, based in Olympia, WA. The AHA has petitioned the federal appeals court in New York City to overturn the FCC's RF/MW radiation exposure limits (see p.18 and *MWN*, N/D97, J/A98 and S/O98).

Although most of the 20 activists at the Fairlee meeting have been involved in mobile phone antenna siting disputes, the new group is "not just concerned with cell towers," said Carole Lomond from her home in Golden, CO, on her return from Vermont. Lomond has been battling a plan to build several digital television (DTV) broadcast towers on Lookout Mountain out-

The Vienna Resolution: Low-Level RF/MW Effects "Established," More Research Needed

In Vienna, Austria, 16 scientists attending the Workshop on Possible Biological and Health Effects of RF Electromagnetic Fields, October 25-28, adopted the resolution reprinted below. According to Dr. Michael Kundi, the head of the Department of Occupational and Social Hygiene at the University of Vienna's Institute of Environmental Hygiene and an organizer of the workshop, the statement was signed by all those present at the close of the meeting—except Dr. Michael Repacholi, the head of the WHO International EMF Project in Geneva, Switzerland (see p.2). Sponsors of the workshop included the Austrian Society of Hygiene, Microbiology and Preventive Medicine and the Vienna Environmental Bar Association. The program of the workshop and the text of the statement are on the Internet at: <www.irf.univie.ac.at/emf/>. Those who wish to endorse the resolution can do so by completing the form that appears on this Web site. The proceedings of the workshop are scheduled to be published in December.

Preamble:

The participants agreed that biological effects from low-intensity* exposures are scientifically established. However, the current state of scientific consensus is inadequate to derive reliable exposure standards. The existing evidence demands an increase in research efforts on possible health impacts and on an adequate exposure and dose assessment.

Base stations: How could satisfactory public participation be ensured?

The public should be given timely participation in the process. This should include information on technical and exposure data as well as information on the status of the health debate. Public participation in the decision (limits, siting, etc.) should be enabled.

Cellular phones: How could the situation of users be improved?

Technical data should be made available to users to allow comparison with respect to EMF exposure. In order to promote prudent usage, sufficient information on the health debate should

**Preferred terminology to use in public communication:*

Instead of using the terms "athermal," "nonthermal" or "microthermal" effects, the term "low-intensity biological effects" is more appropriate.

be provided. This procedure should offer opportunities for users to manage reduction in EMF exposure. In addition, this process could stimulate further development of low-intensity emission devices.

Signers:

Drs. Carl Blackman, Environmental Protection Agency, Research Triangle Park, NC, U.S.; Neil Cherry, Lincoln University, Canterbury, New Zealand; Günter Käs, Federal Military University, Munich, Germany; Lebrecht von Klitzing, University of Lübeck, Germany; Wolfgang Kromp, University of Vienna, Austria; Michael Kundi, University of Vienna; Henry Lai, University of Washington, Seattle, U.S.; William Leiss, Queen's University, Kingston, Ontario, Canada; Theodore Litovitz, Catholic University of America, Washington, U.S.; Kjell Hansson Mild, National Institute for Working Life, Umeå, Sweden; Wilhelm Mosgöller, University of Vienna; Joachim Röschke, University of Mainz, Germany; Felix Schinner, University of Vienna; Stanislaw Szmigielski, Center for Radiobiology and Radiation Safety and Military Institute of Hygiene and Epidemiology, Warsaw, Poland; Luc Verschaeve, Flemish Institute for Technological Research (VITO), Mol, Belgium; Ulrich Warnke, University of the Saarland, Saarbrücken, Germany.

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side of Denver, which is already the site of a dozen high-power radio and TV towers and hundreds of other antennas (see *MWN*, J/A98). Another founding member of the network, Sharon Judge of Sandwich, MA, is working to shut down the U.S. Air Force's PAVE PAWS missile defense radar on Cape Cod (see p.16 and *MWN*, J/F98).

Besides offering information to concerned citizens and advice to activists, Kelley said, the network will press for "credible, impartial science" on the possible health effects of non-ionizing electromagnetic radiation. The network will lobby for federally funded research on possible health effects of wireless telephone radiation, to be directed by the Environmental Protection Agency.

The new group will be active in the legislative arena as well: It is urging passage of S.2514, Sen. Patrick Leahy's (D-VT) bill to repeal federal preemption of antenna siting (see *MWN*, S/O98). Aides to Leahy and to Sen. James Jeffords (R-VT) attended the Fairlee meeting as observers.

The network will also argue for a revision of the FCC's RF/MW exposure limits. A statement adopted in Vermont contends that the available scientific evidence "should prompt policymakers to seek more stringent standards immediately."

For more information on the EMR Network, contact Kelley at: 936-B Seventh St., Suite 206, Novato, CA 94945, (415) 892-1863, Fax: (415) 892-3108, E-mail: <info@emrnetwork.org>, Web: <www.emrnetwork.org>.

U.K.'s NRPB Tests Feasibility of Occupational RF/MW Study

U.K. researchers have begun a three-year study of the feasibility of investigating cancer and other health problems among broadcast and telecommunications workers.

A team from the Institute of Occupational Health (IOH) at the University of Birmingham and the National Radiological Protection Board (NRPB) in Chilton, led by IOH's Prof. Malcolm Harrington, will develop a protocol for assessing on-the-job exposures to RF/MW radiation. In its October 30 press release announcing the project, the NRPB noted that the Health and Safety Executive and the Department of Health have affirmed the need for a feasibility study.

The NRPB declined to identify the sponsors of the study, describing them only as "major industrial companies with workforces potentially exposed to RF radiation." Other details were also unavailable, including the types of workers to be examined and the cost of the study. NRPB spokesperson Dr. Michael Clark told *Microwave News* that all this information is confidential.

When the feasibility study is complete, the study team, together with NRPB's Advisory Group on Non-Ionizing Radiation, which is chaired by Sir Richard Doll, will decide whether to proceed with a full-scale epidemiological study.

Corporate Interference Charged over Pacemaker EMI (continued from p.1)

Sensormatic maintains that its lawyers' intervention became necessary when McIvor refused to provide the company with all of his raw data. "Sensormatic has never tried to suppress Dr. McIvor's research," insisted spokesperson Lee Pernice. "All we've wanted is the data that he agreed to provide," she told *Microwave News* from the company's headquarters in Boca Raton, FL. "But we never got what we paid for."

McIvor, of the Heart Institute of St. Petersburg in Florida, presented his initial findings at the May 1997 meeting of the North American Society of Pacing and Electrophysiology (NASPE—see *MWN*, S/O97). "When Sensormatic saw an advance copy of the abstract, they wanted me to change the wording," McIvor said in an interview. "I said clinically relevant interactions could be avoided—but Sensormatic wanted me to say that they were not possible."

McIvor wrote up his final results and submitted them to *PACE*, NASPE's journal, in October 1997. The company's stand became more aggressive, he said, after he gave them an advance copy of this manuscript: Sensormatic demanded that he "cease and desist" from saying that there could be any danger to pacemaker users.

By winter's end, McIvor said, he began receiving letters from Sensormatic's lawyers that warned of possible litigation. "After I appeared at a conference in England in March, they insisted that I not speak at any conferences or to the press or make any public comments until the study was published," he stated. McIvor said he made no presentations on his study for the next

six months, at the request of his partners at the Heart Institute.

Pernice acknowledged that, "Sensormatic asked Dr. McIvor not to speak publicly on the research until we had the information" that it felt he had promised. The company needed the raw data first, she said, "so that we would be able to respond appropriately to the questions of the media."

On July 6, 1998, *PACE* accepted the study for publication. "But later I got a message from the editor, through his lawyer," said McIvor. "They said, 'We want to make sure that you want to publish—because you might face legal consequences'."

"We did not write to *PACE*," said Sensormatic's Pernice. She explained that Sensormatic only sent *PACE* copies of letters that Sensormatic's attorneys wrote to McIvor in the dispute over access to the study data. The purpose, she said, "was just to make sure that *PACE* understood that there was controversy around this article."

"My reaction to those events was to get an attorney," said *PACE* editor Dr. Seymour Furman, who is at Montefiore Medical Center in New York City. Furman noted that this was the only time that the journal had ever needed to hire a lawyer. "I believe, frankly, that it was a very wise move," he told *Microwave News*.

According to Pernice, Sensormatic wrote directly to *PACE* only once—to offer a formal release from any legal liability if the journal published McIvor's study. "We were being accused of trying to discourage publication, and we wanted to make clear that we were not," she said, insisting that Sensormatic had never

threatened *PACE* with litigation. Furman responded that, "Legal pressure takes many forms."

At a Food and Drug Administration (FDA) hearing on September 24, the FDA's senior pacemaker reviewer, Mitchell Shein, called McIvor's still-unpublished research "the single most comprehensive study on the issue" (see *MWN*, S/O98). Shortly afterwards, the study appeared in *PACE*'s October issue. "It was a surprise to me," said McIvor, noting that the paper had originally been slated for publication in August. He said he thought that the FDA's interest in the subject had helped to assure publication.

Alongside McIvor's paper, *PACE* ran a sharply critical editorial by Warren Harthorne of Massachusetts General Hospital in Boston. "There are no reports in the real world of patient harm," Harthorne argued, adding that most of the EMI observed by McIvor is "of no clinical relevance."

Harthorne, a past president and founding member of NASPE, is one of many prominent cardiologists who argue that McIvor has exaggerated the significance of his results. He is also a Sensormatic consultant, and has been McIvor's most active critic. At the NASPE annual meeting in May 1998, Harthorne chaired a symposium, funded by an EAS industry group, that highlighted criticism of the McIvor study.

Sensormatic's Pernice argued that it was actually McIvor who was suppressing his research: "What is in that data that he can't share?" she asked. "He clearly told us that we would have access to it. We still haven't seen it."

McIvor responded that he had given Sensormatic substantial data from the study, and made many changes to the paper in response to the company's concerns. The problem, he said, was that the company also wanted its consultants to analyze each patient's electrocardiogram (EKG). "The patients who volunteered for this study had not given permission for their EKGs to be shared with anyone outside of the Heart Institute," McIvor said, and this had made it difficult to respond to Sensormatic's requests.

Sensormatic Long Under Siege

The conflicts over McIvor's study occurred against the background of a bitter struggle that has engulfed Sensormatic for several years—a struggle in which pacemaker EMI has played a prominent role. The company has been under attack by Wall Street speculators known as "short-sellers," who bet that the price of Sensormatic's stock will fall. The short-sellers have done their best to make this prediction come true, by spreading bad news and rumors about the company at every opportunity.

In both 1994 and 1995, short-sellers tried to use news stories about EAS systems and pacemakers against Sensormatic. In response, the company hired Harthorne to review confidential data from an industry-supported test facility. Harthorne reported that there was no cause for pacemaker users to worry.

When Sensormatic's top public relations consultant left in 1994, he cited the company's secrecy over EMI data. He promptly went to work for a competitor, Checkpoint Systems Inc. of Thorofare, NJ, and met with short-sellers. Checkpoint contends that it has a safer product, and has aggressively promoted this message to the media.

"The EAS industry is one of the most poisonous industries I've seen," commented Prof. Joshua Bamfield, director of the

Two New EMI Case Reports

"A life-threatening interaction" between an implantable cardiac defibrillator (ICD) and an anti-theft system is reported in the November 5 issue of the *New England Journal of Medicine* (339, pp.1,371-1,374).

Dr. Peter Santucci and colleagues at Rush-Presbyterian-St. Luke's Medical Center in Chicago describe a 72-year-old man who received four shocks from his defibrillator while standing at a magazine rack, about one foot from an acousto-magnetic anti-theft system.

"If nobody had pulled him away, there's a good chance he might have died right there," Santucci told *Microwave News*: "When the EMI occurred, the man had no heartbeat," since he is dependent on pacing from his ICD.

But Santucci noted that such severe EMI is rare, and can be avoided if ICD users do not linger near anti-theft systems. "If people are aware, it shouldn't cause major problems," he said.

A letter in the same issue of the *Journal* (pp.1,394-1,395) by Dr. S. Sridhar of Affiliated Cardiologists in Phoenix and Dr. Michael McIvor describes how EMI from acousto-magnetic systems caused "palpitations, nausea...and dizziness" in a pacemaker patient of Dr. Sridhar's.

Center for Retail Research in Nottingham, U.K. Bamfield was the main organizer of a March 1998 conference at which McIvor was a featured speaker. Bamfield told *Microwave News* that he was pressured to drop McIvor from the program. "It was suggested to me that McIvor was just a public relations front, and that I ought to have another speaker," he said. Bamfield declined to give further details, but noted that he had felt compelled to buy "an incredibly large professional indemnity policy."

The March conference was attended by a Sensormatic lawyer, Kenneth Taber of Christy & Viener in New York City—the same lawyer who later wrote to McIvor to demand that he not speak in public and forwarded the correspondence to *PACE*.

Sensormatic has recently sought to portray McIvor as a tool of Checkpoint. On November 4, a company press release described McIvor as "author of a study principally funded by a competitor of Sensormatic"—namely, Checkpoint. The fact that Sensormatic helped to fund the study went unmentioned.

Sensormatic has supported other studies of pacemaker EMI in France, Spain, the U.K. and the U.S. But the company reportedly blocked one attempt to document the problem. George Eisinger and Dan Costello, both with pacemaker manufacturer St. Jude Medical, told *Microwave News* that in mid-July Sensormatic refused to allow testing of a Seattle department store employee who had reported symptoms of pacemaker EMI. Costello said that the store and Sensormatic both said no to the proposed test. "This is the only time I've run into a manufacturer that wouldn't allow me to test," commented Eisinger, a clinical engineer.

"That's incorrect," said Sensormatic's Pernice, denying that the company had blocked such testing. "Sensormatic would not have the authority to deny testing at a retail location," she said. "Once the systems are sold they are no longer our property, and the stores are free to do whatever they want."

« Power Line Talk »

The staff at the NIEHS in Research Triangle Park, NC, has nearly completed a draft of Director Dr. **Kenneth Olden**'s report to Congress on the **EMF RAPID** program. It is now undergoing various reviews. No word yet on when it will be released to the public. More than 2,000 copies of the Working Group's report have now been distributed (see *MWN*, J/A98). The transcripts of the four hearings, at which the public was invited to comment on the report, have been added to the NIEHS Web site: <www.niehs.nih.gov/emfrapid>. The 178 sets of written comments on the report, running over 2,000 pages, have been collected into four bound volumes. Copies are being placed in a number of libraries, including those of the National Academy of Sciences and the Edison Electric Institute, both in Washington, EPRI in Palo Alto, CA, and the WHO EMF project in Geneva, Switzerland. The EMR Network has also been given a set (see also p.5). "We plan to put all the written public comments on the Web early next year," said NIEHS' Dr. **Mary Wolfe**.

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The **American Institute of Stress** will honor Dr. **Ross Adey** at its 10th annual meeting, to be held in Montreux, Switzerland, the first week of March (see p.15 for details). Adey will receive the 1999 **Hans Selye Award** for his "seminal contributions" to the understanding of biological effects resulting from exposure to weak EMFs.

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The Labor government of U.K. Prime Minister **Tony Blair** has rejected a request for a moratorium on the construction of new transmission lines. In an October 29 debate in the House of Commons, **Anne McIntosh**, a Conservative member from northern England, asked that no new power lines be built "until more is known about their health effects and potential risks." McIntosh is concerned about a planned 400 kV line that would run through her district. The government approved the power line last March, after extended public inquiries. Responding to McIntosh, **Tessa Jowell**, Blair's minister for public health, reaffirmed the conclusion reached by Tory Prime Minister **John Major**'s government in 1995: "Possible health effects provide insufficient grounds" to block the line. McIntosh countered that the government banned beef on the bone to protect the public from BSE ("mad cow disease") despite the lack of conclusive evidence of a hazard to human health, and she argued that it should authorize similar preventive measures for EMFs.

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A consortium of New York state utilities is the latest to fold its EMF research operation. "Our EMF work is coming to an end as of December 31," said **Ed Torrero**, the EMF project manager of the Empire State Electric Energy Research Corp. (**ESEERCO**) in New York City. The decision to end EMF work is part of an overall cutback at ESEERCO, prompted by "changes in the utility industry, specifically deregulation," according to **Herbert Kaufman**, director of R&D operations. ESEERCO has one ongoing EMF project: an assessment of magnetic field exposures from transmission lines of 345 kV and above. This project will

NIOSH Measurement Manual

The National Institute for Occupational Safety and Health (NIOSH) has published a technical manual on how to measure EMFs below 30 kHz in work environments.

Designed to assist industrial hygienists and researchers, the manual describes 16 methods that have been used to measure EMF exposures in epidemiological studies and health hazard evaluations. It also includes suggestions on how to develop protocols to meet other needs.

The manual, which comes in a loose-leaf binder, was edited by Drs. Joseph Bowman of NIOSH in Cincinnati, Michael Kelsh of Exponent in Menlo Park, CA, and William Kaune of EM Factors in Richland, WA.

Manual for Measuring Occupational Electric and Magnetic Field Exposures, DHHS (NIOSH) Publication No.98-154, 1998, can be ordered from NIOSH publications at: (800) 356-4674 or by E-mail at: <pubstaft@cdc.gov>. Copies are scheduled to be available in early 1999.

be taken over by the **New York Power Authority** (NYPA), where it will be managed by Dr. Susan White of the NYPA's White Plains office. ESEERCO recently completed its part of a joint study with the EPRI in Palo Alto, CA, on whether wire codes are associated with measured magnetic fields. Despite deregulation, the New York State Public Service Commission's (PSC) 1988 ruling ordering utility industry funding of EMF research (see *MWN*, M/A88) is still in effect—but it is not clear who will do any future studies. The state wants EMF research to continue, Dr. **Dan Driscoll** of the PSC staff in Albany told *Microwave News*. The PSC wants to see field characterization and exposure assessment studies for lower voltage power lines, in addition to the ongoing exposure assessment effort, which Driscoll called "the major EMF project in New York." But while Driscoll said that it is his understanding that the utilities will do the work themselves, he conceded that he is not aware of any plan that is now in place. He also noted that the PSC could change its views on EMF research. When the NIEHS releases its final report on the EMF RAPID program (see *MWN*, S/O98), a New York staff committee on EMFs, which Driscoll chairs, will review it together with the NIEHS Working Group's report (see *MWN*, J/A98) and submit recommendations to the PSC. If the NIEHS says there is no health risk from EMFs, he explained, the PSC may decide that further studies are unnecessary.

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The "**Less EMF**" catalog contains products such as gaussmeters and low-field appliances, and books that range from *The Great Power Line Cover-Up* to the NAS EMF report. A section titled "Metaphysical Items" includes exotic devices whose efficacy might generously be described as unproven, such as the "D-Nuke Microwave Neutralizer" and the "Electrosmog Corrector." For a catalog, call (888) 537-7363, or go to <www.lessemf.com> on the Web.

Four Labs Link 50/60 Hz Fields to DNA Breaks; Two Reproduce Effect at Occupational Exposure Levels

Power frequency EMFs have been found to increase significantly the number of broken strands of DNA in recent experiments in India, Sweden and the U.S. The effect has now been reported by four different labs, with consistent and statistically strong results.

In two recent experiments, the increase in DNA damage was seen after exposure to fields of 75 mG and 100 mG—levels that are routinely found in the workplace. The effect appears to be cumulative, in one case first emerging after a month's exposure.

Drs. Henry Lai and Narendra Singh of the University of Washington, Seattle, were the first to report an increase in DNA breaks after exposure to 60 Hz fields. They found more single-strand breaks in the brains of rats after a single two-hour exposure at 1 G, 2.5 G or 5 G, and more double-strand breaks at 2.5 G and 5 G. The increases are dose-dependent, and all are highly significant ($p < 0.001$). These results were published last year in *Bioelectromagnetics* (18, pp.156-165, 1997; see also *MWN*, N/D95).

Even earlier, Lai and Singh had reported that microwave exposure caused an increase in DNA breaks in the brains of rats (see *MWN*, N/D94). They went on to study exposure to 60 Hz fields, and have followed up their initial EMF study with a series of related experiments.

An increase in DNA breaks after exposure to 60 Hz fields was subsequently observed by Dr. Jerry Phillips of the Veterans Administration Medical Center in Loma Linda, CA, using a 1 G field, and at much higher 50 Hz EMF levels by Dr. Yog Raj Ahuja of the Mahavir Medical Research Center in Hyderabad, India.

Sweden's Dr. Britt-Marie Svedenstål has observed the same effect in a study using real-world EMFs, at levels that occur in many jobs—an average field strength of 75 mG. In Svedenstål's study, mice were exposed outdoors to the fields from a 220 kV power transmission line for 11, 20 or 32 days. After 11 or 20

days there was virtually no difference between the EMF-exposed animals and controls—but after 32 days the exposed animals had a highly significant increase in DNA damage.

"Something is happening," Svedenstål told *Microwave News*. "There is a weak genotoxic effect." Svedenstål, who is in the Department of Radioecology at the Swedish University of Agricultural Sciences in Uppsala, presented her findings at the final EMF research review sponsored by the U.S. Department of Energy (DOE) in Tucson, AZ, in September (see *MWN*, S/O98). She called the results "a signal to go further."

Like the Svedenstål study, Lai and Singh's latest work also showed that DNA damage can occur at lower EMF levels. After exposing rats to a 100 mG, 60 Hz field for 24 hours, Lai and Singh found significant increases in both single- and double-strand breaks in DNA from the animals' brains. After 48 hours, there was a further increase. This suggests that the effect is cumulative, Lai told *Microwave News*—which would be consistent with Svedenstål's results.

Svedenstål's team included Drs. Karl-Johan Johanson, Mats-Olof Mattsson and Lars-Erik Paulson. Johanson, also of the Swedish University of Agricultural Sciences, was one of the originators of the comet assay, a test for detecting DNA damage in which broken strands form a comet-like tail. Johanson's version of the assay, used in the Svedenstål study, is chemically neutral. Singh developed another version of this technique, the alkaline comet assay, which was used in the Lai-Singh, Ahuja and Phillips experiments.

At the other end of the intensity scale, Ahuja and colleagues used field levels that were extremely high, ranging from 20 G to 100 G. This also produced significant effects—after only one hour of exposure—in blood samples from six human volunteers.

"At each of the magnetic field intensities tested by us, there was a significant increase in the DNA damage as compared to the control," Ahuja's group told the *International Conference on Electromagnetic Interference and Compatibility*, held in Hyderabad in December 1997. This "increase in genomic instability," they suggested, could mean that chronic exposure to very strong EMFs "may result in an increased incidence of congenital malformations and cancer."

Phillips told *Microwave News* that he saw significant increases in DNA breaks in eight out of ten experiments he conducted with Molt-4 T-lymphoblastoid cells, a type of human leukemia cell. Phillips exposed the cells to a 1 G field for 18 hours.

In related experiments, Phillips and colleagues first treated similar cells with a chemical known to cause DNA damage. Cells that were then exposed to EMFs showed significantly more damage, as well as changes in the activity of an enzyme involved in DNA repair, poly(ADP-ribose) polymerase.

"We propose that [EMF] exposure can affect both DNA damage and repair processes," Phillips stated at the DOE meeting in Tucson, "and that it can act in concert with chemical agents to potentiate the damaging effects of those agents." There was also a decrease in the number of viable cells, and Phillips suggested

Funding Dries Up for DNA-EMF Studies

While recent studies of DNA damage and 50/60 Hz fields are provocative, consistent and statistically strong, the prospects for follow-up research appear dim.

Lai and Singh's work in this area was funded by the NIEHS EMF RAPID program, which is now coming to an end. Phillips's work was funded by DOE's EMF research program, which Congress shut down this fall (see *MWN*, S/O98). And Svedenstål's department will be closed at the end of the year.

In an interview, Lai said he had asked EPRI to fund studies of power frequency EMFs and DNA damage. "We sent in a complete proposal, and the reviewers recommended funding," said Lai. "Dr. Charles Rafferty wrote to us two-and-a-half years ago and said EPRI wanted to go ahead. But we have never received a dime."

that EMF exposure may “increase the number of cells that undergo apoptosis,” or programmed cell death.

In an interview, Phillips said that his findings on DNA damage might support studies that have linked EMF exposure to chromosome damage—for which DNA damage is a prerequisite (see *MWN*, Mar83, J/F85 and S/O88). “Our work confirms the damage to DNA observed by others,” he stated, “and emphasizes the need to use the most sensitive assay available.”

In Lai and Singh’s recent work, they have found that the ability of EMFs to increase DNA damage can be blocked in several different ways. Their findings suggest that the mechanism for this EMF effect involves free radicals—compounds that are highly reactive, and therefore able to do biological harm.

Free radicals can be kept from damaging other cells by antioxidants, such as melatonin or Trolox, a Vitamin E analog. Lai and Singh have found that treatment with Trolox, which they describe as “a potent free radical scavenger,” prevented EMF-induced breaks in DNA. These results were reported at the 1997 DOE EMF research review in San Diego.

The University of Washington researchers had previously achieved the same result by using two different antioxidants (see *Journal of Pineal Research*, 22, pp.152-162, 1997). In addition, Lai told *Microwave News*, they have found that this EMF effect can also be blocked by 7-nitroindazole—a chemical that suppresses the production of nitric oxide, a common free radical.

Lai and Singh attribute the buildup of DNA damage observed in these experiments to a combination of “oxidative damage to DNA and its subsequent misrepair.” They speculate that EMF-induced free radicals may not only lead to an increase in DNA breaks, but also to an increase in cell death. If so, this would explain how EMFs could play a role in the development of neurodegenerative illnesses such as Alzheimer’s disease and ALS.

WHO EMF Project Eschews Prudent Avoidance

The World Health Organization’s (WHO) EMF Project does not endorse prudent avoidance. “It is not WHO’s job to be recommending ‘prudent avoidance’ to national governments,” Dr. Michael Repacholi, WHO’s project manager, told *Microwave News*. He stressed that the WHO has no position on the issue.

In its latest fact sheet, *EMFs and Public Health: Extremely Low Frequency (ELF)*, issued in November, the WHO project advises that, “[T]here is no need for any specific protective measures for members of the general public.”

Repacholi argued that this recommendation followed from a seminar on EMFs and health held in Bologna, Italy, in June 1997 (see *MWN*, M/A97). Attendees there concluded that while the literature does not establish that low-level exposures cause health hazards, biological effects have been observed. A summary of the Bologna meeting has been accepted for publication in *Bioelectromagnetics* and is scheduled to appear next year.

Repacholi explained that the WHO program is designed to determine if there are EMF health effects. He added that, “If national authorities want to take this [uncertainty] to mean they need to act in case there are any health consequences found in the future, then that is their responsibility.”

Meanwhile, on November 17, the WHO project launched an initiative to “harmonize” EMF exposure standards worldwide. “Globalization of trade and the rapid introduction of mobile telecommunications worldwide have focused attention on the large differences...in standards limiting exposure to EMFs,” the WHO press release noted.

Bullock Case Ends: An EMF Era Comes to a Close? (continued from p.1)

Watson of Watson & Renner in Washington in an interview. “I have felt all along that these cases cannot prevail if they are not grounded in solid scientific evidence.” Watson is the attorney for the Utility Health Sciences Group, a consortium of electric utilities dealing with EMF issues.

“These cases will resurface as the science continues to develop,” predicted Bruce DeBoskey of Silver & DeBoskey in Denver, who represented Nancy Jordan in her unsuccessful cancer suit against Georgia Power Co. “I think this is sort of a half-time in the life of EMF—cancer litigation,” DeBoskey said. “In the years ahead, there will be another attempt to put together the case for causation—but I think that now is not the time.”

In late 1995, famed trial lawyer Joseph Jamail dropped a lawsuit involving nine children with leukemia after Texas courts adopted more restrictive standards for scientific evidence (see *MWN*, S/O95). Two test cases in Britain were dropped in 1997, with attorneys also citing the need for more clear-cut scientific data (see *MWN*, S/O97). The Bullock lawsuit was the last well-known EMF—cancer case in the U.S., although a source familiar with U.S. EMF litigation told *Microwave News* that another had been or soon would be filed. No details were available at

press time.

Melissa Bullock was diagnosed with brain cancer in 1989 at the age of 17, and the lawsuit was filed two years later (see *MWN*, J/F92). In a statement announcing the withdrawal of the suit, she emphasized that, “The lawsuit was brought because we believed then, as we do now, that EMFs caused my brain tumor and changed my life.” Her mother, Suzanne, noted that at the time the suit was filed, several studies linked brain cancer and EMF exposure. “We had hoped that over the years even more compelling scientific proof would develop,” Suzanne Bullock explained. “It has not and so we are left with no other choice but to withdraw this case.”

Anthony Fitzgerald, a lawyer for Northeast Utilities who is with Carmody & Torrance in New Haven, said, “There’s simply no scientific basis on which one could say that EMFs would lead to development of a brain tumor.” In an interview, Fitzgerald said that the company’s seven expert witnesses on EMFs and brain tumors included “internationally prominent researchers.”

Northeast Utilities planned to submit videotaped testimony from the U.K.’s Sir Richard Doll, described by the utility as “the world’s foremost epidemiologist.” Doll, who drew world atten-

tion to the link between tobacco and lung cancer in the 1950s, has been reluctant to draw firm conclusions about cancer and EMFs (see *MWN*, M/A94, S/O96 and S/O97).

According to court papers, several of the utility's experts drew distinctions between the data on brain tumors versus other cancers, as well as between occupational and residential exposures.

One example is Dr. Lennart Hardell, an oncologist at the Örebro Medical Center in Örebro, Sweden. Hardell led a 1995 review of EMF health effects, which was part of the basis for the Swedish government's decision to endorse a policy of prudent avoidance (see *MWN*, N/D95). Hardell's review found possible associations between residential EMF exposure and childhood leukemia, and between occupational exposure and chronic lymphatic leukemia (CLL). But he found no evidence of an increased risk of brain cancer from residential exposure and no "consistent pattern" of risk from EMFs at work. Fitzgerald said that if the case had gone to trial, it would have been the first time that Hardell appeared as a witness in any EMF case.

Last June, the EMF working group assembled by the National Institute of Environmental Health Sciences (NIEHS) came to very similar conclusions (see *MWN*, J/A98). A majority of the panel saw the data on childhood leukemia and on CLL among workers as indicating that EMFs are "possible human carcinogens." But the working group voted overwhelmingly that the evidence for any EMF-brain tumor connection must be considered "inadequate."

Other Northeast Utilities witnesses included Dr. John Moulder of the Medical College of Wisconsin in Milwaukee, an associate editor of *Radiation Research*, and Dr. Jerry Williams of Johns

Hopkins University in Baltimore, who served on both the National Research Council and NIEHS panels on EMF health risks (see *MWN*, N/D96 and J/A98). According to court papers, Williams was expected to testify that residential EMF exposure is not "a substantial factor in producing brain cancer," while Moulder planned to say that residential exposure does not "produc[e] cancer of any kind." Moulder has previously testified on behalf of utilities in EMF cases; Williams is a longtime member of EPRI's EMF Advisory Committee.

Expert witnesses for the plaintiffs were to include Drs. Stephen Cleary of the Medical College of Virginia in Richmond, Reba Goodman of Columbia University in New York City and David Ozonoff of Boston University. Of these, only Ozonoff, an epidemiologist, was described as prepared to testify that EMFs "were a substantial factor in causing Melissa Bullock's cancer." Cleary, a biophysicist, was expected to say only "that 60 Hz magnetic fields are biologically active." Goodman was to describe "cellular changes" that can be caused by EMFs, changes that could contribute to the development of cancer.

"The association between EMFs and brain tumors continues to appear in the literature, but it hasn't gotten stronger," explained Horwitz, the Bullocks' lawyer. "So the doctors who'd been called to testify were increasingly uncomfortable testifying that EMFs are causative, and causative in this particular case."

"I think there needs to be a clearer understanding of the mechanism" for EMF-cancer lawsuits to be won in the future, Horwitz said. It need not be definitively proven, he added, but should stand out from alternatives. "Once you have a good hypothetical mechanism," he noted, "you can refine the epidemiological studies and should start to see some higher risk ratios."

The Bullocks' case became well known after it was featured in Paul Brodeur's 1990 article in the *New Yorker*, "Calamity on Meadow Street," a continuation of his "Annals of Radiation" series. Brodeur detailed four cases of brain cancer on the one-block street, including Melissa Bullock's. Brodeur's second book on EMFs, *The Great Power Line Cover-Up*, published in 1993, begins with the Meadow Street story.

Another Meadow Street resident, Jack Walston, had filed suit a month after the Bullocks. But Walston's nonmalignant brain cancer had been diagnosed in 1979, and his case was dismissed on the grounds that he had waited too long to begin legal action.

"Because of my illness I will never be independent, I will not go to college or have a good job," said Melissa Bullock in her statement. "What I hoped to accomplish in this lawsuit was to prevent other children from getting sick from EMFs and suffering the way my family and I have." Horwitz explained that although Bullock has made progress since her tumor was removed, she is still able to read at only a second-grade level.

Bruno Ranniello, a spokesperson for Northeast Utilities, told *Microwave News*, "We've said from the outset that we believe the power lines and the nearby substation had nothing to do with Melissa's cancer." He added that, "We sympathize with the Bullocks—Melissa's cancer is a tragedy."

Suzanne Bullock's statement emphasized the need to continue research: "We hope that our withdrawal of this lawsuit will not deter honest scientists from continuing their investigation...[of] the dangers of EMFs."

National EMF Advisory Group Urges Continued Research

The National EMF Advisory Committee (NEMFAC) has strongly urged the National Institute of Environmental Health Sciences (NIEHS) to continue EMF research.

In an October 20 letter signed by NEMFAC Chair Shirley Linde, the committee told NIEHS Director Dr. Kenneth Olden that, "Without further EMF research, public confusion, speculation and controversy about the public health impact of EMFs will persist and formulation of a clear and consistent set of exposure guidelines will be delayed."

"It is also imperative that there is sufficient stability of funding to ensure the maintenance of a viable infrastructure of scientists and their laboratories over the long term," NEMFAC stated.

The committee asked Olden to ensure that the public is informed about potential health risks and about "low- and no-cost options for minimizing personal exposure to EMFs for those individuals who choose to exercise these options" (see *MWN*, S/O98).

NEMFAC was mandated by the U.S. Congress to advise the heads of the NIEHS and the Department of Energy on the implementation of the EMF RAPID program. Olden is preparing a final report on the EMF RAPID program for submission to Congress (see p.8).

FROM THE FIELD

Behind the Scenes at the NIEHS EMF Working Group Meeting: Germany's Dr. Wolfgang Löscher Cites Dirty Tricks

One of the most contentious issues at two recent meetings sponsored by the National Institute of Environmental Health Sciences (NIEHS)—the Phoenix *in vivo* science review symposium in April and the Minneapolis Working Group meeting in June—was how to reconcile the divergent results of EMF–breast cancer animal studies.

Dr. Wolfgang Löscher's lab at the School of Veterinary Medicine in Hannover, Germany, has reported an EMF-induced increase in tumor growth among rats, while Dr. Larry Anderson at the Battelle Pacific Northwest Labs in Richland, WA, did not see this effect (see MWN, M/A98 and M/J98).

Two of the strongest voices to discount Löscher's findings were those of Drs. Gary Boorman of the NIEHS and Jerry Williams of Johns Hopkins University. For instance, Williams drafted a minority statement to the Working Group report which argued that the Löscher studies are "fundamentally flawed."

One of the complications in interpreting the Battelle results was that in two of the three experiments, the tumor rates among the control animals induced by the chemical carcinogen DMBA were so high (92%-96%) that there was little room for any contrast with those among the EMF-exposed rats. While Anderson himself felt uncomfortable drawing any conclusions on these two studies, Boorman and NIEHS' Dr. Christopher Portier have argued that they, together with the third Battelle study, yielded enough information on tumor incidence and growth to give them confidence that the German studies had been refuted.

The letter reprinted below was obtained by Microwave News from the NIEHS under the Freedom of Information Act. Microwave News offered Boorman an opportunity to respond, but he declined, other than to write that, "The letter [from Prof. Ulrich Mohr] was shown to Dr. Michael Gallo and he determined that it was not relevant to the committee. It was not shown to others!"

In an August 28 letter to Löscher, Dr. George Lucier, director of the NIEHS Environmental Toxicology Program, apologized and assured him that the Mohr letter had had no impact on any of the NIEHS committees reviewing the EMF–animal studies.

August 18, 1998

Dear Dr. Boorman:

As you know, my group has performed a series of experimental *in vivo* studies on the potential carcinogenic effects of 50 Hz electromagnetic field (EMF) exposure in the DMBA breast cancer model in rats. Part of these studies was supported by the U.S. Department of Energy (DOE), Office of Utility Technologies, through Oak Ridge National Laboratory. Our data have been published in several papers in international peer-reviewed cancer journals. Because our studies are among the first to demonstrate a cocarcinogenic effect of EMF exposure in a widely used cancer model, our papers are highly cited. Our data were the reason for a replication study within the National Toxicology Program of the NIH/NIEHS (NIH Publication No. 98-3979). Furthermore, I was invited several times by the DOE, the NIH, or the NIEHS to report on our data or to act as an expert during meetings in the U.S., including the recent EMF Science Review Symposium in Phoenix. I was also invited by the NIEHS to join the working group of scientists which met in Brooklyn Park [outside] Minneapolis and to help in preparing the working group report (*Assessment of Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields*) of the NIH/NIEHS, but I could not attend the meeting because of duties here in Germany.

I shortly informed you by e-mail of August 2, 1998, that I heard

from scientists who attended the Phoenix and Minneapolis meetings that you cited during the meetings from a letter of Prof. Ulrich Mohr, Hannover, Germany. Mohr, who is a well-known pathologist, and his group cooperated with us during some of our studies, including a study that was published in *Carcinogenesis* (Baum, Mevissen, Kamino, Mohr and Löscher, "A Histopathological Study on Alterations in DMBA-Induced Mammary Carcinogenesis in Rats with 50 Hz, 100 μ T Magnetic Field Exposure," *Carcinogenesis* 16, pp.119-125, 1995). In this study, we reported in EMF-exposed rats a significant increase in incidence of grossly recorded mammary tumors, a significant increase in size of grossly recorded mammary tumors and a significant increase in incidence of adenocarcinomas, whereas the overall incidence of mammary tumors (including those only detectable at the microscopic level) was not changed significantly compared to sham controls. In his letter to you of March 3, 1998, Mohr claims that he thinks the study is negative and that he has not seen the paper until recently. Furthermore, he claims that, "Prof. Löscher has used our name, of which I was not actually aware." He also states that by recalculation of the data, using a two-sided Fisher's exact test, the increase in adenocarcinomas in the EMF group is not statistically significant.

I have letters from Dr. A. Baum (the first author of the paper and coworker of Prof. Mohr during the time of the study) clearly indicating that Mohr's group wrote the first draft of the paper, Mohr's group did the statistical analysis of the histopathological findings, including the significant increase in adenocarcinomas and Mohr saw the manuscript before it was submitted for publication in 1994. Of course, I sent Mohr the final manuscript before submission and a reprint of the paper after publication in 1995.

I asked Mohr why he wrote this letter to you, including untrue statements. He wrote me by letter of August 7 that his letter to you was a private letter (not thought to be used in public), and that the fact that he was not aware of the publication, and who did what, could only be due to a striking "communication deficit" in his institute at the time of the study.

How could you use such a letter during the meeting in Minneapolis? I got the letter only after the meeting without having a chance to comment upon its contents. The use of this letter with its false statements is suited to discredit me and my group. After my former coworker Dr. Meike Mevissen heard of the letter and its use during the Minneapolis meeting, she wrote you and asked for a copy, which was the way how I received it. In your e-mail answer of August 3 to my e-mail of August 2, you wrote: "In the meeting in Phoenix, copies of the letter were not given to the participants. Similarly in Brooklyn Park, the chairperson, Dr. Mike Gallo, felt that this letter would be inappropriate for distribution, so it was not given to the participants. Dr. Mike Gallo read the letter but was not given a copy." The fact that you asked Dr. Gallo to distribute the letter speaks [for] itself. Furthermore, as mentioned above, I heard from several U.S. scientists that you mentioned the letter during the Phoenix and Minneapolis meetings and used its contents to discredit my group and the results of our studies.

I am very disappointed about this matter! I never had such an experience in the almost 25 years of my scientific life. It would have been fair to inform me about this letter from Prof. Mohr of March 3. There are several witnesses (Baum and Kamino of Mohr's group, Mevissen of my group) who could confirm that Mohr was aware of the publication, allowed his coworkers to publish it and was also aware that the statistics were done in his institute. As mentioned, there are also letters [from] Mohr's group proving this.

During the meeting in Phoenix, after a debate of two days on EMFs and experimental breast cancer studies, including my data, you stated that I behaved "like a gentleman" during this debate. Dr. Boorman, your behavior is certainly not "gentleman-like." In my e-mail of August 2 to you, I stated that if the discredit of my group produced by your use of this letter [is not] minimized by [giving] correct information [to] everybody [to] whom you gave false information, I will inform the

Bioelectromagnetics Society (BEMS) about the matter and ask for correction. Furthermore, I will not accept any invitations to meetings of the NIEHS or NIH in the future (I just got such an invitation from the NIH to an EMF meeting a couple of days ago) until this matter is resolved in an acceptable manner.

Yours sincerely,
Dr. Wolfgang Löscher

Hot New Papers

Gabriele Freude et al., "Effects of Microwaves Emitted by Cellular Phones on Human Slow Brain Potentials," *Bioelectromagnetics*, 19, pp.384-387, 1998.

"In conclusion, EMFs with a radiation intensity of a usual GSM telephone call may alter preparatory bioelectrical brain activity. Interestingly, the effects occur with respect to the particular task and brain topography. Because the mechanisms of EMF influences on central nervous information processing are rather unknown, the discussion remains on a rather speculative level."

Howard Bassen, Hans Moore and Paul Ruggera, "Cellular Phone Interference Testing of Implantable Cardiac Defibrillators [ICDs] *in Vitro*," *Pacing and Clinical Electrophysiology*, 21, pp.1,709-1,715, September 1998.

"Three models of ICDs were subjected to EMI susceptibility testing using two types of digital phones and one analog cellular phone, each operating at their respective maximum output power. EMI was observed in varying degrees from all DCPs [digital cellular phones]. Inhibition of pacer output occurred in one ICD, and high voltage firing occurred in the two other ICDs, when a TDMA 11 Hz DCP was placed within 2.3 cm of the ICD....EMI occurred most frequently when the lower portion of the monopole antenna of the cellular phone was placed over the ICD header....Amplitude modulation is usually the most significant parameter affecting the ability of a source of RF fields to induce interference....If the amplitude modulation has frequency components in the physiological passband of the medical device, significant interference occurs."

Timo Partonen and Jouko Lönnqvist, "Seasonal Affective Disorder" (seminar), *The Lancet*, 352, pp.1,369-1,374, October 24, 1998.

"SAD was at first believed to be related to abnormal melatonin metabolism, but later findings did not support this hypothesis. Studies of brain serotonin function support the hypothesis of disturbed activity."

Microwaves To Detect Breast Cancer

Susan Hagness, Allen Taflove and Jack Bridges, "Two-Dimensional FDTD Analysis of a Pulsed Microwave Confocal System for Breast Cancer Detection: Fixed-Focus and Antenna-Array Sensors," *IEEE Transactions on Biomedical Engineering*, 45, pp.1,470-1,479, December 1998.

"The system exploits breast-tissue physical properties unique to the microwave spectrum, namely, the translucent nature of normal breast tissues (without lesions) and the high dielectric contrast between malignant tumors and the surrounding normal breast tissues....[O]ur simulations showed that malignant tumors as small as 2 mm in diameter can be detected in the presence of the background clutter generated by the heterogeneity."

First Cell Phone-Headache Study Out

Bruce Hocking, "Preliminary Report: Symptoms Associated with Mobile Phone Use," *Occupational Medicine*, 48, pp.357-360, August 1998.

"Forty respondents from diverse occupations described unpleasant sensations such as a burning feeling or a dull ache mainly occurring in the temporal, occipital or auricular areas. The symptoms often began minutes after beginning a call, but could come on later during the day. The symptoms usually ceased within an hour after the call, but could last until evening. Symptoms did not occur when using an ordinary handset, and were different from ordinary headaches. There were several reports suggestive of intracranial effects....75% of cases were associated with digital mobile phones." (See *MWN*, M/J97 and M/J98.)

James Knoke, Gregory Gray and Frank Garland, "Testicular Cancer and Persian Gulf War Service," *Epidemiology*, 9, pp.648-653, November 1998.

"The finding in our population that blacks had less than 20% the risk of developing testicular cancer as whites is consistent with the published literature, as is the finding that men between the ages of 22 and 31 years were at greater risk than those who were younger or older. However, the increased risk for electronic equipment repair personnel (risk ratio=1.56; 95% confidence interval=1.23-2.00) has not been confirmed by other published reports."

Juris Galvanovskis and John Sandblom, "Amplification of Electromagnetic Signals by Ion Channels," *Biophysical Journal*, 73, pp.3,056-3,065, December 1997.

"[W]e have focused in this study on the primary mechanisms that a biological cell can use to amplify weak external influences, for instance, an alternating magnetic field. Such amplification mechanisms have tended to be overlooked in attempts to explain the response of cells exposed to electromagnetic fields. We have shown that a system of identical ion channels embedded in a membrane and synchronously modulated can significantly amplify the original signal."

J. Dobson and T.G. St. Pierre, "Thermal Effects of Microwave Radiation on Biogenic Magnetite Particles and Circuits: Theoretical Evaluation of Cellular Phone Safety Aspects," *Electro- and Magnetobiology*, 17, pp.351-359, 1998.

"Calculations based on particle size, electrical conductivity of magnetite and power output from cellular telephones indicate that local heating of submicron magnetite particles is insignificant in comparison with thermal background effects at present power output levels and magnetite concentrations."

Clippings from All Over

“We have seen a dramatic increase in people claiming health problems from mobiles coming to us. We now have more than 20 cases, including six brain tumors, five with immune system problems and a number of severe migraine sufferers. There is no question in my mind that the evidence is mounting up and I understand we should have the results of some significant new studies in the near future. I am hopeful we will be in a position to launch proceedings in about six months.”

—**Martyn Day, attorney, Leigh, Day & Co., London (U.K.),** quoted by **Nic Fleming and Michael Hanlon** in “**Cellphone Firms Face Deluge of Claims in Health Alert,**” *The Express* (U.K.), p.8, October 16, 1998

[T]he popular press tends to put a sensational spin on the idea that cell phones contribute to brain cancer, and anecdotal reports of headaches, skin numbing, and memory loss due to cell phone use have helped to heighten public fears. Science and industry alike are looking to the IARC study to provide a firm foundation for either assuaging public fears or enacting measures to protect against whatever health risks may come to light.

—“**Of Mobile Phones and Morbidity,**” *Environmental Health Perspectives* (published by the NIEHS), 106, pp.A474-A475, October 1998 (see *MWN*, S/O98)

“If Motorola and Lucent want to do research, more power to them. If it doesn’t help post-market surveillance, then it doesn’t help the public.”

—**Dr. George Carlo, chair, Wireless Technology Research (WTR),** Washington, quoted by **Jeffrey Silva** in “**WTR To Recommend Post-Market Surveillance in Cancer Debate,**” *RCR*, p.3, November 2, 1998

[BellSouth Mobility Georgia Director of Engineering Terry] Durand says BellSouth has disguised antennas for in-building situations as well. For some classrooms, the carrier has installed antennas that look like smoke detectors.

—**Heather Bainbridge, associate editor,** in “**Towers for the Community,**” *Wireless Business & Technology*, p.45, November 1998

“High-powered microwaves are obviously the weapons of choice.”

—**Bengt Anderberg, director general, Swedish Defense Research Establishment** (a counterpart of U.S. DARPA), quoted by **Bruce Nordwall** in “**EMP, High-Powered Microwaves Pose New EW Threat to Aircraft,**” *Aviation Week*, p.68, October 26, 1998

I do claim credit for one major, but generally unrecognized, development. In 1971 after considerable study, I wrote a memo predicting that the apparent problem of microwave radiation hazards would eventually disappear and be replaced by interference as the real limiting environmental problem. Thirty years later my prediction is being borne out, as is evidenced by the following: The power line scare is being closed out. Microwave scares continue to exist, but do not slow the explosive growth of wireless communications....

—**Dr. John Osepchuk, consultant, Concord, MA, formerly with Raytheon Co.,** in a guest editorial, “**Predictions and Breakthroughs,**” *Journal of Microwave Power & Electromagnetic Energy*, 33, p.142, 1998

Rule 1: There is no claim so preposterous that a PhD physicist cannot be found to vouch for it.

—**Dr. Robert Park, American Physical Society, Washington,** in “**Voodoo Science: Perpetuum Mobile,**” *Physics & Society*, p.4, October 1998

Circadian Information, Cambridge, MA, mails out materials touting its 12th annual Working Nights Family Calendar, which gives graveyard-shift workers tips for planning time with their families and improving overnight alertness. But at 3 am, a worker at the printing company doing the mailing sent 130,000 letters with incomplete addresses. Says Circadian’s publisher, Ed Coburn: “I don’t think they were using the product.” The mailing was redone.

—**Stacy Kravetz, “Working Week: Eyes Wide Shut,”** *Wall Street Journal*, p.1, November 24, 1998

“MICROWAVE NEWS” FLASHBACK

Years 15 Ago

- The Occupational Safety and Health Administration (OSHA) cancels plans to develop a new RF/MW safety standard, thereby insuring that the agency cannot enforce any RF/MW exposure limits—even under the general duty clause.
- Six men at the Clear Air Force Station in Alaska are exposed to high levels of radiation when the base’s Ballistic Missile Early Warning System megawatt radar is accidentally turned on during routine maintenance.
- The U.S. ambassador in Moscow reveals that the Soviet Union is beaming microwave radiation at the embassy for the first time in four years. The Soviet Foreign Ministry denies it.

Years 10 Ago

- Citing possible EMI, the Radio Technical Commission for Aeronautics, which advises the Federal Aviation Administration, officially recommends that airline passengers turn off electronic devices during takeoffs and landings.

- The New York Power Authority discloses payments to three scientists at the National Cancer Institute (NCI) who served as its expert witnesses in the Marcy-South power line trial. NCI’s Dr. Stuart Aaronson received over \$70,000.
- The U.S. Air Force admits that its PAVE PAWS radar at Robins Air Force Base in Georgia may constitute an “electromagnetic danger” to passing aircraft carrying electro-explosive devices.

Years 5 Ago

- The University of North Carolina’s Dr. Dana Loomis reports that women in electrical occupations have a 40% greater chance of dying from breast cancer than do those in other jobs.
- A Swiss study finds that people living near a powerful shortwave transmitter station in Schwarzenburg are more likely to suffer sleep disorders, high blood pressure and feelings of anxiety.
- The San Francisco school board prohibits mobile communications antennas on school property—the first such measure by a major city. “We didn’t feel that the risk was warranted at all,” says a member of the board.

1999 Conference Calendar (Part I)

January 4-8: **International Union of Radio Science (URSI) National Radio Science Meeting**, University of Colorado, Boulder. Contact for Commission K on Electromagnetics in Biology and Medicine: Dr. James Lin, Dept. of EECS, M/C 154, University of Illinois, 851 S. Morgan St., Chicago, IL 60607, (312) 413-1052, Fax: (312) 413-0024, E-mail: <lin@eeecs.uic.edu>, Web: <cires.colorado.edu/ursi>.

January 11-13: **International Research Conference on Health Hazards and Challenges in the New Working Life**, Hotel Foresta, Stockholm, Sweden. Contact: Marianne Ekdahl, National Institute for Working Life, S-171 84 Solna, Sweden, (46+8) 705 89 44, Fax: (46+8) 730 98 60, E-mail: <marianne.ekdahl@niwl.se>.

January 31-February 4: **1999 IEEE Power Engineering Society (PES) Winter Meeting**, Hilton Hotel, New York, NY. Contact: IEEE PES, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855, (908) 562-3883, Fax: (908) 981-1769, E-mail: <pes@ieee.org>, Web: <www.ieee.org/power>.

February 1-2: **2nd State of the Science Colloquium on the Public Health Impact of Wireless Technology**, Marriott Metro Center, Washington, DC. Contact: Wireless Technology Research, 1711 N St., NW, Washington, DC 20036, (202) 833-2800, Fax: (202) 833-2801, E-mail: <wtr@hesgroup.com>.

February 8-10: **Wireless '99**, Ernest Morial Convention Center, New Orleans, LA. Contact: Jeffrey Nelson, Cellular Telecommunications Industry Association, 1250 Connecticut Ave., NW, Suite 200, Washington, DC 20036, (202) 736-3207, E-mail: <JNelson@ctia.org>.

February 16-18: **13th International Zurich Symposium & Technical Exhibition on Electromagnetic Compatibility**, Swiss Federal Institute of Technology, Zurich, Switzerland. Contact: Dr. Gabriel Meyer, ETH Zentrum-IKT, CH-8092 Zurich, Switzerland, (41+1) 632 27 90, Fax: (41+1) 632 12 09, E-mail: <gmeyer@nari.ee.ethz.ch>, Web: <www.nari.ee.ethz.ch/emc>. See p.16.

February 28-March 5: **10th International Montreux Congress on Stress**, Grand Hotel Excelsior, Montreux, Switzerland. Contact: Dr. Paul Rosch, American Institute of Stress, 124 Park Ave., Yonkers, NY 10703, (914) 963-1200, Fax: (914) 965-6267, E-mail: <stress124@earthlink.net>, Web: <www.stress.org>. See p.8.

March 15-17: **1999 Annual Meeting of the Society of Toxicology**, Ernest Morial Convention Center, New Orleans, LA. Contact: Society of Toxicology, 1767 Business Center Dr., Suite 302, Reston, VA 20190, (703) 438-3115, Fax: (703) 438-3113, E-mail: <trish@toxicology.org>, Web: <www.toxicology.org>.

March 22-26: **Progress in Electromagnetics Research Symposium (PIERS 1999)**, Taipei International Convention Center, Taipei, Taiwan. Contact: Prof. Kun Shan Chen, Center for Space and Remote Sensing Research, National Central University, Chung-Li, Taiwan, (886+3) 425-7232, Fax: (886+3) 425-4908, E-mail: <dkschen@csrsr.ncu.edu.tw>, Fax: <piers1999.csrsr.ncu.edu.tw>.

March 27-April 1: **30th Annual Meeting of the Environmental Mutagen Society**, Capitol Hilton, Washington, DC. Contact: Elizabeth Von Halle, 113 Wendover Circle, Oak Ridge, TN 37830, (423) 483-5805, Fax: (423) 574-9888, E-mail: <liz@ornl.gov>, Web: <www.ornl.gov/TechResources/ems/futanc.html>.

March 28-31: **1999 Electric Power Research Institute (EPRI) EMF Science Seminar**, Hyatt Regency Downtown, Denver, CO. Contact: Robert S. Banks Associates Inc., PO Box 141049, Minneapolis, MN 55414, (612) 623-4600, Fax: (612) 623-3645, E-mail: <vlprock@rsba.com>.

March 29-31: **Electricity '99 Conference and Exposition**, Hyatt Regency, Vancouver, BC, Canada. Contact: Canadian Electricity Association, 1155 Metcalfe St., Suite 1120, Montreal, Quebec H3B 2V6, Canada, (514) 866-6121, Fax: (514) 866-1880, E-mail: <info@canelect.ca>, Web: <www.canelect.ca>.

April 2-4: **18th Southern Biomedical Engineering Conference and 2nd International Conference on Ethical Issues in Biomedical Engineering**, Clemson University, Clemson, SC. Contact: Dr. Subrata Saha, Bioengineering Alliance of South Carolina, 313 Rhodes Research Center, Clemson University, Clemson, SC 29634, (864) 656-7603, Fax: (864) 656-4466, E-mail: <ssaha@clemson.edu>, Web: <sbec.abe.msstate.edu>.

April 6-8: **61st Annual Meeting of the American Power Conference**, Marriott

Downtown, Chicago, IL. Contact: Robert Porter, Illinois Institute of Technology, 10 W. 32nd St., Chicago, IL 60616, (312) 567-3196, Fax: (312) 567-3892, E-mail: <apc@iit.edu>, Web: <apc.iit.edu>.

April 7-8: **35th Annual Meeting of the National Council on Radiation Protection and Measurements (NCRP)**, Crystal City Marriott, Arlington, VA. Contact: NCRP, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814, (301) 657-2652, Fax: (301) 907-8768, E-mail: <ncrp@ncrp.com>, Web: <www.ncrp.com>.

April 11-16: **1999 IEEE PES Transmission and Distribution Conference and Exposition**, Ernest Morial Convention Center, New Orleans, LA. Contact: Dennis Doss, BICC Cables, 1 Crosfield Ave., West Nyack, NY 10994, (914) 353-4000, Fax: (914) 353-0542, E-mail: <ddoss@BICCCables-na.com>, Web: <www.99ieeet-d.org>.

April 20-22: **1999 IEEE Radar Conference**, Boston, MA. Contact: Robert Alongi, 255 Bear Hill Rd., Waltham, MA 02154, (781) 890-5290, Fax: (781) 890-5294, E-mail: <sec.boston@ieee.org>, Web: <www.ieee-boston.org/radar99>.

April 23-30: **58th Annual American Occupational Health Conference**, Ernest Morial Convention Center, New Orleans, LA. Contact: Kay Coyne, American College of Occupational and Environmental Medicine, 55 W. Seegers Rd., Arlington Heights, IL 60005, (847) 228-6850, Fax: (847) 228-1856, E-mail: <kcoyne@acoem.org>, Web: <www.acoem.org>.

April 27-29: **17th Symposium on Explosives and Pyrotechnics**, Philadelphia Airport Holiday Inn, Essington, PA. Contact: Franklin Applied Physics Inc., 98 Highland Ave., PO Box 313, Oaks, PA 19456, (610) 666-6645, Fax: (610) 666-0173, E-mail: <FrankPhys@aol.com>, Web: <members.aol.com/FrankPhys>.

May 9-12: **31st Annual National Conference on Radiation Control**, Hyatt Regency Hotel, Louisville, KY. Contact: Lin Carigan, Conference of Radiation Control Program Directors, 205 Capital Ave., Frankfort, KY 40601, (502) 227-4543, Fax: (502) 227-7862, E-mail: <cariganlin@aol.com> or <lcarigan@crpcd.org>, Web: <www.crpcd.org>.

May 18-21: **International Magnetics Conference: InterMag '99**, Kyongju, Korea. Contact: Korean Magnetics Society, Korea Science and Technology Center, Room 905, Yeoksam-dong 635-4, Kangnam-ku, Seoul 135-703, Korea, (82+2) 967-0518, Fax: (82+2) 967-0518, E-mail: <intermag@kistmail.kist.re.kr>, Web: <intermag99.kist.re.kr>.

May 22-28: **7th Scientific Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine (ISMRM)**, Pennsylvania Convention Center, Philadelphia, PA. Contact: ISMRM, 2118 Milvia St., Suite 201, Berkeley, CA 94704, (510) 841-1899, Fax: (510) 841-2340, E-mail: <info@ismrm.org>, Web: <www.ismrm.org>.

June 7-8: **WHO/ICNIRP International Seminar on Health Effects of Exposure to 300 Hz to 10 MHz Electromagnetic Fields**, Maastricht, the Netherlands. Contact: R. Matthes, Institut für Strahlenhygiene, Bundesamt für Strahlenschutz, Ingolstädter Landstrasse 1, D-85764 Oberschleißheim, Germany, (49+89) 31603 288, Fax: (49+89) 31603 289, E-mail: <RMatthes@bfs.de>, Web: <www.who.ch/emf/>. On June 9-10, following the seminar, working group meetings will be held for speakers and interested participants. For more information, contact: Dr. Michael Repacholi, World Health Organization, CH-1211 Geneva 27, Switzerland, (41+22) 791-3427, Fax: (41+22) 791-4123, E-mail: <repacholim@who.ch>.

June 10-12: **32nd Annual Meeting of the Society for Epidemiologic Research (SER)**, Baltimore, MD. Contact: SER, PO Box 64655, Baltimore, MD 21264, E-mail: <stacey@caat.spharbor.jhu.edu>, Web: <www.jheph.edu/pubs/jepi/serdates.htm>.

June 20-24: **21st Annual Meeting of the Bioelectromagnetics Society**, Hyatt Regency Hotel, Long Beach, CA. Contact: W/L Associates, 7519 Ridge Rd., Frederick, MD 21702, (301) 663-4252, Fax: (301) 371-8955, E-mail: <75230.1222@compuserve.com>, Web: <biomed.ucr.edu/bems.htm>.

June 27-July 1: **44th Annual Meeting of the Health Physics Society (HPS)**, Marriott Hotel, Philadelphia, PA. Contact: HPS, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101, (703) 790-1745, Fax: (703) 790-2672, E-mail: <hps@burkinc.com>, Web: <www.hps.org>.

Jerry L. Phillips, PhD

Consultant on Non-Ionizing Radiation Issues

12790 Puesta del Sol
Redlands, CA 92373
(909) 389-0221
E-mail: <phillips@pipeline.com>

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MEETINGS

Zurich Workshops...On February 18 at the EMC meeting in Zurich, Switzerland, there will be a workshop on *Electromagnetic Terrorism and Adverse Effects of High-Power Electromagnetic Environments*, which is designed to heighten awareness of intentional and accidental threats in the context of information warfare. And on February 15, the day before the conference officially opens, COST 244 will host an *Open Meeting on Biomedical Effects of EMFs*, which will focus on exposure systems and dosimetry. For more information, see p.15.

MICROWAVE WEAPONS

Human Testing Lawsuit Dismissed...In September, a lawsuit brought by the International Committee on Offensive Microwave Weapons (ICOMW) was dismissed in the U.S. district court in Washington. "We were asking the court to enforce a presidential memorandum which bans involuntary research on human subjects," said the group's director, Harlan Girard. The Philadelphia-based organization had alleged that the DOD and the CIA have conducted such experiments in their efforts to develop weapons systems using EMFs, lasers, microwaves and sound waves (see *MWN*, M/J98). The judge ruled that the group did not have standing to bring suit because the people alleged to have suffered from such testing were not ICOMW members. She acknowledged that Girard himself was a member, but stated that his own complaints were "too generalized and nonspecific to support a complaint." Girard told *Microwave News* that the ICOMW could not afford an appeal. Instead, he said, the committee plans to raise the matter with the Inter-American Commission on Human Rights. A new report from the Coalition Against Torture and Racial Discrimination, an alliance of 15 U.S. human rights groups, states that the lawsuit's charges deserve attention. "Given the past history of secret experimentation by the government," the anti-torture group declares, "these allegations of continuing...government-sponsored human testing should not be dismissed without more thorough, impartial investigation."

MILITARY RADAR

PAVE PAWS Advisory Panel...The Massachusetts Department of Public Health in Boston has formed a scientific panel to address public concerns about the U.S. Air Force's PAVE PAWS missile defense radar on Cape Cod (see p.6 and *MWN*, M/J87 and J/A98). Dr. Linda Erdreich of Bailey Research Associates, a consulting firm in New York City, is the group's chair. The other members are Dr. Om Gandhi of the University of Utah, Salt Lake City, Dr. Henry Lai of the University of Washington, Seattle, and Dr. Marvin Ziskin of Temple University Medical School in Philadelphia. The panel's first public meeting, which was originally scheduled for December 2, has been postponed until early 1999.

PEOPLE

Koslov's Collection...On November 18, Christie's in London auctioned the collection of scientific and photographic instruments and books assembled by Dr. Samuel Koslov, who died

last year (see *MWN*, N/D97). Koslov was one of the original policy makers on RF/MW health effects and a longtime member of ERMAC, a federal advisory committee for a time based at the White House. As noted in the Christie's sale catalog (No. 8200), "This collection represents one man's passion for life, through and behind the lenses of cameras, microscopes, microscope slides and related books." Over 600 items were auctioned, bringing in close to £250,000, or approximately \$400,000 (including commissions).

PROTECTIVE CLOTHING

Performance Standard...The IEEE standards committee (SCC-34) on Electromagnetic Energy Product Performance Safety has established a new subcommittee to address RF/MW protective clothing, chaired by Richard Tell, a consultant based in Las Vegas. Tell told *Microwave News* that the subcommittee will develop a standard for evaluating the performance of such garments. The starting point, Tell said, is a standard that has been drafted in Germany. The first meeting of the subcommittee will be held on January 27 at the Motorola labs in Fort Lauderdale, FL. For more information, contact Tell at: (702) 645-3338, Fax: (702) 645-8842 or E-mail: <rtell@radhaz.com>. Another SCC-34 subcommittee is working on certifying the compliance of wireless devices with SAR limits (see *MWN*, M/A97).

REPRODUCTIVE EFFECTS

Radar and Male Fertility...In 1992, a joint study by the U.S. Army and NIOSH found that men exposed to RF/MW radiation from radars had significantly lower sperm counts than did controls or soldiers who may have been exposed to airborne lead. (The researchers, led by Dr. Timothy Weyandt, then at the Army's Biomedical R&D Labs in Frederick, MD, and now at Pennsylvania State University in University Park, had originally planned to use the radar operators as controls; see *MWN*, M/A93.) But a follow-up study by a team led by NIOSH's Dr. Steven Schrader in Cincinnati and including Weyandt found only small differences between another radar-exposed group—signal corps men—and controls (see *MWN*, M/J96). Results of the 1992 study, previously available only in a little-known Army technical report, were published in *Reproductive Toxicology* in 1996 (10, pp.521-528). Now, the follow-up study, first reported at a conference in April 1996, has also been published in *Reproductive Toxicology* (12, pp.465-468, 1998). Noting that the earlier study looked at men who worked with radar in intelligence gathering rather than in the signal corps, Schrader and colleagues write that, "There are many conditions that may influence the potential health effects of radar," including "power level, pulse width and frequency band," as well as the transmitter's design and its proximity to the operator. "More data are needed," they write, "to evaluate the relationship between military radar and male reproductive health." But, they warn, "Collecting this type of information in a study of military operators is complicated" by the fact that much of it is classified. Weyandt and Dr. William James of University College of London, U.K., exchange letters on the studies' use of sperm count as an indicator of male fertility in the same issue of *Reproductive Toxicology* (12, pp.495-496).

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RESOURCES

Radiation Primer...The U.K.'s National Radiological Protection Board (NRPB) has published a new edition (the fifth) of *Living with Radiation*, its introductory text on the nature, uses and risks of radiation. Most of the book is devoted to ionizing radiation, but one chapter addresses EMFs and RF/MW. The board notes that, “[T]here is no basis on which to quantify the risk of cancer from ordinary exposure and so establish standards of protection.” It goes on to argue that, “The subject is so important, however, that epidemiological and biological research will need to be focused on the issue of causation.” Copies are available for £10.95 (approx. \$18.00) each, which includes postage and handling, from: NRPB, Chilton, Didcot, Oxon OX11 0RQ, U.K., Fax: (44+1235) 833891, Web: <www.nrp.org.uk>.

SIGNAL-TO-NOISE

300,000 Penguins at a Cocktail Party...Whether at a social gathering, in a crowded store or on a noisy street, people can often pick out familiar voices despite high levels of background noise. Psychologists call this “the cocktail party effect.” But could you do it at a cocktail party for 300,000? That’s the size of some breeding colonies of king penguins in the Antarctic, and they are not quiet places. Yet penguin chicks rely mainly on sound, not sight or smell, to find their parents. The October 15 issue of *Nature* reports that researchers measured “the background cacophony” and calculated that the chicks should not be able to identify their parents’ calls beyond a distance of 8-9 meters. But in behavioral experiments, the chicks picked out their parents’ sounds at almost twice that distance. “This remarkable feat of auditory discrimination is yet to be explained,” notes *Nature*.

Keeping Current: Follow-Up on the News

◆ During his triumphant return to space in the space shuttle, Sen. John Glenn (D-OH) did not experiment with melatonin as originally planned (see *MWN*, M/A98). Glenn did, however, take Metamucil, according to the *Washington Post* (October 28).

◆ The U.K.’s *Sunday Times* reported on November 22 that Richard Branson, the Virgin business group tycoon, “warned his staff about the potential risk of mobile phones” after a close friend, who was a heavy user, died of a brain tumor. Branson ordered that all company mobile phones be issued with headsets, according to the November 29 *Observer*.

◆ The California EMF Program has moved to Oakland. The new address is 1515 Clay St., 17th Floor, Oakland, CA 94612. The main telephone number is now (510) 622-4500. The E-mail addresses are unchanged. M.A. Stevenson, who helped administer the program, has changed jobs and is now with the California Public Utilities Commission.

◆ The National Transportation Safety Board has asked NASA and the U.S. Navy to investigate whether EMI could have played a role in the explosion of TWA Flight 800 in July 1996, *Aviation Week* reported in its November 2 issue. The possibility was raised earlier this year by a Harvard professor of English literature (see *MWN*, M/A98).

◆ In our last issue, we reported on some of the factors that might explain the elevated rates of breast cancer among flight attendants—including lower melatonin levels due to chronic jet lag. In the October 24 issue of *The Lancet*, Drs. Margo Barker and Jodi Stookey raise a new possible risk factor: dehydration associated with flying.

◆ The court date for the challenge to the FCC’s RF/MW exposure rules has been delayed again. It is now scheduled for the week of January 11, 1999.

◆ It’s not just electricity anymore: “EPRI” is now preferred to the name “Electric Power Research Institute.”

As We Go to Press

◆ ◆ Sony Electronics Inc. is contacting the U.S. users of an estimated 60,000 Sony dual-band wireless phones because some of the units may cause exposures that are in excess of the limits adopted by the FCC. For more information, contact: (888) 914-SONY. ◆ ◆

◆ ◆ Dr. Daniel Wartenberg’s paper, “Residential Magnetic Fields and Childhood Leukemia: A Meta-Analysis,” appears in the December issue of the *American Journal of Public Health*. ◆ ◆

VIEWS ON THE NEWS

What We Would Like To See in 1999

Here is our wish list for next year.

Give Wertheimer the d'Arsonval Award

The Bioelectromagnetics Society (BEMS) should award its d'Arsonval prize for "extraordinary accomplishments" to Dr. Nancy Wertheimer. Her seminal epidemiological studies, carried out without any outside funding, have forever changed the EMF landscape, prompting international interest in EMF health research.

Wertheimer's 1979 hypothesis linking power line magnetic fields and childhood cancer raised an important question of public health. She inspired a great many researchers to look into this problem—including some of the world's leading epidemiologists.

Wertheimer and Ed Leeper's findings have been borne out by many other studies. One exception is the recent effort by the National Cancer Institute (NCI), but there are reasons to believe that this was due to the design of the institute's study, not problems with Wertheimer's hypothesis.

Whatever else may be said about the 1996 National Academy of Sciences report on EMFs, the academy did conclude that there is indeed an association between living near high-current power lines and childhood cancer, which is precisely what Wertheimer has been saying for 20 years.

Wertheimer deserves recognition, and it is long overdue. Tell this to Dr. Larry Anderson, the chairman of BEMS' awards committee, at <le_anderson@pnl.gov> or by fax to (509) 375-3764.

FDA: Stop the WTR Charade

The Food and Drug Administration (FDA) must stop allowing itself to be used as a fig leaf to cover up Dr. George Carlo's failure to sponsor serious research on cell phone health risks.

For more than five years, the FDA's Center for Devices and Radiological Health has played along as Carlo has used every possible tactic to avoid doing the one thing he was hired to do: find out whether cell phone radiation can promote brain tumors.

Now, the FDA is almost an accessory to the hoax perpetrated by Carlo and his group, Wireless Technology Research (WTR). The FDA is trapped by its own inaction: Agency staffers cannot be too critical of WTR, lest someone ask why the FDA did not speak out on WTR's scam earlier.

After spending years drawing up the perfect research agenda, Carlo threw his own plan out the window last December: He announced that he had no intention of carrying out lifetime animal exposure studies, the centerpiece of any risk assessment. And, in a recent interview, Carlo had the gall to tell Jeffrey Silva of *RCR* that doing biological research of any kind isn't worth the effort (see p.14). The only thing Carlo is now advocating is "surveillance." That is, someone—no doubt Carlo himself for a fat fee—should watch and see whether large numbers of people keel over after using mobile phones.

It's time for Drs. Elizabeth Jacobson, Russell Owen and others at the FDA to say that the emperor has no clothes. The FDA must acknowledge that WTR and the Cellular Telecommunications Industry Association (CTIA) have not done, and will not

do, the safety research that consumers need. Federal health agencies must take the responsibility for making sure that this work gets done.

A WHO EMF Project for All of Us

We look forward to an International EMF Project at the World Health Organization (WHO) that takes the public interest as seriously as the interests of the cell phone industry, the electric utilities and the U.S. Air Force (see, for instance, p.2).

The project's latest initiative is to "harmonize" worldwide electromagnetic exposure standards. The objective is to promote global trade rather than public health. Previously, WHO's Dr. Michael Repacholi tried to convince Australia and New Zealand to adopt the weaker limits of the ICNIRP, but he was voted down.

We find it more than peculiar that in one breath Repacholi tells us that a decision to favor prudent avoidance is best left to national governments (see p.10), while in the next breath he says that they should all follow his lead in setting exposure standards.

Perhaps what is missing is the personal oversight of WHO Director-General Dr. Gro Harlem Brundtland.

Some Preferred Stocking Stuffers

- The release of the Environmental Protection Agency's and the National Council on Radiation Protection's EMF health reviews. Both point to cancer risks and were paid for with public money. They have been suppressed for far too long.
- An independent and honest investigation of the *Kvikk* birth defect cluster in Norway (see p.4).
- Broad-based research on EMFs and neurological diseases such as Alzheimer's and ALS.
- A less secretive U.K. National Radiological Protection Board.
- The return of Hydro-Québec's data set on exposures to high frequency transients and cancer to Canada's McGill University and its release to any other interested researchers. (Some protests from other epidemiologists against this long-running corporate cover-up would be a good beginning.)
- Experimental data that explain how hand-held Iridium phones, which can send signals to satellites orbiting close to 500 miles overhead, meet exposure limits that can be a challenge for a phone that only has to reach a cell site a few miles away.

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