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INSIDE...

Higher Leukemia Rates Among Those Living Near Australian TV Towers

Children who live in the shadow of television broadcast towers have higher rates of leukemia than those with homes further away from the antennas, according to a pilot study carried out in Sydney, Australia. The radiofrequency and microwave (RF/MW) radiation exposures implicated in the study are in the microwatt range—up to 1,000 times below many current RF/MW health standards.

"It's preliminary, it's tentative, it needs to be confirmed," said Dr. Bruce Hocking, a consultant on occupational medicine based in Melbourne, who led the study team. Nevertheless, he added, "It needs to be looked at in detail." He noted that the results have been submitted to a medical journal. Until early this year, Hocking was the chief medical officer at Australia Telecom, now renamed Telstra.

Between 1972 and 1990, children who lived in the communities closest to three broadcast towers, which house four TV stations and an FM radio station, had more than twice the rate of leukemia compared to similar children living some seven-and-a-half miles away. This is a statistically significant elevated risk. Most of the excess cancers were lymphatic leukemias. For adults the risk was smaller, though still significantly elevated. There was no increased incidence of brain tumors among those living near the TV towers.

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Swedish Government Endorses EMF Policy of Prudent Avoidance

On October 9, the five Swedish government agencies with responsibility for controlling human exposures to electromagnetic fields (EMFs) endorsed a policy of prudent avoidance.

The announcement accompanied the release of a long-awaited review by the Criteria Group for Physical Risk Factors, *Magnetic Fields and Cancer—A Criteria Document,* which concluded that, while "the scientific data base is insufficient to develop limits of exposures," this "does not exclude other steps to reduce exposure—based, e.g., on some form of strategy of caution." (A summary of the document appears on p.7.)

"Sweden is the first country to adopt, from a scientific viewpoint, the principle of prudent avoidance," Dr. Bengt Knave, the chair of the criteria group, told *Microwave News*. "This is a step forward." Knave is with the National Institute for Working Life (NIWL) in Solna.

In an interview, Dr. Kjell Hansson Mild of the NIWL in Umeå commented that, "All regulatory agencies now have the same strategy to address EMF exposures: prudent avoidance."

Some agencies—for instance, the National Electrical Safety Board (NESB)

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« The Talk of Palm Springs »

A number of those who came to Palm Springs, CA, for the annual review of EMF health research* had a copy of Dr. **Russel Reiter**'s and **Jo Robinson**'s new book, ***Melatonin: Your Body's Natural Wonder Drug*** (New York: Bantam, $22.95). Some even came with melatonin capsules to help them sleep.

The book features a chapter on EMFs, "The Elusive Enemy" (see p.14), which includes a section on the effects of electric blankets. Reiter and Robinson report that:

> In a study yet to be published, researchers measured the EMF exposure of 40 California women as they went about their daily routines. Some of the women happened to be electric blanket users. When they slept with their blankets turned on, their melatonin levels were as much as 50% lower than when they did not use the blankets.

They are referring to the ongoing study on the possible association between EMF exposures and miscarriages being carried out by Drs. **Gerri Lee** and **Raymond Neutra** of the California Department of Health in Berkeley. But after Lee and Neutra presented some preliminary findings at an Electric Power Research Institute (EPRI) workshop three years ago (*MWN,* J/A 92), neither has commented on the study results—and no details on melatonin have surfaced.

Reiter and Robinson credit a "personal communication" from Dr. **Bary Wilson** of the Battelle Labs in Richland, WA, as their source. But in Palm Springs, Wilson said he wasn't the source. And both Lee and Neutra said they weren't either. "It's a misunderstanding," Neutra said, "Reiter can't possibly have the results because *we* don't have them." And Lee explained why. "I haven't analyzed the data yet," she said. Unfortunately, Reiter was not at the DOE meeting to clear up the confusion.

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Drs. **Henry Lai** and **N.P. Singh** have found that 60 Hz magnetic fields can cause single-strand and double-strand breaks in the DNA of rat brain cells. The University of Washington, Seattle, researchers caused a stir in the cellular phone industry last year when they announced a similar effect following microwave radiation exposure (see p.9 and *MWN,* N/D94).

In Palm Springs, Lai reported statistically significant increases in single-strand breaks following a two-hour exposure at 1 G, 2.5 G and 5 G and in double-strand breaks at 2.5 G and at 5 G. For each type of DNA damage, they observed a dose-response relationship.

One confused utility representative asked what these results could mean—after all, he had long been told that power frequency EMFs are too weak to cause genetic damage. The answer, Lai later told *Microwave News,* is not that the EMFs cause the breaks, but that they may hinder DNA's natural repair mechanisms.

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Dr. **Maria Feychting** returned once more to the landmark results she and Dr. **Anders Ahlbom** reported in 1992 in order to address the persistent view that they had shown a link between childhood leukemia and distance from power lines—but not necessarily to magnetic fields (see p.5 and *MWN,* S/O92 and M/J94).

The difference is crucial because if separation distance is as reliable an indicator as magnetic field intensity, then distance may be a surrogate for something other than EMFs. Pesticides, perhaps, or some yet-to-be-determined variable—an elusive factor "X"—associated with transmission rights-of-way. Not so, reported Feychting. "There is no association with distance independent of historical calculations of magnetic fields," she said in Palm Springs.

Why are present-day measurements bad predictors of past leukemias? "Because the time interval between diagnosis and exposure measurement is important," Feychting answered.

In an interview, Feychting stressed that she does not believe that her latest results will settle this matter. But, she added, "Our study provides empirical support for the hypothesis that it is the magnetic fields that are of importance."

These results will appear in *Epidemiology* next spring.

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Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a neurodegenerative condition whose incidence has doubled in industrialized countries over the last 30 years—without explanation. In the 1980s, a study linked ALS to electrical occupations (see *MWN,* S/O86) and a few years ago a case of ALS was reported in a worker whose chair was located above a power transformer (see *MWN,* M/A92).

In Palm Springs, Drs. **Zoreh Davanipour** and **Eugene Sobel** of the University of Southern California medical school in Los Angeles, members of the group that published the case report, announced the results of a small-scale epidemiological study which concluded that, "occupational exposure to EMFs may increase the risk of ALS, particularly long-term exposure." Last year, Sobel reported a connection between EMFs and Alzheimer's disease (see *MWN,* J/A94 and J/A95).

Jordan Verdict Reversed

As we go to press, a new trial has been ordered in Larry and Nancy Jordan's cancer lawsuit against Georgia Power Co. and Oglethorpe Power Co. On November 30, the Third Division of the Georgia State Court of Appeals overturned a May 11, 1994, jury verdict in favor of the two utilities (see *MWN,* M/J94 and M/J95).

The appeals panel found that the trial judge had improperly allowed expert witnesses for the power companies to testify as to a "consensus in the scientific community" that EMFs could not cause non-Hodgkin's lymphoma, which Nancy Jordan had contracted in 1989. The court ruled that the companies' witnesses had not "clearly identified the 'community' of experts for which [they were] speaking," nor did they "precisely explain the method by which [they] ascertained the 'consensus.'"

* *Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery and Use of Electricity,* Palm Springs, CA, DOE and EPRI, November 12-16.

Lawyer for Atlantic Electric Drops Case After Death Threats

The lead counsel defending Atlantic Electric Co. in an EMF cancer lawsuit has dropped out of the case after receiving a series of death threats. The New Jersey utility has charged that the threats came from the plaintiff in the case, John Altoonian of West Wildwood, NJ, and has asked that he be found in contempt of court. "I didn't do a thing," Altoonian responded in an interview. "They have no proof."

The trial date of Altoonian's lawsuit is scheduled for February 5, 1996. A hearing date on the contempt charges, which will be heard by a different judge, has not yet been set.

On October 9, attorney Gerald Corcoran found the outline of a tombstone spray-painted on the sidewalk in front of his law firm, Youngblood, Corcoran, Aleli, Lafferty & Stackhouse of Pleasantville, NJ. Within the tombstone was painted, "R.I.P., G. Corcoran, 11-1-95." On October 12, Atlantic Electric notified the court that Corcoran was withdrawing from the case and filed its motion for contempt.

Two days later, Tom Watson, an Atlantic Electric attorney who had filed the contempt motion, received the following letter at his home: "Hey motherf—er, I know where you work (nice place), I know where you live (f—in' dump), I know what you drive (nice car), I know where you go hunting (accidents happen), Don't worry your [sic] not going to die you are going to have pain and suffering beginning 11-1-95 so get the f— out of the EMF business." The unsigned letter was opened by Watson's wife, and included photos of Watson's office and the apartment building where he and his family live.

"I think it's prudent to take threats like that seriously," Watson said. "But I am not dropping out. I intend to try the case to verdict, and the threats are not going to deter me one bit from representing our client." Watson noted that 19 years ago he received similar threats while representing a group of Midwest utilities in a power line siting dispute, but had remained on the case. Asked which companies were involved, he answered, "I don't think they'd want it publicized."

Microwave News has learned that Watson, of the Washington firm of Crowell & Moring, is now accompanied by bodyguards. When asked for comment, Watson answered, "I never talk about security matters one way or the other."

Altoonian denied he was responsible for the anonymous threats, adding that he posed no danger to anyone: "I'm half dead, but I'm supposed to be this dangerous guy." He was diagnosed with chronic myelogenous leukemia (CML) in 1990, two years after moving into the home he built in West Wildwood. An underground 69 kV power line ran through his backyard, and, according to Altoonian, magnetic fields were as high as 300 mG in the yard, 60 mG on his deck, and 29 mG in his bedroom. In 1991 Altoonian filed suit against Atlantic Electric, which is based in Pleasantville, NJ, charging that EMFs from the line had caused his cancer. The utility moved the power line in 1992 (see *MWN,* N/D93, M/A94 and S/O94).

A heavy equipment operator who has been unable to work due to his illness, Altoonian is self-employed and without health insurance. This has made it impossible for him to afford a bone marrow transplant, which his doctors estimate would cost $300,000.

Besides alleging that Altoonian was responsible for the anonymous threats, Atlantic Electric has charged that he chased Corcoran at high speed down New Jersey's Garden State Parkway. On another occasion, according to the company's court papers, Corcoran was leaving an unrelated meeting of a local city council and found Altoonian waiting in a dark parking lot: "Altoonian silently raised his hand in a *gesture appearing to denote that he was holding a handgun...and pulling the trigger."*

"Not me. He's seeing things," said Altoonian, rejecting both allegations. "I drive on the Garden State Parkway all the time, but I never did that." He explained that he had gone to the city council meeting "to get some information on the beach erosion problem," and had seen Corcoran there. "What, I'm not allowed to go to a public meeting? When he tried to talk to me, I just ignored him."

Until the court ordered a stop to it, Altoonian had run ads in a local paper asking Atlantic Electric employees to get in touch with him if they had information relevant to his lawsuit. He says he faxed a copy of one of those ads to Corcoran, marking an ad for cemetery plots on the same page with the note, "I've got mine—how about you?" Altoonian insists that this signed note was "just a gesture" and not intended as a threat: "Everybody has to plan for death. I have to plan for it."

Also cited as a threat by Atlantic Electric is the following signed note, which Altoonian faxed to Corcoran: "In reply to your letter of June 27, 1995 to William Wolf [Altoonian's attorney]. I would like to educate you on the real meaning of the word *'harassment.'* When a strong healthy body is destroyed by radiation that is *'harassment.'* When I as a human being have had to suffer mental and physical pain for five years that is *'harassment.'*...Next week I will educate you on the meaning of the word *'threatening.'"*

The company obtained court orders twice this year barring Altoonian from communicating with its employees, specifically its lawyers.

Watson would not discuss how he intends to prove that Altoonian was behind the anonymous messages, explaining, "I don't think it's appropriate for me to preview the evidence before it's presented to the court." But the company's contempt motion argues for a link based on the date referred to in the mes-

Upcoming EMF Court Dates

• *Johsz vs. Koll* goes to trial on January 8. The case involves a cancer cluster in a real estate office above a set of Southern California Edison (SCE) transformers (see *MWN,* J/A94). *Younkin v. SCE,* a related case involving two other employees, has yet to be scheduled (see *MWN,* M/J95).

• Leonard Glazer's leukemia suit against Florida Power & Light Co., slated to begin October 23, was postponed until January 22 (see *MWN,* J/F94, M/J94 and S/O95).

• John Altoonian's lawsuit against Atlantic Electric is scheduled for trial on February 5.

sages: "November 1 is the day plaintiff John Altoonian filed his original complaint in this case in 1991." The motion also emphasizes that an anonymous letter received by Corcoran, warning, "Watson's going to get you F—ed Up Big Time," was mailed the day after a September 20 meeting at which the utility refused to offer any money towards an out-of-court settlement.

The contempt motion cites psychological reports describing Altoonian as "angry, sullen and depressed," with "possible signs of a burgeoning paranoid trend in his thinking." Altoonian's lawyer, William Wolf of Bathgate, Wegener, Dugan & Wolf in Lakewood, NJ, disputed the reports' relevance to the contempt charges: "Those are psychologists' reports that are part of our case with respect to possible damages that may be sought by the plaintiff." Wolf said that anyone in Altoonian's situation would experience some emotional strain: "I don't know how you even get up in the morning when you've got those kinds of problems."

Attorneys for the two sides have held three settlement meetings, but Watson said, "There have been no settlement offers by the defense." Asked if one was likely in the future, Watson answered that that would be his client's decision—"but if I were Altoonian, I wouldn't hold my breath."

Altoonian asserted that Corcoran had been paid $800,000 for his work on the case, and that Atlantic Electric was spending $31,000 a week to have him under full-time surveillance by private security guards—"more than enough money to take care of me." He argued that, "This could've been settled a long time ago. I would have had my operation and this all would've been over and done with." Atlantic Electric would not comment on its defense costs or on surveillance, and Corcoran did not answer repeated requests for an interview.

The suit had been scheduled to go to trial in April 1994, but has been repeatedly delayed. "They're trying to drag it out as long as they can," charged Altoonian. "They're hoping I'll die first. There should be some kind of statute, a certain period in which they're forced to go to trial." Watson responded that none of the delays had been requested by Atlantic Electric, and contended that they were in large part caused by difficulties in getting dates for the deposition of the plaintiff's expert witnesses. But Watson said he is treating the February 5 trial date as firm, and does not expect further delays.

Atlantic Legal Foundation: New Player on the EMF Scene

The Atlantic Legal Foundation (ALF) decided to take on the EMF issue to "prevent the introduction of bad science, or at least, if bad science is introduced, to mitigate its damage," according to Harvard University's Dr. Richard Wilson, a member of ALF's advisory council.

While ALF's *amicus* brief in the *Covalt* case was its first action on EMFs, this was not the first time it had dealt with science in the courtroom. An ALF brief was quoted by the U.S. Supreme Court in its *Daubert* decision, which imposed a more restrictive standard for the admissibility of scientific evidence. Other ALF legal actions have included opposing the shutdown of the Shoreham nuclear power plant on New York's Long Island, fighting restrictions on U.S companies doing business in South Africa, arguing against affirmative action programs and supporting drug testing of prospective employees.

ALF literature stresses "the foundation's deep commitment to redressing the bias against business which manifests itself in favor of narrow 'consumer' or 'environmental' concerns," and notes that the ALF "provides the counterbalance to narrow-interest groups by representing traditional American values."

The foundation's financial contributors include Chevron, Dow Chemical, Exxon, General Public Utilities, ITT, Kraft General Foods, New Jersey Bell, Pfizer, PSE&G, Texaco and Union Carbide.

"ALF intends to submit further *amicus* briefs in many cases to a variety of courts...[on] the relationship, if any, between 'EMF' and various diseases," wrote Wilson in an October 28 letter to the Duke Power Company Foundation. Written on stationery with the heading, "Harvard University Physics Department," the letter requested a contribution to the ALF and suggested an amount of $5,000 and up. The ALF brief in *Covalt* was described, and a copy of it was included. In closing, Wilson noted that, "The [Atlantic Legal] Foundation is always willing to discuss other issues where you think the foundation may be helpful."

Wilson told *Microwave News* that this fund-raising appeal was one of several similar letters: "We're writing to some utility people to see if they might be interested in contributing." He stressed that the foundation's legal work was entirely supported by donations from those who shared its goals. Edwin Selover, vice president and general counsel of the Public Service Electric & Gas Co. (PSE&G) in northern New Jersey, is also a member of ALF's Advisory Council.

Less than a month after filing its *Covalt* brief, the ALF organized a conference on EMFs in Philadelphia, co-sponsored by the Franklin Institute. In addition to Wilson, speakers at the October 19 meeting included Drs. Anders Ahlbom of the Karolinska Institute in Stockholm, Sweden, Philip Cole of the University of Alabama School of Public Health in Birmingham, and Kenneth Foster of the University of Pennsylvania, Philadelphia. "We set out to present a balanced picture by having scientists of different views," Martin Kaufman, ALF's general counsel, said in an interview.

The conference's final presentation was "Is 'Prudent Avoidance' Prudent?" by Dr. Edward Gerjuoy, a former physics professor at the University of Pittsburgh and now an attorney with the Pittsburgh firm of Rose, Schmidt, Hasley, & DiSalle. Attacks on the concept of prudent avoidance of EMF exposure have been increasingly prominent in the arguments of those who are skeptical about EMF health effects (see *MWN,* J/F95, M/J95, J/A95, S/O95), and were highlighted in the ALF brief in the *Covalt* case.

Skeptical Scientists Criticize California EMF Lawsuit

NO CANCER-EMF LINK FOUND, 14 SCIENTISTS TELL HIGH COURT and SCIENTISTS FIND NO EMF RISK. These were two of the newspaper headlines after a brief was filed with the California Supreme Court, arguing that "it is not scientifically reasonable to believe that 60 Hz magnetic fields increase the incidence of cancer." Of the document's 14 signers, six are Nobel Prize winners and most are physicists. The unsolicited brief reflects an increased willingness by those skeptical of EMF health effects to take action outside scientific circles.

The friend-of-the-court filing came in support of San Diego Gas & Electric Co. (SDG&E) in a lawsuit brought by Martin and Jean Covalt of San Clemente, CA. The Covalts charge that power lines near their home caused its value to decline (see *MWN,* M/A95 and M/J95). Several other *amicus* briefs have been filed in the case, including one submitted at SDG&E's request by the American Medical Association (AMA) and the California Medical Association (CMA).

The scientists' brief was an initiative of the Atlantic Legal Foundation (ALF), a conservative non-profit organization which has recently entered the EMF arena. "I was the one who got the group together," said Dr. Richard Wilson, a member of ALF's Advisory Council and a professor of physics at Harvard University in Cambridge, MA. An October 28 letter from Wilson to a utility company executive indicates that this brief is only the first of many EMF actions planned by the ALF (see p.4). ALF President Douglas Foster said in an interview that the foundation had decided on its own to intervene in *Covalt,* without any requests from SDG&E.

Wilson and the other signers of the ALF brief argue that those epidemiological studies finding an EMF–cancer connection have shown consistently low risk ratios—much smaller, for example, than those associated with smoking cigarettes. They then criticize the studies' statistical methodology, contending that even these relatively low-risk ratios are too high.

These scientists acknowledge that an association between power lines and a rise in childhood leukemia "has been repeated a few times, and there seems to be a consistent relationship with *proximity* to power lines, but not with the measured magnetic field itself" (see p.2). This, they state, "seems to many scientists to exonerate magnetic fields as the real cause of the leukemias found."

Those signing the ALF brief also emphasize inconsistencies in the types of cancer that have been linked to EMFs. Since one epidemiological study may find an increase in leukemia but not brain cancer, while another study finds the reverse, they hold that "these studies are *not* consistent and do *not* confirm each other." The idea that power line magnetic fields could cause cancer "violate[s] well-established laws of electromagnetism and thermodynamics," according to Wilson and the other 13 signers.

A reply brief from the Covalts' lawyer, Michael Withey of the Seattle firm of Schroeter, Goldmark & Bender, points out that the ALF argument is not endorsed by "a single epidemiologist," even though almost half of it is devoted to a discussion of "Hill's principles of epidemiology." Withey argues that, "The testimony in this brief would never be admitted into evidence, because these physicists are far outside the relevant [fields of] scientific inquiry, including epidemiology, biology, and biophysics." He calls the arguments in the ALF brief

Covalt Ruling Seen Unlikely To Include Personal Injury Cases

A few months ago, many observers thought that a broad Supreme Court ruling in the *Covalt* property devaluation case might end *all* EMF litigation in California—including personal injury suits. But such a sweeping decision now seems unlikely.

The state Supreme Court agreed to consider the case in May after an appeals panel ruled that the Covalts' lawsuit did not belong in court at all. The appellate decision held that their property devaluation claim fell under the jurisdiction of the California Public Utilities Commission (CPUC)—which has no legal authority to award damages.

Utility companies were quick to argue that the CPUC's authority covered not only property cases like the Covalts', but also EMF personal injury claims. Lower courts have issued contradictory rulings on the issue (see *MWN,* M/J95).

When Southern California Edison Co. (SCE) had such arguments rejected in the Younkin cancer suit, it appealed to the state Supreme Court to review both Younkin and the related Johsz case (see *MWN,* M/J95), and to establish the CPUC's jurisdiction over EMF claims of all kinds. But in June and again in August the Supreme Court rejected SCE's petitions, signaling that it will likely decide *Covalt* without addressing the personal injury issue.

"I think it's pretty clear that they were telling the Superior Court to go ahead, that they do have jurisdiction," said Annee Della Donna of Wylie Aitken in Santa Ana, CA, who represents plaintiffs in both *Younkin* and *Johsz*. "The issue of jurisdiction is so paramount that if they truly felt there was any question about it, they would have taken the case." A key factor, Della Donna told *Microwave News,* was probably the fact that the CPUC has no authority to award damages—"and in a personal injury case, that's all you can ask for."

SCE attorney Joel Lamp, of O'Connor, Cohn, Dillon & Barr in San Francisco, contended that the jurisdiction issue was still unresolved. "The Supreme Court denied review without any comment whatsoever," he said in an interview, calling Della Donna's view "pure speculation."

"Our position is that the Court of Appeal ruling applies even more strongly to personal injury cases than to property issues," Lamp explained. But he conceded that the Supreme Court may not address this argument in its ruling on *Covalt:* "We may have to go back to them with a personal injury case in the future."

Oral arguments in *Covalt* will be presented early next year, said Michael Withey, the plaintiffs' attorney.

"legally irrelevant and scientifically disputed."

Wilson told *Microwave News* that although his group had been accused of having only physicists, Drs. Rosalyn Yalow and Allan Cormack are both Nobel laureates in medicine. "There are no epidemiologists," Wilson conceded. "Of course, one reason was that the epidemiologists were either out of town or had a conflict of interest."

Withey's reply brief compares ALF's skepticism on EMF bioeffects to the arguments of the tobacco industry:

> The Tobacco Institute,...an offshoot of the Tobacco Research Council, questions "conventional wisdom" by focusing attention on a series of apparent "mysteries," the rhetorical force of which is to cast doubts on the connection between smoking and disease. [For example] why does lung cancer often occur "in the parts of the lung *least* exposed to smoke?"...The point...is to insinuate doubt, to reassure smokers, to stave off regulations....

Withey also contrasts the conclusions in the ALF brief with those in the recent draft report of the National Council on Radiation Protection and Measurements (NCRP) committee on EMFs (see *MWN,* J/A95), which cites accumulating evidence of a link between EMFs and cancer. The members of this committee, he writes, "are experts within the relevant fields of bioelectromagnetics, epidemiology and biophysics."

The Covalts' lawsuit does not seek to prove that EMFs are harmful—only that SDG&E's power lines have caused the Covalts to suffer financially, due to public concerns that EMFs *may* pose a danger. This point is the focus of an *amicus* brief filed in support of SDG&E by the AMA and the CMA.

The medical associations stress "the importance of relying on sound scientific knowledge in any case involving health concerns," and argue that, "There can only be harm to society when uncorroborated, inaccurate and/or unproven beliefs which fuel public fear become institutionalized in precedential court rulings." They highlight the AMA's conclusion that "no scientifically documented health risk has been associated with the usually occurring levels of EMFs" (see *MWN,* J/A95).

While Withey's reply brief explicitly states that "the Covalts' lawsuit does not depend upon evidence that EMFs are hazardous to health," it does seek to link changes in the real estate market with the existence of a real possibility that a health hazard could exist. Withey argues that it is unrealistic to delay all property damage claims until every scientific uncertainty is resolved.

The concept of "fair market value," he explains, is based on "a hypothetical prospective buyer 'with full knowledge' of all uses and purposes of the property." To reject the Covalts' claim, he contends, means that "a buyer with 'full knowledge' of EMFs...cannot *as a matter of law* [his emphasis] be legitimately concerned that such elevated EMFs might cause the buyer to have an increased risk of cancer," or that their investment may lose value if researchers find more evidence supporting an EMF-cancer connection. According to Withey, "This argument defies rationality."

Scientists Critical of Covalt Suit

The Atlantic Legal Foundation's *amicus* brief in the *Covalt* case was signed by the following: Drs. Robert Adair, Yale University, New Haven, CT; Nicholaas Bloembergen,* Harvard University (emeritus), Cambridge, MA; David Bodansky, University of Washington (emeritus), Seattle; Allan Cormack,* Tufts University (emeritus), Medford, MA; Walter Gilbert,* Harvard; Sheldon Lee Glashow,* Harvard; David Hafemeister, California State Polytechnic University, San Luis Obispo; Col. James Merritt, Armstrong Laboratory, Brooks Air Force Base, TX; John Moulder, Medical College of Wisconsin, Milwaukee; Robert Park, University of Maryland, College Park; Robert Pound, Harvard (emeritus); Glenn Seaborg,* (emeritus) University of California, Berkeley; Richard Wilson, Harvard; and Rosalyn Yalow,* Bronx VA Medical Center (emeritus), New York City. *(* = Nobel laureate)*

Sweden Endorses Prudent Avoidance *(continued from p.1)*

—have been advocating prudent avoidance for some time (see *MWN,* S/O92, M/J93, J/F94, M/J94 and J/F95).

Rolf Lindgren, the EMF manager at Vattenfall, the state power company, in Göteborg, commented that, "Personally, I agree with these recommendations—it's prudent."

When asked what data would be needed to set exposure standards, Knave replied: "There still needs to be some replication of the epidemiological studies and more information on mechanisms." Knave pointed out that different forms of leukemia show up in epidemiological studies. "Why can't we have some similar results?" he said.

"If similar studies continue to show an EMF link to Alzheimer's disease, ALS [amyotrophic lateral sclerosis], EMF sensitivity and breast cancer," Knave added, "this will increase the burden to set standards."

In a series of interviews, a number of Swedish scientists and regulators commented that it is practically impossible to site a power line next to a school or a playground in their country.

Three other Swedish reports were also released on October 9. A team led by Dr. Lennart Hardell of the Department of Oncology at the Örebro Medical Center in Örebro, has published a detailed 107-page evaluation of the EMF–cancer data as a supplement to the *European Journal of Cancer Prevention.* This team, which includes Drs. Bo Holmberg of the NIWL and Lars-Erik Paulsson of the Swedish Radiation Protection Institute (RPI) in Stockholm, agreed with Knave's group that there is "no scientific basis" for EMF standards, but they did point out that there are a number of "possible associations" between various types of cancer and exposures to EMFs (see p.7).

In addition, Knave's criteria group issued a second report on approaches to standard setting and NIWL's Dr. Ulf Bergqvist, who served as the secretary of the criteria group, released his own review of the epidemiological studies on occupational EMF exposures and cancer. Bergqvist concluded that, "despite the comparatively high degree of credibility that can be given positive findings in some studies," the association between EMFs and cancer has not been shown "beyond reasonable doubt."

The five Swedish agencies that endorsed a policy of prudent avoidance are: the National Board of Housing, Building and Planning; the National Electrical Safety Board; the NIWL; the RPI; and the National Board of Health and Welfare.

Swedish Abstracts

"Epidemiological and experimental studies concerning extremely low frequency electromagnetic field exposure and malignant diseases published up to July 1, 1994, were evaluated to assess the possible carcinogenicity of electromagnetic fields and the scientific basis for environmental and occupational standard setting. We concluded that there are possible associations between (i) an increased risk of leukemia in children and the existence of, or distance to, power lines in the vicinity of their residence, (ii) an increased risk of chronic lymphatic leukemia and occupational exposure to low frequency electromagnetic fields and (iii) an increased risk of breast cancer, malignant melanoma of the skin, nervous system tumors, non-Hodgkin's lymphoma, acute lymphatic leukemia or acute myeloid leukemia and certain occupations. There is no scientific basis for occupational or environmental standard setting for low-frequency electric or magnetic fields."

Lennart Hardell et al., "Exposure to Extremely Low Frequency Electromagnetic Fields and the Risk of Malignant Diseases—An Evaluation of Epidemiological and Experimental Findings," **European Journal of Cancer Prevention,** Vol.4 (Supplement 1), *September 1995, 107 pp. Copies are available for £29.50 (approx. $44.25), plus £2.50 (approx. $3.75) for postage and handling. Contact: Julie Gribben, Sales Administrator, Rapid Science Publishers, The Old Malthouse, Paradise St., Oxford OX1 1LD, U.K., (44+1865) 790447, Fax: (44+1865) 344012.*

"This document summarizes certain issues concerning whether scientific support exists for developing limits of exposures for occupational exposure to low-frequency magnetic fields. Effects under discussion in the document are certain forms of leukemia and brain tumors. There is a lack of knowledge concerning the relevant exposure measure for a possible association between magnetic fields and biological effects. Based on performed epidemiological studies, the discussion is centered on the external exposure in terms of average exposure in μT during a certain time period, or in terms of accumulated exposure during a number of years. The Criteria Group for Physical Risk Factors notes that animal experiments do not give sufficient support for a relationship between cancer and exposure to magnetic fields. Epidemiological studies show a certain, credible but weak, support for the hypothesis of an association between brain tumors and certain forms of leukemia and magnetic field exposure. An overall evaluation of both animal and epidemiological studies is that occupational exposure could possibly be a human carcinogen. There is, however, a lack of data to determine whether a dose–response relationship exists. The Criteria Group summarizes the situation such that the scientific data base is insufficient to develop limits of exposures. This does not exclude other steps to reduce exposure—based, e.g., on some form of strategy of caution."

The Criteria Group for Physical Risk Factors, "Magnetic Fields and Cancer—A Criteria Document," **Arbete och Hälsa,** No.13, *1995, pp.1-10. See also, "Evaluations Made When Developing a Scientific Basis for Limitations of Exposures,"* **Arbete och Hälsa,** No.12, *1995, pp.1-18. (Both reports are in Swedish.)*

"Eight epidemiological studies of occupational exposure to low frequency magnetic fields and cancer were reviewed—with exposure estimates based on actual measurements at relevant workplaces. The review was supplemented by some studies where exposure estimates were derived in other manners. In conclusion, we find—despite the comparatively high degree of credibility that can be given positive findings in some studies—that the results of these studies have not, with sufficient degree of certainty, shown that occupational exposure to extremely low frequency magnetic fields is associated with cancer. Thus, such associations have not been shown 'beyond reasonable doubt.'"

Ulf Bergqvist, "Epidemiological Studies of Possible Associations Between Occupational Exposure to Magnetic Fields and Cancer—A Review," **Arbete och Hälsa,** No.11, *1995, pp.1-26 (in Swedish).*

HIGHLIGHTS

« Cellular Phone Notes »

Experiments by Dr. **Peter Semm** of **German Telekom** in Darmstadt show that 60% of the cells in the avian brain will respond to a relatively weak microwave signal. Speaking at a November 12 workshop on *Sensory Perception of Magnetic Fields,* organized by the Department of Energy in Palm Springs, CA, Semm said he can observe "a very clear response in the cells of the central nervous system of birds" following an exposure to 100 $\mu W/cm^2$. He thinks it is unlikely that humans are similarly influenced because, if so, he believes they would feel it. Semm speculated that healthy human brains, which are more highly developed than those of birds, can compensate for such exposures, though he is less sure whether older subjects could do so as effectively. In general, according to Semm, it is not the high frequency microwave radiation that is biologically relevant, but the pulsing of the signal. He also remarked that he has been investigating this phenomenon for two years but had hesitated to publish his findings. "The technique is complicated and therefore there is an opportunity for artifacts," he explained.

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CTIA's research group, **WTR**, has awarded a two-year grant of approximately $300,000 to Dr. **Kenneth Foster** of the University of Pennsylvania in Philadelphia for an evaluation of different ways of analyzing how the head absorbs radiation from a hand-held cellular phone. WTR will purchase a measurement system from Dr. **Niels Kuster**'s lab at the Swiss Federal Institute of Technology in Zurich for Foster's use. "It consists of an elaborate robot-controlled device for moving a field probe around a human-shaped tank filled with phantom material—that is, liquid whose electrical properties are similar to those of tissue at microwave frequencies," Foster told

Do Cellular Phones Cause Headaches?

Not long ago, anyone who complained about getting a headache after using a cellular phone was dismissed as loopy. No longer. A growing number of reports of migraines and other types of headaches is prompting researchers from around the world to take this possible link seriously.

"Using my mobile phone for short periods—2-3 minutes—makes me feel dizzy; using it for more than 15 minutes gives me a headache," wrote Dr. Paul Jackson of Winchester, U.K., in a message to *EMF-Link,* a World Wide Web site on the Internet run by Information Ventures in Philadelphia (http://infoventures.com). Jackson has a doctorate in chemical engineering and works as training manager in information technology.

Another note to *EMF-Link* read in part "I began experiencing headaches, one or two a day, since I began using my new cellular phone on October 2, 1995....I hold the phone on the left side of my head and the headaches are occurring on the same side. Most of my headaches seem to begin while I am sleeping during the night as I wake up with it."

Such complaints have caught the interest of Dr. Robin Cox, a consultant on occupational health to a number of telecommunications companies and to the British Electricity Association. Cox, who is based in London, U.K., has come across five to ten cases. "A number of people including myself have become aware of those who claim to have headaches associated with the use of mobile phones," he told *Microwave News.* "We ought to look into it to determine whether there is a real association." Cox is the former chief medical officer of the U.K. Central Electricity Generating Board, which has been broken up into a number of privatized electrical utilities.

Dr. Bruce Hocking, an occupational medicine consultant in Melbourne, Australia, echoed Cox's concerns. "I am aware of several cases of headaches among cell phone users and, interestingly, many of these people said they don't usually get headaches," he said in an interview. He added that he too would like to know whether there is any substance to such claims. Until early this year, Hocking was the chief medical officer of Australia Telecom (now called Telstra).

In Sweden, Dr. Kjell Hansson Mild of the National Institute of Working Life in Umeå, said that he had heard of approximately 30 cases. "It's much easier to believe that there are subjective disorders like headaches than that there are cancers," he told *Microwave News.* "They could be related to the electromagnetic hypersensitivity problem." Mild is a member of the newly established EC expert group on the safety of mobile phones (see p.9).

The new GSM cellular phones that emit pulsed modulated signals are more likely to cause headaches than the older Nordic analog system, known as NMT, according to Clas Tegenfeldt, an electrical engineer at Linköping University in Linköping, Sweden. Jackson, however, reported that he got headaches whether he used a digital or an analog phone.

In the U.S., Dr. Gregory Lotz, the chief of the Physical Agents Effects Branch at the National Institute for Occupational Safety and Health (NIOSH) in Cincinnati, stated that his agency has not had any inquiries about headaches associated with cell phones. "NIOSH continues to monitor research on the issue," he said in an interview.

Microwave News. "The problem is to determine the best way of measuring the specific absorption rates," he explained. One option is to use a physical model like Kuster's, which Foster called "a very nice phantom of the head." Alternatively, he said, "You can do very accurate calculations as Om Gandhi has done." Foster added, "I'll be doing experimental work with Kuster's system to see if we can get a better picture of the accuracy of present techniques, and if possible make them more accurate. The present techniques seem to work pretty well, but there are some questions about how accurate they really are for a person actually using a cellular phone." Some results may be released before the end of the project. "This validation work is an ongoing process," Foster noted. He will be collaborating with WTR's Dr. Bill Guy in Seattle and with Dr. Om Gandhi's team at the University of Utah, Salt Lake City (see *MWN,* J/F94 and S/O94).

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The Georgia Court of Appeals will consider the dismissal of a brain cancer lawsuit brought by **Richard Ward** against **Motorola**. On September 18, after the trial judge rejected Motorola's motion to dismiss the case for lack of evidence (see *MWN,* S/O 95), the cellular phone maker asked the appellate court to overturn the ruling. Motorola's request was denied October 5 on the grounds that it had been filed too late. But five days later the Court of Appeals reversed itself, saying that Motorola had been a victim of a "clerical error." Motorola spokesperson Norman Sandler, in Schaumburg, IL, told *Microwave News,* "We're gratified the appeal was accepted," and called the lawsuit "baseless." Ward's attorney, William Gray of the Atlanta firm of Dennis, Corry, Porter & Gray, does not expect the case to be settled quickly. "If we get out of the Court of Appeals within six months," he said in an interview, "we'll be on the fast track. We're quite a ways from getting this resolved."

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WTR has awarded three research grants for work on electromagnetic interference (EMI) between portable cellular telephones and implantable cardiac pacemakers. Dr. **Mark Estes** of the New England Medical Center in Boston received $105,000, Dr. **David Hayes** of the Mayo Clinic in Rochester, MN, got $110,000 and Dr. **Dwight Reynolds** of the University of Oklahoma Health Sciences Center in Oklahoma City was given $138,000. Last May, when WTR first announced this initia-

tive, its spokesperson Mike Volpe had said that WTR's pacemaker study would be conducted by Hayes, Dr. **Roger Carrillo** of Mt. Sinai Medical Center in Miami Beach and Dr. **Hans Moore** of George Washington University (GWU) (see *MWN,* M/J95). "Mount Sinai, the Mayo Clinic and GWU have all been officially approved to carry out work described in the [pacemaker research] protocol," Volpe told *Microwave News* at that time. "In our view, the work has already begun," he added, although "the contracts technically have not been signed." WTR's October newsletter, which announced the three pacemaker grants, stated that, "WTR has identified Dr. Hans Moore of the GWU Medical Center, Washington, DC, to conduct a clinical study investigating interference between cellular telephones and implanted defibrillators." It gave no further details, and Carrillo was not mentioned. When asked about the change in Carrillo's role, Volpe answered that he had been invited to serve as clinical liaison to a WTR advisory committee, but had not yet responded. Carrillo declined to comment.

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WTR's expert panel on the single cell gel (SCG) assay—also known as the "comet assay"—has endorsed the procedure for use in studying effects of RF/MW exposure on DNA. Last year, when Drs. **Henry Lai** and **N.P. Singh** of the University of Washington, Seattle, reported that low levels of RF/MW exposure caused an increase in single-strand breaks in the DNA of the brain cells of rats, some in the cellular phone industry questioned whether the comet assay was a reliable technique. For instance, WTR's Dr. Ian Munro of CanTox in Mississauga, Canada, said, "We are not sure it is producing a valid result" (see *MWN,* N/D94). WTR now reports that its expert panel, organized in October 1994, has concluded that use of the alkaline SCG assay is appropriate "due to its sensitivity." The assay is not specific to single-strand breaks, but rather "measures a range of DNA damage," panel member Dr. **Ray Tice** of Integrated Laboratory Systems in Research Triangle Park, NC, said in an interview. "When you're running the DNA out in the gel," Tice explained, "the smaller it is, the further it runs. And there are types of DNA damage besides single-strand breaks that can cause that migration." This, he continued, was actually an advantage: "It's a useful tool *because* of the fact that it's more generic." Tice is also one of the coordinators of an international validation study of the SCG assay that will probably not be completed for a couple of years. Some members of the Harvard Center for Risk Analysis cellular telephone advisory committee had argued that attempts to replicate the Lai-Singh experiment should wait until that international effort was completed (see *MWN,* M/A95). Tice said that the international evaluation had to look at a wider variety of possible uses for the assay, and that if WTR had opted to wait for its completion, "they would probably be considered overly cautious." On hearing of the WTR panel's conclusion, Lai told *Microwave News,* "I am happy they have accepted the assay for studying RF mutagenesis."

EC Seeks Plan for Mobile Phone Health Research Program

The European Commission (EC), with the backing of the European Parliament, has established an expert group to prepare a "blueprint for a comprehensive action plan for research into the possible effects of mobile telecommunications on human health." Dr. Alastair McKinlay, the head of the non-ionizing radiation department at the U.K. National Radiological Protection Board in Chilton, Oxfordshire, is the chair of the group.

A decision has not yet been made as to whether the research plan will be implemented. The areas to be covered include bioeffects, dosimetry, epidemiology and mechanisms of interaction.

The research plan is due to be completed by July 31, 1996, McKinlay told *Microwave News.* The group plans to hold two meetings in December and another in January. McKinlay added that his expert group will also recommend "a structure for funding that allows industry to contribute to the research program, but clearly and demonstrably separates them from the research being carried out—in essence the construction of an administrative fire wall between the funding source and the researchers."

McKinlay is also a member of the International Committee on Wireless Communication Health Research (ICWCHR). But, he said, the two efforts are "entirely separate." Dr. Jørgen Bach Andersen of the Center for Personkommunikation at Denmark's Aalborg University is also a member of both the EC group and the ICWCHR.

Earlier this year, Andersen prepared a report for the EC concluding that more health research is needed (see *MWN,* S/O95).

The ICWCHR was set up by Dr. George Carlo of Wireless Technology Research (WTR), based in Washington, which is sponsored by the U.S. cellular phone industry. The WTR and ICWCHR sponsored a *State of the Science Colloquium* in Rome, Italy, November 13-15 (see *MWN,* S/O95).

Part of the impetus for the European research program is the increasing concern over the health and safety of mobile phones and personal communication devices as well as the growing opposition to the siting of communication towers in urban areas. In its October 3 announcement, the EC, which has its headquarters in Brussels, Belgium, predicted that, in certain European markets "more than 50% of all telephone accesses will be wireless by as early as the year 2000."

Sweden's Dr. Kjell Hansson Mild, a member of McKinlay's committee, explained that the EC believes "the communities of tomorrow will be using mobile phones, so the objective is to stop the hindrances to the development of this technology."

With respect to the possible health impacts of this technology, the EC said: "While the thermal effects of exposure to [RF] energy are relatively well-known, there is a lively debate as regards the athermal effects, for which, however, no convincing adverse effect has been demonstrated." Nevertheless Mild, who is with the National Institute for Working Life in Umeå, commented that, "It will not be easy to settle the bioeffects

problem in the short term."

In addition to Andersen, McKinlay and Mild, the other members of the expert group are: Drs. Jürgen Bernhardt, Institute for Radiation Hygiene, Neuherberg, Germany; Martino Grandolfo, National Institute of Health, Rome, Italy; Konstantin Hossmann, Max Planck Institute for Neurological Research, Köln, Germany; Anthony Swerdlow, London School of Hygiene and Tropical Medicine, U.K.; Flora van Leeuwen, The Netherlands Cancer Institute, Amsterdam; Luc Verschaeve, Flemish Technological Research Institute (VITO), Brussels, Belgium; and Bernard Veyret, University of Bordeaux, France.

Rooftop Cellular Antennas Pose Localized Health Risks

Workers who come close to roof-mounted cellular antennas may be exposed to RF/MW radiation levels which exceed current occupational safety guidelines, according to a new report* prepared for the Federal Communications Commission (FCC) by Richard Tell of Richard Tell Associates Inc. in Las Vegas.

Roof-mounted cellular antennas use relatively low power and therefore do not entail "significant" exposures to those who are on the ground at the base of the tower, Tell found. But he added that a worker standing near such antennas could be exposed to much higher levels.

Tell stressed in his report that, "The issue of neighborhood exposure in the vicinity of cellular base stations is irrelevant to any consideration of compliance with applicable guidelines for safety because of the minuscule levels." In an interview with *Microwave News,* Tell said that he has no concerns over school-mounted antennas, except in cases in which the rooftops are accessible.

"It's clear that on some rooftops there is a potential for RF/MW levels to exceed the controlled and uncontrolled limits in the 1992 ANSI/IEEE standard," Tell said. The 1992 standard specifies two types of exposures: "controlled" for environments where those exposed are assumed to be aware of the risks, and "uncontrolled" for environments where they are assumed to be unaware (see *MWN,* N/D91 and N/D92).

"It is common to have other types of communication antennas nearby such as paging and two-way radios," Tell added. He pointed out that paging antennas with power outputs of 500 W are becoming commonplace on rooftops. "What the industry should be looking at is dense, roof communication sites, especially rooftops which have public access," Tell said. "The sticky side of this issue comes up when a building manager has to decide whether a roof is a controlled environment. If so, warning signs would have to be used to alert electricians, roof repairers, air conditioning mechanics and any others who might work nearby," he added.

The FCC is currently considering adopting the 1992 ANSI/IEEE standard. According to Tell, its decision may be influenced by the distinction between controlled and uncontrolled environments—instead of the more common dichotomy between occupational and public exposures. Although cellular telephone antennas are now exempt from FCC RF/MW guidelines due to their low power (see *MWN,* Ap85 and M/A87), Tell points out in his report that this may change: "Even though present FCC regulations categorically exclude cellular facilities from certifying that they comply with RF radiation rules used for most other regulated services, the FCC is presently reconsidering this position, mainly driven by concerns over possible worker exposure to strong RF fields..."

In his report, Tell estimated a maximum "keep-out" distance of about 18-20 feet for a cellular phone installation with 30 active, 100 W channels. Tell explained that although keep-out distances, which bracket areas exceeding the 1992 standard, do not necessarily indicate a hazard, they do suggest the potential for overexposure. He pointed out that in cases where the antenna is situated high above the roof, the keep-out distances are smaller because the power density falls rapidly with distance. Reflections from roofing materials are included in Tell's estimates since they can increase the power levels.

Tell's results are consistent with those presented in an earlier study by Ronald Petersen and Paul Testagrossa of AT&T

Osepchuk Becomes Chairman of ANSI/IEEE Standards Group

Dr. John Osepchuk is the new chairman of Standards Coordinating Committee 28 (SCC28) on Non-Ionizing Radiation, the group that developed the 1992 ANSI/IEEE RF/MW exposure standard. SCC28 is sponsored by the Institute of Electric and Electronic Engineers (IEEE) Standards Board.

Osepchuk, who is based in Concord, MA, recently retired after a long career at Raytheon Co. He replaces Dr. Tom Budinger of the University of California, Berkeley, who stepped down last year.

Ronald Petersen of AT&T Bell Labs in Murray Hill, NJ, has taken over Osepchuk's past duties as SCC28's executive secretary. Dr. Eleanor Adair of the John Pierce Laboratory in New Haven, CT, is the new vice chair of the committee. She replaces Dr. Bill Guy, an emeritus professor at the University of Washington, Seattle, and now a member of WTR.

Adair was previously cochair—with Dr. Om Gandhi of the University of Utah, Salt Lake City—of SCC28's Subcommittee 4, which drafted the 1992 standard. Dr. John D'Andrea of the Naval Medical Research Institute at Brooks Air Force Base, TX, is the new cochair of the subcommittee.

In a further change, Subcommittee 2 has a new name: "RF Control Measures and Hazard Communications." The old name was simply "Terminology and Units of Measurements." Richard Tell, a consultant based in Las Vegas, who is the chair of Subcommittee 2, said that he is planning to generate a guidance document on how to set up an RF safety program.

Next October, the IEEE will hold a workshop on how to apply the 1992 RF/MW standard. (See p.16 for details.)

Bell Labs in Murray Hill, NJ,† and in another by Dr. Robert Cleveland and coworkers at the FCC and Edwin Mantiply of the Environmental Protection Agency.‡

* Richard Tell, ***Engineering Services for Measurement and Analysis of Radiofrequency (RF) Fields*** (FCC Report No. OET/RTA 95-01), June 1, 1995, 159 pp. (No. PB95-253829). Order from: National Technical Information Service, Springfield, VA, (800) 553-6847.

† R. Petersen and P. Testagrossa, "Radiofrequency Electromagnetic Fields Associated with Cellular-Radio Cell-Site Antennas," ***Bioelectromagnetics,*** *13,* pp.527-542, 1992.

‡ R. Cleveland, et al. ***Measurement of Radiofrequency Fields and Potential Exposure from Land-Mobile Paging and Cellular Radio Base Station Antennas,*** Abstract No. P-36C, *17th Annual Meeting of the Bioelectromagnetics Society,* Boston, MA, June 18-22, 1995.

California PUC Advises Against Cellular Antennas Near Schools and Hospitals

The California Public Utilities Commission (CPUC) has urged cellular telephone companies to avoid building their towers near schools and hospitals. The November 8 recommendation counsels that these sites should be used only as a last resort. The commission, which is based in San Francisco, did not endorse specific limits for exposures to radiofrequency and microwave (RF/MW) radiation. Nor did it adopt a staff recommendation that called for restricting access to cellular towers by use of warning signs or physical barriers.

The CPUC opinion was unexpected and caught most observers by surprise. On learning of the decision, Dr. Raymond Neutra, acting chief of the California EMF Program in Emeryville, told *Microwave News* that it "seems like a very reasonable approach to the issue."

Stephen Carlson, executive director of the Sacramento-based Cellular Carriers Association of California, did not respond to repeated requests for comment.

The siting of cellular phone antennas on school property has long been a contentious issue. While school districts are attracted by the rents paid by communications companies, they must also answer to parents and teachers who are concerned about the possible ill effects of chronic exposure to RF/MW radiation. With more than 1,000 cellular towers in California, 10,000 across the country and 100,000 expected in the U.S. in the next 10 years (see p.14 and *MWN,* M/J95), numerous confrontations between companies and activists have erupted (see p.12 and *MWN,* N/D93) and will no doubt continue.

Each side has had its share of victories. One significant turning point came in 1993, when the San Francisco school board prohibited a mobile communications company from placing an RF transmitter on top of a high school, a decision based in part on a recommendation from Neutra (see *MWN,* N/D93).

"Public perception about potential health problems will continue to exist as long as there remain unanswered and unexplored questions in the scientific community on the EMF and RF radiation issue," the CPUC concluded. The commission's opinion follows a December 1993 report from its Commission Advisory and Compliance Division (CACD), based on a July 1993 workshop held in San Francisco. The CACD had recommended that, "Until clearer answers emerge, the commission should consider the possibilities that a health hazard could exist."

In an effort to keep itself and other interested parties apprised of significant developments that may require action in the future, the commission agreed that the CACD should be a "storehouse" of the latest RF/MW research results. And it ordered the CACD to hold informal RF/MW workshops as additional health information becomes available.

The decision of the CPUC noted that, "Scientific studies have not indicated any obvious relationship between prolonged lower-level RF radiation exposure and increased mortality or morbidity, including cancer." The CACD had observed that there is even less data on the health effects of RF exposure than on EMFs, and both the commission and the CACD felt that it would be "premature" to adopt specific RF exposure standards at this time.

But precisely because "very little is known about possible health hazards associated with EMF and RF exposure levels," the CPUC decided that it should take some interim measures. It voted to adopt the CACD report and almost all of its recommendations.

The one exception was a CACD recommendation that cellular companies "be encouraged to restrict access to cell sites by use of warning signs or physical barriers such as fences," a measure which the CPUC declined to endorse. The commission pointed out that cellular utilities are already required to address public concerns about potential health problems from EMF and RF radiation associated with the construction of new cell sites as part of the environmental review process under General Order 159 and that most towers are already inaccessible. General Order 159 is currently undergoing revision and cellular utilities will be expected to implement any revised requirements.

The CACD report observed that, although the "economic considerations of this issue are significant," the health and safety of the public was "equally, if not more, important." Diana Brooks of the CPUC's Division of Ratepayer Advocates commented that, "I believe the CPUC's interim measures are an attempt to balance important economic considerations with crucial public health and safety concerns."

Local governments are likely to be influenced by the CPUC's position. The CACD report noted that, "explosive growth of cellular base stations or cell sites throughout California has placed the issue squarely on the shoulders of local governments, which are responsible for granting use and construction approval....Due to public pressure from various communities to [prevent] cellular companies from constructing more sites, local governments are looking to the commission for more leadership on this issue."

The CPUC's decision noted that "siting cells close to schools

or hospitals often raise[s] local opposition based on a perception of health risks," and stated that utilities should address public health concerns. The CACD report expressed the hope that, "These steps may demonstrate to the public that the industry is willing to accommodate public concern, which may result in greater cooperation in the construction of future cell sites."

But the cellular phone industry has become impatient with restrictions on tower siting and is trying to preempt local siting decisions. Amendments have been added to the U.S. Congress' pending overhaul of communications law that would prevent state and local RF safety regulations from being more stringent than federal standards (see *MWN,* M/J95).

Similarly, in December 1994, the Electromagnetic Energy Association (EEA) and the Cellular Telecommunications Industry Association (CTIA) petitioned the Federal Communications Commission to preempt state and local regulations for licensing cellular phone towers (see *MWN,* J/F95). In August 1995, the industry won a tactical victory when President Clinton ordered the heads of all federal agencies to facilitate the use of government property for locating cellular antennas (see *MWN,* S/O95).

While no mandatory restrictions are imposed by the CPUC decision, it is likely to have a significant impact. Cellular companies that are perceived as being uncooperative could be pressured through the CPUC's substantial regulatory authority. For example, last February, the commission fined the Los Angeles Cellular Telephone Co. $4.37 million for filing false information regarding 150 of its cellular facilities (see *MWN,* M/A95).

Opposition to Communication Towers on the Rise in the U.S. and Around the World

As cellular phone and personal communications services (PCS) companies seek to expand their coverage, communities in the U.S. and around the world continue to fight to keep antennas out of their neighborhoods (see *MWN,* N/D93, M/J95 and S/O95):

• On November 21, 1995, New York's Supreme Court (the state's lowest court) affirmed the right of the town of Harrison in Westchester County to impose a 90-day moratorium on the building of cellular towers, pending the development of appropriate zoning regulations. In his decision involving Cellular One, Judge James Cowhey ruled that, "The moratorium at issue constituted a reasonable measure designed to give the town a short period of time in which to enact zoning changes to rationally meet the need to address the increasing number of cellular telephone antenna facility applications." He noted that Harrison's action "is not based upon any perceived health risks on the part of the community." In nearby Tarrytown, a moratorium on cellular towers based on public perception of a health impact had been previously overturned.

• In Washington state, Governor Mike Lowry has set up a Telecommunications Policy Coordination Task Force to address antenna siting and other issues. Citizens' groups in many parts of the state have blocked construction of cellular installations. For instance, on Bainbridge Island, residents persuaded the city council to block a cellular tower, contending that it was "out of scale" with the surrounding neighborhood, according to the November 18 *Bainbridge Review.* Citizens' groups in Edmonds and Poulsbo, two other towns in Washington state, have also successfully fought cellular tower construction in their backyards.

• San Francisco residents presented arguments against Pacific Telesis' proposed construction of nearly 200 PCS antennas at a November 30 hearing of the San Francisco Planning Commission. According to Daniel Zoll's article in the *San Francisco Bay Guardian* of December 6, "Neighbors expressed frustration over the city's haphazard permit process for the installation of cellular antennas and transmitters, as well as its lack of a comprehensive telecommunications plan." Dr. Jerrold Bushberg of the University of California, Davis, reassured the public on behalf of Pacific Telesis. The hearing is scheduled to resume on December 14.

• At the request of the Policemen's Benevolent Association Local 36, Clifton, NJ, city officials and the Passaic County Board of Health will be conducting an investigation into possible health effects of a radio antenna. According to the September 24 *Dateline Journal,* the request was sparked by six police officers who were diagnosed with cancer. The paper reported that all six worked about 30 feet from the tower. Last year, a school in Clifton was the site of an intense EMF controversy (see *MWN,* M/A94).

• Telstra, Australia's largest telecommunications company, shut down an installation near a kindergarten and a baby health center in suburban Sydney. The October 21 *British Medical Journal* reported that: "With their cherubic toddlers carrying placards, the group chained themselves to Telstra's fence, called in the media and became the latest players in the timeless saga of little (virtuous) people up against big (venal) companies. Within two weeks Telstra lost face and switched off the installation, maintaining its position on negligible risk but acknowledging the community's outrage. A fortnight later the same battle erupted in another suburb and is expected to spread nationally."

• Concerns from those living near cellular towers in New Zealand prompted a one-day symposium on November 18 in Christchurch to debate potential health effects. Among the speakers were Drs. Ivan Beale of Auckland University, John Goldsmith of Ben Gurion University of the Negev, Israel, Dr. Richard Luben of the University of California, Riverside and Neil Pearce of the Wellington Clinical School. According to Jennifer Macintyre of the Environmental Protection for Children Trust, one of the symposium's sponsors, the meeting was prompted by local officials' lack of sufficient knowledge and information for making critical decisions about safety and siting within residential areas.

EMFs Lead to a Fivefold Increase in Gene Expression: "Results...Do Not Support Further Studies"—Case Closed?

Reprinted below is the full text of the project summary of "Alterations in Astrocyte Functioning and Regulation of Cytokine mRNAs During Development Following Perinatal Exposure to Environmental Agents (EMF)," which appears in Status of Health Effects Research Through Fiscal Year 1995, *a report published by the National Institute of Environmental Health Sciences (NIEHS) in November (see p.17). This project on neurobehavioral dysfunction, which was led by Dr. Jean Harry of NIEHS' Laboratory of Biochemical Risk Analysis, began in September 1993 and was completed in September 1995 at a cost of $10,000.*

Under certain conditions, Harry has found that a 2 G magnetic field can cause a fivefold increase in gene expression—a type of effect that has been at the center of an intense controversy (see MWN, *J/A94, J/F95 and J/A95). In an interview with* Microwave News, *Harry said: "I am confident of the experimental validity of these results. We made considerable effort to control for any extraneous variables. The exposure was carried at the IIT Research Institute (IITRI) facility in Chicago. However, additional research is needed before any biological significance can be determined."*

"These results are intriguing," commented Dr. Imre Gyuk, program manager for DOE's EMF research.

NIEHS, however, decided to cancel the project instead of following it up. Harry said that she did not write the last two sentences of the project summary (see below). Dr. Gary Boorman, chief of NIEHS' Pathology Branch, conceded to Microwave News *that he had inserted the last paragraph "in haste." But, he added, "I am willing to reconsider." Boorman explained his decision: "The last paragraph was written with the knowledge that we did not have any more brain material available. These results will probably have to be revisited and we will need to decide how to proceed."*

Rationale and Summary

This developmental period is highly sensitive to environmental insults. This project addresses the possible effects of EMFs during the neonatal period. Studies in our laboratory have demonstrated that exposure to low levels of a known neurotoxicant, lead acetate, during the developmental period results in a shift in the developmental pattern for mRNA associated with the outgrowth of the neuronal axon and the maturation of the astrocyte. During development, the axon of the neuron elongates to form connections (synapses) with various target sites. This process is guided by the axonal growth cone at the leading edge of the axon. During development and regeneration, the developmentally regulated protein, growth associated protein-43 (GAP-43) is expressed maximally and located prominently along axons as they are elongating. This protein is enriched at the tip of the growing axon at the cytosolic surface of the growth cone membrane. Alterations in this protein during critical periods of development could result in altered axonal elongation and subsequent connectivity of the neural network.

During the formation of the brain, there is an overabundance in axonal outgrowth in order to insure contact with the proper target site. Once this contact has been made, the excess material is removed by a process of pruning. This process may be the function of immune-like phagocytic cells of the brain, the microglia. When activated, the microglia up-regulate expression of pro-inflammatory cytokines. We have identified a developmental profile for the mRNA for interleukin-1, interleukin-6 and tumor necrosis factor alpha. This profile appears to be altered by developmental lead exposure suggesting a link between the abortive axonal elongation and the decrease in the material needed to phagocytize and the induction of pro-inflammatory cytokines in the developing brain.

Given the significance of the growth of the axon, the formation of appropriate synapses on target sites and the process of "pruning" in the final formation of the neural network of the brain, we will measure mRNA for GAP-43 and pro-inflammatory cytokines early in the postnatal development of EMF-exposed animals in an attempt to detect any alterations which could suggest a subtle perturbation to the developing nervous system.

Experimental Design and Exposure Conditions

Pregnant rats were exposed to EMF for 18.5 hrs per day or intermittently (1 hr on, 1 hr off for 18.5 hrs) during their entire pregnancies and during the postnatal period using the continuous breeding protocol at IITRI. The exposure conditions were control, 20 mG, 2 G and 10 G continuous exposure, 10 G intermittent exposure. Brain tissue was collected from postnatal day 2, 3 and 5, coded, and shipped on dry ice to NIEHS. Additional brain samples were collected at the end of exposure when the offspring were adults.

RNA was isolated from the cerebellum of brains at each time point, subjected to Northern blot analysis and probed with radiolabelled cDNA for GAP-43 and Actin. The amount of radioactivity in each band representing mRNA for GAP-43 or Actin was determined.

Following Northern hybridization, the RNA samples from postnatal days 2, 3 and 5 will be analyzed for the level of mRNA for interleukin-1, interleukin-6 and tumor necrosis factor alpha by RT-PCR.

Forebrain tissue is in the process of analysis for PND 2.

Adult tissue will be evaluated for a glia specific protein—GFAP by ELISA.

Quality Assurance Measures

The identity of the exposure conditions has remained unknown throughout these experiments. For each time point, five samples per exposure condition were isolated together, run on the same gel and hybridized together to minimize variability. Exposure QA measures are associated with IITRI.

Results and Discussion

At both postnatal day 2 and 5 there was no apparent difference between exposure groups with regard to levels of GAP-43 and Actin mRNA. At postnatal day 3 the control and low-dose groups showed a low level of GAP-43 mRNA, the 10 G continuous and intermittent groups were 2 times higher, while the 2 G continuous group was dramatically higher than all other groups (5 times higher than 0 and 2 mG, 2.5 times higher than groups 10 G continuous and intermittent).

The developmental onset of GAP-43 mRNA expression occurs at a time of terminal cell division and accompanies the neuronal decision of cell fate while the continued elevation is associated with the developmental progression of the axon. This protein is enriched in the leading edge of the axon, the growth cone which provides crucial guidance in response to appropriate targets and other environmen-

tal cues. The increase in mRNA level seen at postnatal day 3 suggests that exposure to EMF produces subtle alterations in the neural network pattern of the brain. The increase could be representative of a stimulation in axonal growth as a result of a decrease in target sites or other factors involved in regulating the stability of neural connections. This observation suggests the need for further studies to examine the developmental pattern of expression of this gene as well as other associated genes that are developmentally regulated.

The results from this pilot project do not support further studies. The project will not be continued.

Clippings from All Over

[Bennett's] superficial discussion of the laboratory data and his simplistic treatment of electrical noise at the single-cell level could mislead the reader into supposing that little experimental information is available on the biological effects of ELF fields, and that nearly all the laboratory observations can be readily dismissed on the basis of physical arguments. This is far from accurate. Bennett's arguments generally proceed from a simple fact: that the ELF field levels reported to elicit these biological effects are too small to do so, being less than the body's intrinsic electrical noise over the dimensions of a single cell. But there is ample reason to expect that biological systems may exhibit responses to ELF fields that cannot readily be modeled by treating an integrated organ or tissue as a noninteracting collection of individual cells.

—Dr. Thomas Tenforde, in a review of *Health and Low-Frequency Electromagnetic Fields* (New Haven, CT: Yale University Press, 1994) by Dr. William Bennett, in *IEEE Spectrum,* p.10, October 1995

In time, monitoring your exposure to EMFs will become second nature. You will become more mindful of electromagnetic fields when you make decisions about where to live, where to send your children to school, how to arrange your furniture, which appliances to buy, where to locate them and how to use them.

—Dr. Russel Reiter, *Melatonin: Your Body's Natural Wonder Drug* (New York: Bantam Books, 1995), p.180 (see also p.2)

I happen to believe there is a danger in living under these electromagnetic fields—it's just hard to say at this point what exactly it does to you. So I'm going to wait for the science to catch up, and these kids have a better case. By nonsuiting it now, what I was really doing was protecting the rights of these children down the line.

—Joe Jamail, quoted in "Joe Jamail Passes (for Now) on Power Line Litigation," by Joseph Nocera, *Fortune,* p.48, November 13, 1995

One wag has calculated that if radioastronomy were to sell off its present allocation of protected radio frequencies to commercial interests at something like the prices for which frequencies have recently been auctioned in the United States, there would be enough cash to provide every radioastronomer with an income of $160,000 a year for the rest of time. And it would be a life of leisure; radioastronomy as a science would have to fold its tent.

—John Maddox, "Radioastronomy and the Unquiet Radio Sky," *Nature, 378,* p.11, November 2, 1995

We conclude that the association between leukemia risk and wire codes is not due to confounding by non-EMF related factors or to selection bias and may reflect a causal effect of [EMFs]. The association does not appear to be mediated simply through the mean field intensity, even after allowing for measurement error in that variable. Our findings suggest that resonances with the geomagnetic field and/or some aspect of the temporal variability in ELF field strengths may play a role. These hypotheses merit testing in future epidemiologic and experimental studies.

—Dr. John Peters et al., *Exposure to Residential Electric and Magnetic Fields and Risk of Childhood Leukemia,* Palo Alto, CA: Electric Power Research Institute, Report No.TR-104528, p.ES-3, June 1995

[The Covalt] case is a very big deal. Essentially, [environmental lawyers] are out there selling paranoia for profit. If we win, though, it closes the book on these actions in California.

—Greg Barnes, assistant general counsel of SDG&E (see also p.5), quoted in "Bucking the Current," by Michael Granberry, *Los Angeles Times,* p.B4, November 6, 1995

Epidemiologists have an abundance of valid reasons to be self-critical and cautious in the interpretation of their results, usually presented in the discussion section of manuscripts. However, epidemiologists themselves—and, to a much greater extent, nonepidemiologists—often question the validity of a particular finding because of its context rather than because of the methods that generated it. In this commentary, we argue that a concern with multiple comparisons is unwarranted. A closely related theme is the concern with the investigator's perspective—how and when the idea for collecting and analyzing data occurred, which we also argue is irrelevant to assessing the validity of the product.

—Drs. David Savitz and Andrew Olshan, "Multiple Comparisons and Related Issues in the Interpretation of Epidemiologic Data," *American Journal of Epidemiology, 142,* p.904, November 1, 1995

The [CTIA] turned to Carma [a media-evaluation consultant] in 1993 when a Florida man filed suit claiming that cellular phones caused cancer. "My first day on the job the guy went on Larry King," says the association's spokesman, Mike Houghton. For the next five weeks, Carma tracked articles written by 65 reporters. Each story was evaluated for whether it was positive or negative and assigned a score from zero to one hundred. Carma then rated reporters by the average score of their articles and ranked the journalists on a separate list in descending order of favorability so the client could quickly identify friends and foes. Carma even identified which cities had the most favorable coverage—Detroit and Tulsa were best, San Diego worst—so that a media campaign could be targeted. Pleased with the results, the industry group is still using Carma.

—Michael Moss, "Reverse Gotcha: Companies Are Paying Big Fees To Get News about Beat Reporters," *Wall Street Journal,* p.A4, November 10, 1995 (Carma's work for the DOE prompted protests.)

FCC Chairman Reed Hundt estimates that U.S. investment in new wireless systems will total $50 billion in the next five years....Collectively, the [PCS] auction winners will need but 100,000 new cell sites, far fewer than once imagined....The total bill for 100,000 installations is likely to surpass $3 billion.

—Andrew Kupfer, "The Trouble with Cellular," *Fortune,* pp.180-186, November 13, 1995

[T]he environmental movement has a political lever in the electric-car program that the utility industry so passionately supports. Public expenditure for electric transit development should be linked to the utilities' mitigation of magnetic field hazards.

—Carlos Porras of Communities for a Better Environment, quoted in "Electromagnetic Plague," by Mike Davis, *LA Weekly,* p.15, November 9, 1995

CONFERENCES

1996 Conference Calendar

January 21-25: **1996 IEEE Power Engineering Society (PES) Winter Meeting,** Baltimore, MD. Contact: Nancy Heitmann, IEEE PES Special Services, 445 Hoes Lane., PO Box 1331, Piscataway, NJ 08855, (908) 562-3881, Fax: (908) 981-1769.

February 6-7: **International Symposium on Human Health and Non-Ionizing Radiation,** Ivan Cankar Congress Center, Ljubljana, Slovenia. Contact: Peter Gajsek, Slovenian Institute of Quality and Metrology, Trzaska c.2, 61000 Ljubljana, Slovenia, (386+61) 218-006, Fax:(386+61) 218-020.

February 12-16: **4th Annual Wireless Symposium & Exhibition,** Convention Center, Santa Clara, CA. Contact: Jack Browne, *Microwaves & RF,* 611 Route 46 West, Hasbrouck Heights, NJ 07604, (201) 393-6293, Fax: (201) 393-6297.

February 29-March 3: **3rd International Congress of the European Bioelectromagnetics Association (EBEA),** Nancy, France. Contact: Gérard Prieur, EBEA, University Henri Poincaré-Nancy 1, BP 239, F-54506 Vandoeuvre Lès Nancy, France, (33) 83912071, Fax: (33) 83912391.

March 10-14: **35th Annual Meeting of the Society of Toxicology (SOT),** Convention Center, Anaheim, CA. Contact: SOT, 1767 Business Center Dr., Suite 302, Reston, VA 22090, (703) 438-3115, Fax: (703) 438-3113.

March 12: **EMFs and the Public's Health,** Rutgers University, New Brunswick, NJ. Contact: Rhonda Roby, NJ Public Health Association, 470 Piaget Ave., Clifton, NJ 07011, (201) 340-4645, Fax: (201) 340-4645.

March 18-20: **1996 International Transmission & Distribution Conference & Exhibition,** Novotel Centre, Hammersmith, London, U.K. Contact: *Transmission & Distribution,* 9800 Metcalf Ave., Overland Park, KS 66212, (913) 341-1300, Fax: (913) 967-1898.

March 24-28: **27th Annual Meeting of the Environmental Mutagen Society (EMS),** Empress Hotel, Victoria, BC, Canada. Contact: EMS, 11250 Roger Bacon Dr., Suite 8, Reston, VA 22090, (703) 437-4377, Fax: (703) 435-4390.

April 3-4: **32nd Annual Meeting of the National Council on Radiation Protection and Measurements (NCRP),** Crystal City Marriott, Arlington, VA. Contact: NCRP, 7910 Woodmont Ave., Bethesda, MD 20814, (301) 657-2652, Fax: (301) 907-8768.

April 8-12: **Symposium on Microwave Processing of Materials,** Marriott Hotel, San Francisco, CA. Contact: Magdy Iskander, University of Utah, Electrical Engineering Department, Salt Lake City, UT 84112, (801) 581-6944, Fax: (801) 581-5281.

April 9-11: **58th Annual Meeting of the American Power Conference,** Marriott Downtown Hotel, Chicago, IL. Contact: Robert Porter, Illinois Institute of Technology, Chicago, IL 60616, (312) 567-3196, Fax: (312) 567-3892.

April 9-12: **International Magnetics Conference,** Seattle, WA. Contact: Diane Suiters, Courtesy Associates, 655 15th St., NW, Suite 300, Washington, DC 20005, (202) 639-5088, Fax: (202) 347-6109.

April9-12: **7th International Congress for Hypothermic Oncology,** Rome, Italy. Contact: Cafiero Franconi, Department of Internal Medicine, Tor Vergata University of Rome, Via O. Raimondo, I-00173 Rome, Italy, (39+6) 723-5170, Fax: (39+6) 725-92821.

April 10-12: **3rd International Conference on Computation in Electromagnetics (CEM),** University of Bath, U.K. Contact: CEM Secretariat, IEE Conference Services, Savoy Place, London WC2R OBL, U.K., (44+171) 240-1871, Fax: (44+171) 497-3633.

April 14-19: **9th World Congress of the International Radiation Protection Association (IRPA),** Vienna, Austria. Contact: IRPA9 Congress Organizing Committee, Austropa Interconvention, PO Box 30, A-1043 Vienna, Austria, (43+1) 58800299, Fax: (43+1) 5867127.

April 15-18: **Annual Convention of the National Association of Broadcasters (NAB),** Convention Center, Las Vegas, NV. Contact: NAB, 1771 N St., NW, Washington, DC 20036, (202) 429-5350, Fax: (202) 429-5406.

April 26-May 3: **American Occupational Health Conference (AOHC),** Convention Center, San Antonio, TX. Contact: Nancy Olson, Director of Conferences & Meetings, AOHC, 55 West Seegers Rd., Arlington Heights, IL 60005, (708) 228-6850 ext.156, Fax: (708) 228-1856.

April 27-May 3: **4th Scientific Meeting and Exhibition of the Society of Magnetic Resonance (SMR),** New York, NY. Contact: SMR, 2118 Milvia St., Suite 201, Berkeley, CA 94704, (510) 841-1899, Fax: (510) 841-2340.

April 28-May 3: **1996 Electricity Conference & Exposition,** Montréal, PQ, Canada. Contact: Canadian Electrical Association, 1 Westmount Sq., Suite 1600, Montréal H3Z 2P9, Canada, (514) 937-6181, Fax: (514) 937-6498.

May 5-9: **1996 National Conference on Radiation Control,** Hilton Hotel, Albuquerque, NM. Contact: Conference of Radiation Control Program Directors, 205 Capital Ave., Frankfort, KY 40601, (502) 227-4543, Fax: (502) 227-7862**.**

May 13-16: **1996 IEEE National Radar Conference,** Ann Arbor, MI. Contact: Adam Kozma, University of Michigan Conferences and Seminars, 600 East Madison, Room G121, Ann Arbor, MI 48109, (313) 663-5748, Fax: (313) 764-1557.

May 18-24: **1996 American Industrial Hygiene Conference & Exposition (AIHCE),** Convention Center, Washington, DC. Contact: AIHCE, 2700 Prosperity Ave., Suite 250, Fairfax, VA 22031, Fax: (703) 207-3561.

May 20-22: **International Conference on Electromagnetic Energy,** Washington Vista Hotel, Washington, DC. Contact: Amy Nelson, Electromagnetic Energy Association, 1255 23rd St., NW, Suite 850, Washington, DC 20037, (202) 452-1070, Fax: (202) 833-3636.

May 27-31: **1996 American Electromagnetics Conference,** Convention Center, Albuquerque, NM. Contact: Chris Jones, Metatech Corp., PO Box 37378, Albuquerque, NM 87176, (505) 243-0681, Fax: (505) 243-0683.

June 1-5: **31st Annual Meeting & Exposition of the Association for the Advancement of Medical Instrumentation (AAMI),** Marriott Hotel, Philadelphia, PA. Contact: AAMI Education & Conferences Department, 3330 Washington Blvd., Suite 400, Arlington, VA 22201, (703) 525-4890, Fax: (703) 276-0793.

June 4-6: **IEEE Instrumentation & Measurement Technology Conference,** Sheraton Hotel & Towers, Brussels, Belgium. Contact: Robert Myers, 3685 Motor Ave., Suite 240, Los Angeles, CA 90034, (310) 287-1463, Fax: (310) 287-1851.

June 9-12: **Annual Conference of the Canadian Radiation Protection Association,** Trois-Rivières, PQ, Canada. Contact: Claude Dufour, Hydro-Quebec/Centrale Nucléaire Gentilly-2, 4900 Bl. Bécancour, Gentilly G0X 1G0, Canada, (819) 298-2943 ext.5138, Fax: (819) 298-5660.

June 9-13: **10th Nordic-Baltic Conference on Biomedical Engineering (NBCBME)** and **1st International Conference on Bioelectromagnetism,** Ragnar Granit Institute, Tampere, Finland. Contact: NBCBME Secretariat, Ragnar Granit Institute, Tampere University of Technology, PO Box 692, FIN-33101 Tampere, Finland, (358+31) 316-2162, Fax: (358+31) 316-2524.

June 9-14: **18th Annual Meeting of the Bioelectromagnetics Society (BEMS),** Conference Centre, Victoria, BC, Canada. Contact: Dr. William Wisecup, BEMS, 7519 Ridge Rd., Frederick, MD 21702, (301) 663-4252, Fax: (301) 371-8955.

June 13-15: **29th Annual Meeting of the Society for Epidemiological Research (SER),** Park Plaza Hotel, Boston, MA. Contact: Stacey Norin, SER, 111 Market Pl., Suite 840, Baltimore, MD 21202, (410) 223-1626, Fax: (410) 223-1620.

June 17-20: **Conference on Precision Electromagnetic Measurements (CPEM),** Braunschweig, Germany. Contact: CPEM Conference Secretary, Physikalisch-Technische, Bundesanstalt, Bundesallee 100, Braunschweig D-38116 Germany, (49+531) 592-2129, Fax: (49+531) 592-2105.

June 17-21: **1996 IEEE MTT-S International Microwave Symposium,** San Francisco, CA. Contact: MTT-S Symposium 1996, c/o LRW Associates, 1218 Balfour Dr., Arnold, MD 21012, (707) 577-3658, Fax: (707) 577-2036.

June 21: **46th Automatic RF Techniques (ARFTG) Conference,** San Francisco, CA. Contact: Mohamed Sayed, ARFTG Program Chair, 1400 Fountaingrove Pkwy., Santa Rosa, CA 95403, (707) 577-3565, Fax: (707) 577-2887.

June 25-28: **13th International Wroclaw Symposium and Exhibition on**

CONFERENCES

Electromagnetic Compatability, Wroclaw, Poland. Contact: EMC Symposium and Exhibition, Box 2141, 51-645 Wroclaw 12, Poland, (48+71) 72-8812, Fax: (48+71) 22-3473.

July 21-26: **1996 IEEE Antennas and Propagation Society International Symposium and International Union of Radio Science (URSI) Meeting,** Hyatt Regency, Baltimore, MD. Contact: Libby Croston, Johns Hopkins University, Applied Physics Laboratory, Johns Hopkins Rd., Laurel, MD 20723, (301) 953-5225, Fax: (301) 953-6123.

August 17-21: **8th Annual Conference of the International Society for Environmental Epidemiology (ISEE),** University of Alberta, Edmonton, Canada. Contact: Michelle Hoyle, 44 Lister Hall, University of Alberta, Edmonton, Alberta, T6G 2H6 Canada, (403) 492-4281, Fax: (403) 492-7032.

August 28-September 5: **25th General Assembly of the International Union of Radio Science (URSI),** Lille, France. Contact: P. Degauque, Université de Lille 1, F-59655 Villeneuve d'Ascq Cedex, France, (33+20) 33 7206, Fax: (33+20) 33 7207.

September 9-12: **26th European Microwave Conference,** Hilton Atrium, Prague, Czech Republic. Contact: Gillian Shinar, Nexus Information Technology, Nexus House, Swanley, Kent BR8 8HY U.K., (44+1322) 660 070, Fax: (44+1322) 661 257.

September 15-20: **IEEE Power Engineering Society (PES) Transmission and Distribution Conference and Exposition,** Convention Center, Los Angeles, CA. Contact: IEEE PES, see January 21 above.

September 15-20: **25th International Congress on Occupational Health (ICOH),** Stockholm, Sweden. Contact: ICOH Congress, Box 6911, S-102 39 Stockholm, Sweden, (46+8) 736-1500, Fax: (46+8) 348-441.

September 17-20: **1996 International Symposium on Electromagnetic Compatibility,** University of Rome, Italy. Contact: Mauro Feliziani, Department of Electrical Engineering, University of Rome, Via Eudossiana 18, I-00184 Rome Italy, (39+6) 445-85809, Fax: (39+6) 488-3235.

October 22: **1st IEEE Workshop on the Application of ANSI/IEEE C95.1-1992,** Wilmington, DE. Contact: Donald Zipse, Zipse Electrical Engineering Inc., 671 Kadar Dr., West Chester, PA 19382, (610) 358-1462, Fax: (610) 793-1693.

October 31-November 3: **18th Annual International Conference IEEE Engineering in Medicine and Biology Society,** Amsterdam, The Netherlands. Contact: Michael Neuman, Program Co-chair, MetroHealth Medical Center, 2500 MetroHealth Dr., Cleveland, OH 44109, Fax: (216) 459-4608.

November 3-7: **International Conference on Radiation and Health (ICRH),** Beer Sheva, Israel. Contact: ICRH, Ortra Ltd., 2 Kaufman St., Textile Center, PO Box 50432, Tel Aviv 61500, Israel, (972+3) 517-7888, Fax: (972+3) 517-4433.

November 12-14: **International Symposium on Antennas,** Université de Nice, France. Contact: Conference Secrétariat, CNET-PAB, F-06320 La Turbie, France, Fax: (33+93) 41 0229.

November 17-21: **DOE-EPRI Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery and Use of Electricity,** St. Anthony's Hotel, San Antonio, TX. Contact: W/L Associates Ltd., 7519 Ridge Rd., Frederick, MD 21702, (301) 663-1915, Fax: (301) 371-8955.

Higher Leukemia Rates Among Those Living Near Australian TV Towers *(continued from p.1)*

In 1987, a similar study identified higher rates of cancer among those living near radio and TV broadcast towers in Honolulu. However, this finding was never followed up. Dr. Bruce Anderson and Alden Henderson of the Hawaii Department of Health found higher rates of cancer—and leukemia—in census tracts with broadcast towers (see *MWN,* M/J87). An RF/MW survey by the Environmental Protection Agency had shown that the city of Honolulu had the highest radiation levels of any U.S. urban area (*MWN,* J/F85). Dr. William Morton of the University of Oregon's Health Sciences Center in Portland had found parallel trends in his study of cancer and broadcast radiation in Portland (see *MWN,* J/F82 and My82).

In a paper to be published next year, Dr. Stanislaw Szmigielski of the Center for Radiobiology and Radiation Safety in Warsaw, Poland, will present data showing that young military personnel exposed to RF/MW radiation had more than eight times the expected rate of leukemia and lymphoma (see *MWN,* M/J95).

According to calculations by Hocking's team, the RF/MW power density in the areas closest to the towers in North Sydney was 8 $\mu W/cm^2$ and decreased to 0.2 $\mu W/cm^2$ at a distance of two-and-a-half miles. In contrast, the RF/MW levels in the control communities—seven-and-a-half miles from the towers—were approximately 0.02 $\mu W/cm^2$.

The 1992 ANSI/IEEE standard allows exposures of approximately 200-600 $\mu W/cm^2$ at radio and TV broadcast frequencies for the general public. In Australia, the exposure standard is 200 $\mu W/cm^2$ for the 30 MHz-300 GHz band.

Hocking's new findings come at a time when there is an initiative to relax Australia's RF/MW exposure standard. They also coincide with ongoing battles over the siting of cellular phone antennas. A neighborhood group in suburban Sydney recently blocked the installation of a cellular tower by Telstra near a kindergarten, due in part to concerns over long-term exposure to RF/MW radiation (see p.12).

In an interview with *Microwave News,* Hocking commented that, "It would be stretching too far to apply our broadcast results to cell phone towers." But, he added, "It would be prudent for some countries to set up prospective epidemiological cancer studies of the possible effects of mobile phones—both base stations and hand-held units—so that in ten years we have some answers."

"The first step," Hocking continued, "is to confirm these Australian findings and then take another look at Honolulu. After that, we should investigate other communities near broadcast towers, such as Crystal Palace in London."

Hocking presented his new results in a poster paper at the Department of Energy's annual review of EMF research, which was held in Palm Springs, CA, November 13-16.

The three towers transmit the signals of four TV stations with peak powers of 100 kW for the video signals and 10 kW for the audio signals. There is also a 50 kW FM station, according to Hocking.

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CANCER RATES

Childhood Leukemia... One of the favored arguments among those who dismiss the EMF–cancer connection is that cancer rates have not kept up with the increased use of electricity during the 20th century (see *MWN,* M/J92, J/A92 and N/D92). Most epidemiologists—one exception is Harvard's Dr. Dimitrios Trichopoulos—reject this view as insupportable (see *MWN,* J/A92 and J/F93). But even if the two variables are indeed causally related, there is another issue: A number of studies show that certain types of cancer *are* increasing (see *MWN,* J/F91 and J/A91). As Dr. Philip Landrigan, the chairman of the Department of Community Medicine at Mt. Sinai School of Medicine in New York City, reminded the readers of the *New England Journal of Medicine* (November 9): "...the incidence rate of new cases [of childhood leukemia] has increased steadily in the United States over the last two decades." Landrigan went on: "For acute lymphoblastic leukemia (ALL), the most common form of leukemia among children, the cumulative increase in the incidence rate from 1973 to 1991 was 20.0%. The increase is particularly striking among white children. The causes are not known."

EMF RAPID RESEARCH

Recent Developments... The NIEHS has awarded two new three-year biomedical grants under the EMF RAPID program (see *MWN,* S/O94 and M/A95). Dr. Roy Aaron of the Orthopaedic Research Lab at the Rhode Island Hospital in Providence received $599,000 for research on EMFs and early bone development, and Dr. Andrew Marino of the Louisiana State University Medical Center in Shreveport received $562,000 for work on the effects of 60 Hz magnetic fields on lymphoid phenotype. Descriptions of these and other RAPID grants, as well as other EMF research funded by NIEHS, are available in an NIEHS report issued in November, *Status of Health Effects Research Through Fiscal Year 1995: Project Summaries, Experimental Designs and Results*. It is available from: Naomi Bernheim, NIEHS, PO Box 12233, Research Triangle Park, NC 27709, Fax: (919) 541-4714....The NAS-NRC committee charged with reviewing RAPID research has completed its 1995 interim report, as required under the Energy Policy Act (see *MWN,* M/A95). "A great deal of care has gone into the development of the research strategy for the EMF RAPID program, and no glaring omissions in the program can be identified," the committee concluded. Chaired by Dr. Charles Bean of Rensselaer Polytechnic Institute in Troy, NY, the committee stressed that, "When attempting to replicate previous experiments, one must follow the original protocol with obsessive precision because, there being no accepted theory of why one should see any effect at all, one has no idea as to which steps are truly essential and which can be modified or bypassed."... Dan Vandermeer, NIEHS' RAPID program director, retired from NIEHS effective December 3 but will continue to work on RAPID under contract to the agency. "I have been asked by [NIEHS Director Ken] Olden to continue to manage several short-term, high-visibility projects," Vandermeer told *Microwave News,* noting that he will keep his seat on the interagency

committee and continue as its cochair. Vandermeer announced his plans at the November 16 meeting of the National EMF Advisory Committee (NEMFAC) in Palm Springs, CA....Joe Garcia, a commissioner of the Florida PSC in Tallahassee, made his first appearance as a member of NEMFAC at that meeting. He replaces John Coughlin, who resigned from the committee when he stepped down from the Wisconsin PSC (see *MWN,* M/A95)....And in a related development, Dr. Stephanie London has left the University of Southern California in Los Angeles to join NIEHS' intramural research program in Research Triangle Park. She said that she plans to continue her breast cancer study (see *MWN,* N/D94) and expand her work in the areas of breast cancer, melatonin and EMFs.

LEGAL NOTES

Shift-Work Compensation... On October 26, a Pennsylvania court ruled that shift-work maladaptation is a compensable injury under the state's workers' compensation system, according to an item in the November 20 *National Law Journal*. The worker claimed to have suffered from diarrhea, cramps, headaches and vomiting due to a disruption of his circadian rhythm.

MEDICAL APPLICATIONS

Prostate Shrinker... An FDA advisory committee has unanimously recommended approval for the Prostatron, a device that uses microwave energy to reduce an enlarged prostate gland. The unit operates at 1296 MHz and kills excess tissue, heating it to temperatures reaching 111°F. The Prostatron, made by the French company EDAP International and marketed in the U.S. by the Technomed Group of Cambridge, MA, is already in use in 25 countries. Treatment with the Prostatron costs about half as much as surgery, does not appear to have such side effects as impotence or incontinence, takes an hour to complete and does not require anesthetics. It is also considered to be more effective than drugs in reducing swollen tissue. The FDA panel asked EDAP to monitor the health of at least 100 patients over a five-year period following treatment with the Prostatron in order to ensure that there are no long-term complications. Repeated calls to Technomed requesting specific absorption rates (SARs) for the prostate gland and nearby tissue from the device were not returned. FDA approval of the device is expected. (See also *MWN,* J/A89.)

RESEARCH FELLOWSHIPS

Postdoctoral Openings...NIOSH's Division of Biomedical and Behavioral Sciences is seeking qualified researchers for *in vitro* and *in vivo* studies on EMF bioeffects. NIOSH explained that it is "unusual to find an individual with talents required for complete studies, i.e., having both physical (EMF) skills and biochemical/cellular physiology expertise." The research will be carried out as part of NIOSH's participation in DOE's and NIEHS' EMF RAPID program and will be administered by the NAS-NRC. The application deadline is January 15, 1996. For more information, contact: Dr. Russell Savage, MS-C22, NIOSH, 4676 Columbia Pkwy., Cincinnati, OH 45226, (513) 533-8289, E-mail: ras6@niobbs.em.cdc.gov.

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