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INSIDE...

Breast Cancer Risk Found for Female Electrical Workers

Women in electrical occupations had a greater chance of dying of breast cancer than those working at other jobs, according to a new study by Dr. Dana Loomis of the University of North Carolina (UNC), Chapel Hill. However, in a paper presented on November 4 at the Department of Energy's (DOE) annual meeting on the health effects of electromagnetic fields (EMFs), Loomis cautioned that while the results were "suggestive" of an EMF–breast cancer link, they were "far from conclusive."

Loomis reported that the female electrical workers had a statistically significant 40% higher mortality from breast cancer than women who worked in non-electrical jobs. For women aged 45 to 54, twice the expected number of breast cancer deaths was observed—this increase was also significant. Loomis's study is the first to show a link between occupational EMF exposures and breast cancer among women, though four previous studies have reported a similar association among men.

In an interview with *Microwave News,* Loomis said that the risk of breast cancer from EMF exposure could, in fact, be much greater. "We should expect a lot of dilution of the true risk," he said. He explained that because female breast cancer is a common disease and because so much of the population is routinely exposed to EMFs, one would expect many of those in nonelectrical jobs to have been EMF-exposed. "Conversely," Loomis added, "some of the women in electrical occupations might not have had any contact with EMFs. Each of these factors would lower the observed cancer risk." He also warned that, "In general,

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San Francisco Bans Cellular Antennas on School Property

Controversy over a proposal to put a low-power radio transmitter atop a public high school in San Francisco has prompted the city's school board to prohibit new mobile communications antennas on school property. The San Francisco Unified School District has also decided against renewing existing leases for four cellular antennas already on city schools. The board has not issued a formal policy, but school officials told *Microwave News* that the decision is final. "We didn't feel that the risk was warranted at all," said board member Leland Yee.

San Francisco is believed to be the first major city to embrace such measures. School officials nationwide are grappling with cellular transmitter safety issues (see p.11).

The board based its decision in part on the views of Dr. Raymond Neutra of the California Department of Health Services (DHS). "There would be no

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« Power Line Talk »

The EMF war is escalating and law firms that defend utilities are girding for battle. In November, **LeBoeuf, Lamb, Leiby & MacRae**, a leading utility defense firm, announced its new EMF litigation team—almost all of whom were hired away from **Crowell & Moring** in Washington, which made EMF law a big business. EMFs "will be an area of increased litigation for many of our clients," said Samuel Sugden, head of the utility practice at LeBoeuf, a 470-lawyer firm that represents nearly 40 utilities. **Tom Watson** of Crowell & Moring, who has defended EMF suits for more than 17 years, said the raid didn't hurt his firm much. "We did lose a staff scientist and an associate, but nobody with any partner-level experience," he said, referring to Dr. **H.B. Graves** and **Rob Manor**. "It's not a big event for us." But it does seem Crowell & Moring has had its share of difficulties lately. An article in the October issue of the *Electricity Journal* sheds some light on the politics of this business. Apparently, after San Diego Gas & Electric Co. (SDG&E) retained the San Francisco-based firm of O'Connor, Cohn, Dillon & Barr as trial counsel in the high-profile *Zuidema* case, Watson, who had been advising SDG&E during the early stages of the case, withdrew. According to the article, an observer covering the trial on behalf of Crowell & Moring wrote reports containing "negative characterizations of SDG&E's lawyers" that ended up in an Edison Electric Institute (EEI) advisory report to utility executives and attorneys. In response, SDG&E threatened to pull out of EEI unless it dropped Crowell & Moring as its EMF counsel. EEI denied receiving any threat but dismissed the firm, the article states. With LeBoeuf entering the field, some say there may not be any EMF business left over for other firms. According to Sugden, however, there is more than enough to go around. "If my perception of the volume of litigation is accurate, other firms will become involved," he said. **Tony Roisman**, a member of EMRCET, the Electromagnetic Radiation Case Evaluation Team, who is with the Washington law firm of Cohen, Milstein, Hausfeld & Toll, said that LeBoeuf's move has broad implications: "It signals the fact that more and more utilities are beginning to realize that this is serious business." Graves, who is based in Washington, is the environmental and health sciences director for the new LeBoeuf team. "Utilities have to track the science—as well as the public perception of the science—much more carefully," he said. **Mark Warnquist**, the team's lead attorney, who left Crowell & Moring several months before Graves and Manor, is based in Denver. Meanwhile, Crowell & Moring has hired Dr. Greg Jackson to replace Graves on its team, which has 10 members, including support staff, and is headed by Watson.

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Here is a progress report on the implementation of the **National EMF Health Research and Communications Program**: Members of the interagency committee that will set research priorities held their first meeting on November 15. Although President Clinton is by law supposed to appoint committee members—the President's busy schedule is often cited as the reason for the nearly one-year delay in assembling the committee—there is no official indication that he has in fact done so. Rather, his Office of Science and Technology Policy (**OSTP**), in order to get things moving and end the embarrassing delay, invited the nine participating agencies to send representatives to the Old Executive Office Building to hash out organizational details. The committee membership will be finalized and a chairperson appointed at the next meeting, which is scheduled for December 14, according to Cynthia Arnold-McKenna, an assistant to Dr. M.R.C. Greenwood, OSTP's associate director for science, who chaired the November meeting. The **DOE** is due to release its draft implementation plan for the EMF program ten days later, on Christmas Eve—exactly one year late. The **NIEHS** did not wait for DOE's plan, but began distributing requests for applications (RFAs) for research on cellular and *in vivo* effects of EMFs at the annual DOE research review in Savannah, GA, in early November. (Proposals are due by February 16, 1994, and awards are anticipated by September 30, 1994.) There has already been a huge response from the scientific community. "The phones are ringing off the hook," said **Dan Vander Meer**, one of the EMF program man-

New Jersey Ruling Derails Major Pennsylvania Power Line Project

Plans for a 268-mile, 500 kV transmission line in Pennsylvania have been dropped, handing a major victory to its opponents, who were concerned about EMF health risks.

As we went to press in early December, a decision by New Jersey's Board of Regulatory Commissioners (BRC) had derailed the project by ruling that it was an "expensive and risky venture" for General Public Utilities (GPU) and its Jersey Central Power and Light (JCP&L) subsidiary. The BRC was ruling on a long-term power purchase agreement between JCP&L and Duquesne Light Co., based in Pittsburgh, and the transmission line.

The proposed line had faced determined opposition from people who live near its route, including members of the York County Citizens' Action Group, based in Franklintown, PA, and Citizens Opposed to Unsafe Power, in Darlington, PA. The proposal was the subject of a series of hearings on EMF issues before the Pennsylvania Public Utilities Commission (see *MWN*, J/A92 and J/F93). But in the end, it was the New Jersey regulatory agency which killed the project. In a 3-0 decision on December 8, the BRC rejected an administrative law judge's recommendation that the project be allowed to proceed. "There was significant public and political opposition to the construction of the transmission line," the BRC stated in a press release, noting that without the line, "the entire project would have fallen through." The BRC argued that shorter-term power purchase options would better meet JCP&L's needs.

The line was to run from the Pittsburgh area to the Three Mile Island nuclear facility near Harrisburg, where it would connect with existing transmission facilities to reach New Jersey. GPU, in Parsippany, NJ, and its subsidiaries had invested $23 million in the failed project.

agers at NIEHS. Meanwhile, President Clinton signed into law on October 28 the energy appropriations bill that earmarks only $4 million, rather than the promised $6.5 million, for the first year of the five-year, $65 million national program—as well as $6 million for DOE's own program (see *MWN*, J/A93). On December 7, the DOE published its official solicitation for $4 million in matching funds from industry in the *Federal Register*, asking that contributions be made "as soon as possible." The DOE stated that no portion of the government's $4 million will be spent until at least half of industry's share is in hand. EEI's **Rick Loughery**, who is coordinating the utilities' contributions, said that "checks are starting to come in," and that, "We are confident that at least the $2 million needed to start the program will be transferred to the DOE by February." But there are still a few sticking points: First, it is not yet known how much of the $8 million the DOE will give to NIEHS for health research. Second, some utility representatives are now saying that their companies are only responsible for two-thirds of the matching funds—it is not clear where this idea originated. The utilities have pledged $21.67 million and the National Electrical Manufacturers Association has pledged $2 million for the program. The utilities want other companies and trade groups to chip in the remaining $8.83 million required to meet the nonfederal commitment of $32.5 million. At the second meeting of the EMF Program's advisory committee, held immediately following the DOE review in Savannah, committee member **Kate Brown Maracas** of the Salt River Project in Phoenix stressed the need for non-utility money. "This is not a utility issue—it's a health issue," she said. Speaking from the audience, **Madalyn Cafruny** of the American Public Power Association supported Maracas: "I think that everyone has always realized that [the electric utilities] hadn't made the 100% commitment." At that point, **Anne Strauss**, an observer from the New York Power Authority in New York City, tried to put the issue to rest: "There's absolutely no chance that every dollar of the [federal] appropriation won't be matched," she told the committee. In early December, Loughery was also reassuring. "There is no question that the $4 million will be matched," he said. Even so, one question does remain: What will the utilities do if Congress, as expected, fully funds the program in the next few years, and no one comes forward to write a check for the more than $8 million shortfall?

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Utilities should not be the only ones preparing to defend themselves against EMF lawsuits—**insurance companies** must also pay heed. "Insurers should begin to take preemptive measures" to lessen their potential liability in such cases, according to an October 28 memo to the insurance industry by the New York City-based law firm of **Kroll & Tract**. "Utility companies have a huge stake in pursuing EMF claims against their insurance carriers and in establishing favorable legal precedent in the courts," the 11-page memo explains. It focuses in part on the recent **Criscuola** case (see below), which it views as a sign of things to come. Even if a carrier is not ultimately responsible for an award, "vast resources may be spent to reach that determination," the memo notes. Kroll & Tract, a leading insurance industry defense firm, urges insurers to examine their policies—and offers its services in dealing with this "newly developing area of the law." The law firm's advice has gained a wider audience with a November 15 article in *National Underwriter*, "Insurers Warned To Lower Exposure to EMF Liabilities," which discusses it in detail.

New York Landowners Win Property Value Judgment —But How Much Will They Collect?

A recent decision by New York's highest court allows landowners to seek compensation for losses in property value due to perceived health risks from power line EMFs—whether or not those risks are real. The ruling breathes new life into 11 related cases still pending in the state, and could prompt similar claims in New York and elsewhere across the country.

On October 12, the New York Court of Appeals held that Joseph and Dominick Criscuola of Downsville, NY, have the right to sue for damages from the New York Power Authority (NYPA), which built a 345 kV power line on their property. Judge Joseph Bellacosa wrote, "Whether the danger is a scientifically genuine or verifiable fact should be irrelevant to the central issue of its market value impact."

The Criscuola brothers' claim was originally filed with more than 50 others in connection with NYPA's Marcy-South line. After a trial that attracted national attention, the NYPA was victorious. The Criscuolas lost their first appeal to the Appellate Division of the New York State Supreme Court last October, but won their final appeal to the state's highest court (see *MWN*, M/A87, S/O89, J/F90, N/D92 and S/O93). The case has now been returned to the New York Court of Claims, which will determine the amount of an award, if any. A new trial date has not been set.

The ruling brings New York in line with several other states —including California, Florida and Kansas—which have already decided that landowners need not show that there is a reasonable basis for fear of EMFs. While some lawyers say New York's decision could have an impact in other states, others are dubious.

"Criscuola will considerably embolden litigants around the country seeking to assert property damage claims for power lines, microwave towers and other feared facilities," said Michael Gerrard of the New York City firm of Berle, Kass & Case. He said that the decision could have a far-reaching effect because the New York Court of Appeals is highly regarded by other states. Gerrard, who edits his firm's newsletter, *Environmental Law in New York*, wrote an article about the Criscuola case with another partner at the firm, Stephen Kass, which appeared in the *New York Law Journal* on October 22.

On the other hand, Carlos Alvarez of Hopping, Boyd, Green & Sams in Tallahassee, FL, told *Microwave News* that the importance of New York's decision has been inflated: "I don't see what the big deal is." Similar rulings in other states have had little impact on utilities—or on people's decisions to file claims, he

Legal Notebook

Third Cancer Suit Set for Trial Next Spring

Lawyers for the plaintiff will seek to establish a link between magnetic fields and leukemia when the third EMF personal injury case goes to trial in New Jersey next spring. John Altoonian, who blames his illness on EMFs from a power line owned by the Atlantic Electric Co., said that he refused an offer by the utility to settle for $400,000.

In October 1990, at the age of 43, Altoonian was diagnosed with chronic myelogenous leukemia, two years after he moved into a house he built in West Wildwood, NJ, where an underground 69 kV power line operated by Atlantic Electric ran through the backyard. Altoonian told *Microwave News* that he was exposed to high EMFs when he built the house and the deck, which was constructed right over the line. Magnetic fields measured 300 mG in the yard, 60 mG on the deck and 29 mG in his bedroom, he said.

His lawyer, William Wolf of the Lakewood firm of Bathgate, Wegener, Dugan & Wolf, filed the suit against the Pleasantville-based utility in November 1991, claiming that it was liable for negligence, nuisance and trespass. The trial will begin on April 18 in the New Jersey Superior Court in Cape May County.

Altoonian said that in May 1992, after Atlantic Electric tried to settle, he got a court order to have the line moved. He said that the utility had "made a mistake" when it built the power line there—and not along a nearby right-of-way—20 years ago. Atlantic Electric ultimately paid $500,000 to have the line moved about 12 feet away, Altoonian said. EMFs in his house now measure between 4 and 8 mG.

Atlantic Electric's lawyer, Gerald Corcoran of Megargee, Youngblood, Franklin & Corcoran in Pleasantville, declined to comment. Lois Jennings, a spokeswoman for the utility, said only that, "We believe [Altoonian's] illness is not related to the situation he claims it is related to."

Wolf has engaged the following experts: Dr. Frances Arena, American Board of Internal Medical Oncology, Great Neck, NY; Richard Clapp, JSI Center for Environmental Health Studies, Boston; Dr. Stephen Cleary, Virginia Commonwealth University, Richmond; Dr. Andrew Marino, Louisiana State University, Shreveport; Joseph Martin, Martin, Benner & Associates, Lawrenceville, NJ; Samuel Sero, Smith & Robson, Pittsburgh; Dr. Roger Wilk-Raftery, psychologist, Manasquan, NJ; and Dr. Peter Wright, Poly Clinic, Seattle.

Jordan Trial Postponed

The trial of Nancy Jordan's case against two Georgia utilities has been postponed until next year. A new date has not been set.

The case was to have opened in Georgia Superior Court for Douglas County in Douglasville on November 29, but Dr. Peter Wright, one of Jordan's expert witnesses, became too ill to attend, according to Jordan's attorney, Bruce DeBoskey of Silver & DeBoskey in Denver. DeBoskey said that he elected to videotape Wright's testimony and use it at a later trial rather than begin without him. Wright testified for the Zuidemas in their case against the San Diego Gas & Electric Co. last spring (see *MWN*, J/A91, N/D92 and M/J93).

DeBoskey will also use videotaped testimony by Dr. David Carpenter, dean of the School of Public Health at the State University of New York, Albany, who would not have been able to appear at the November trial. Carpenter served as executive secretary of the New York State Power Lines Project's scientific advisory panel, which sponsored David Savitz's landmark study of childhood cancer and EMFs (see *MWN*, N/D86 and J/A87).

James Orr of the Atlanta firm of Sutherland, Asbill & Brennan, who is representing Oglethorpe Power Co., one of the defendants, said that he believes the delay will have no effect on the case.

Jordan, whose suit was filed on July 24, 1991, claims that her non-Hodgkin's lymphoma was caused by EMFs from power lines owned by Oglethorpe and Georgia Power Co. (see *MWN*, S/O91, M/J92, J/A92 and S/O93).

DC Sued After Denying Power Plant Permit

The District of Columbia (DC) and six of its officials face an $80 million lawsuit after denying a building permit to replace a power plant at Georgetown University. The officials cited their concerns over the possible health effects of EMFs from power lines leading from the plant. A trial date has not been set.

Dominion Energy Inc. of Richmond, VA, and TriStar Ventures Corp., a subsidiary of the Columbia Gas System Inc. of Wilmington, DE, filed the suit on November 1, claiming that district officials conspired to delay and ultimately destroy their project. The companies alleged that the officials ordered unnecessary reviews and made "intentionally misleading statements" about the proposed plant, which had met all of the building requirements for health, safety and environmental impacts, including those from EMFs—according to the complaint, which was filed in U.S. District Court in DC.

The six officials, who include the mayor of the nation's capital, declined to comment on the pending litigation. But an October 13 letter to the plant's project manager from Hampton Cross of the district's Department of Consumer and Regulatory Affairs states that, "Given this potential environmental threat to the citizens of our city, and given the mission of this department to protect the health, safety and welfare of the citizens of the District of Columbia, I must therefore deny environmental approval for the pending building permit application...until more is known about the possible health effects of EMFs." Cross is one of the officials named as defendants in the suit.

Under the plan, the DC-based Potomac Electric Power Co. (PEPCO) would purchase electricity generated by the plant, which would also provide steam for the Georgetown campus. The project would entail reactivating overhead and buried power lines—which have been idle since the mid-1980s—to feed the electricity from the plant to a PEPCO substation, according to utility spokeswoman Nancy Moses. The 69 kV overhead line runs near 80 houses in the Palisades section of the district, she said.

said. Alvarez defended Florida Power & Light Co. in the suit that led to the state supreme court's 1987 ruling on the issue, which is consistent with New York's (see *MWN*, S/O86).

Tom Watson of the firm of Crowell & Moring in Washington, who handled the EMF part of the original Marcy-South litigation for the NYPA, said that there is a big difference between a judge deciding that landowners may be compensated and their actually being paid. "I think we have to look at the practical effect of a decision like this, which is measured in terms of the damages recovered." Watson said that he doubts that the Criscuolas will recover damages, since landowners in previous eminent-domain cases have not been able to establish that fear of EMFs

actually decreases market value (see *MWN*, S/O93).

New York City attorney Michael Rikon, who is representing the Criscuolas, maintained that he will be able to show that the value of his clients' property has been diminished as a result of the power line. Rikon is asking for $50,000 in damages from the New York City-based NYPA. He explained that the figure is based on the value of the Criscuolas' property at the time the easements were taken in 1986. The NYPA used nine of the Criscuolas' 100 acres for the line and Rikon said that it will not be difficult to prove that, even then, people's fears about power line EMFs affected land sales. At the original trial in 1988, a real estate appraiser testifying for the landowners said that fear of cancer could lower property values near the Marcy-South line by up to 90% (see *MWN*, N/D88).

There are suggestions that concerns about EMFs are widespread. For instance, on July 11, 1993, the *New York Times* ran a story under the headline "Power Lines Raise Fears in Home Buyers," which reported that, "The fear has begun to affect the real estate market in the metropolitan area, and indeed, all over the country wherever houses are in close proximity to power lines." On December 8, as we went to press, the *Wall Street Journal* published an article, "Power Lines Short-Circuit Sales, Homeowners Claim."

The NYPA has raised the issue of whether claims of losses in property values can be firmly substantiated. "The big question is, can the plaintiffs support their claim with hard market data," said Arthur Cambouris, NYPA's assistant general counsel. "It's not good enough to have experts opine and say that they have read articles." At their Court of Claims hearing, the Criscuolas will need to produce "credible, tangible evidence" that fear of EMFs had an adverse impact on market value, according to Judge Bellacosa. The utility argues that property values around the Marcy-South line have not been affected. A study of land sales found that there was "no discernible or measurable difference" in sales prices for properties close to Marcy-South and those much farther away, according to an NYPA statement.

At least 35 of the 50 or so original plaintiffs have settled their cases out of court. But there are still 11 claims like the Criscuolas' pending before a New York Court of Claims judge in Binghamton. As a result of the recent decision, the landowners can seek consequential damages—that is, damage to the value of the property outside of the easement—according to Michael Gurda of Gurda, Gurda & Smith in Middletown, who is representing the claimants. Gurda said that another benefit of the decision is that now, property owners "will not need to spend lots of money" retaining expert witnesses to testify about the health effects of EMFs.

Reiter Points to a Different Way of Looking at Cancer Clusters

Epidemiologists have traditionally balked at combining different types of tumors when investigating cancer clusters, arguing that a single toxic agent can only be responsible for a single type of cancer.

Now Dr. Russel Reiter, long a proponent of the key role played by the hormone melatonin, believes that a variety of different cancers may be promoted by magnetic fields. In a paper presented at the Department of Energy meeting in Savannah, GA, in early November, Reiter explained that "the suppression of melatonin by magnetic fields could result in a higher incidence of cancer in any tissue." This effect could clear up "one of the mysteries of the magnetic field/cancer issue," that is, "the large number of different tumor types that have been reportedly increased," he suggested.

Researchers in Reiter's lab at the University of Texas Health Science Center in San Antonio have shown that melatonin is a very potent antioxidant and can therefore protect DNA against damage caused by free radicals.

If Reiter's intriguing hypothesis is correct, the analysis of cancer clusters will change completely. For example, in its report on the cancer cases at the Slater School in Fresno, CA, the California Department of Health Services argued that when evaluating a cluster, it is important to determine "whether the cancers are of the same type or of biologically similar types" (see *MWN*, J/A93). For a more detailed look at Reiter's hypothesis and experimental results, see the following papers from his group: *Cancer Letters, 70,* pp.65-71, 1993; *Endocrine Journal, 1,* pp.57-60, 1993; and *Journal of Pineal Research, 14,* pp.151-168, 1993.

Pooled Nordic Data Support Childhood Leukemia Risk

An analysis of the pooled data from three recent Scandinavian epidemiological studies adds new weight to the link between EMFs and childhood leukemia.

In a letter in the November 20 issue of *The Lancet,* the authors of the Danish, Finnish and Swedish studies concluded that, "Our results show that the three Nordic studies taken together support the hypothesis that exposure to magnetic fields of the type generated by transmission lines has some etiological role in the development of leukemia in children." But, they added, "For nervous system tumors and all childhood cancer the conclusion is less clear."

In their letter, Dr. Anders Ahlbom and Maria Feychting of the Karolinska Institute in Stockholm, Dr. Jørgen Olsen of the Danish Cancer Society, Dr. Pia Verkasalo of the University of Helsinki and their coworkers reported a significant doubling of the risk of childhood leukemia for long-term residential exposures greater than 2 mG.

The combined analysis also found a nonsignificant 50% increased risk for brain tumors and other types of central nervous system cancers. There was no increased risk for lymphoma. For all cancers combined, there was a 30% increased risk, which was just short of significance.

In a telephone interview from his office in Stockholm, Ahlbom said, "Our new analysis was an effort to overcome the small number of cases in each of the individual studies." He added that, "The results indicate a consistent leukemia risk over the three studies." The original Swedish study had seven leukemia cases. Combining the studies brought the total to 13.

Ahlbom and Feychting had originally found a nearly threefold, significant increase in childhood leukemia for long-term residential exposures above 2 mG (see *MWN*, S/O92). The Danes reported a significant fivefold increased lymphoma risk for such exposures above 1 mG, and a comparable but nonsignificant increased leukemia risk for exposures above 4 mG (see *MWN*, N/D92). In contrast, the Finns did not obtain any significant results, although they found a nonsignificant 50% greater incidence of leukemias as well as all cancers (see *MWN*, S/O93).

Despite some differences in design, the three studies were planned in concert with a view towards pooling the data. In addition, researchers in each of the studies estimated magnetic field exposures using historic current loads in the power lines, a novel approach not used in previous studies.

IEEE Weighs the Adoption of the ICNIRP ELF Standard

A subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) has taken a step towards adopting the guidelines for exposures to extremely low frequency (ELF) EMFs endorsed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This standard, first adopted in 1989, limits magnetic field exposures for the general public and for workers to less than 1,000 mG and 5,000 mG, respectively. At present, there are no ELF EMF health standards in the U.S.

At a November 1 meeting of subcommittee 3 (SC3) of Standards Coordinating Committee 28 (SCC28) on Non-Ionizing Radiation, Joseph Koepfinger of Duquesne Light Co. in Pittsburgh put forth a motion asking for a formal vote on whether to adopt the ICNIRP limits. He made the motion, he told *Microwave News*, because, "It will take six to eight years to develop a [new] standard." He pointed out that the subcommittee had already been deliberating for a year and a half and nothing had happened. "The ICNIRP standard is a straw man," he said. "This way we'll find out what the problems are." Koepfinger, a member of the IEEE Standards Board, stressed that he was not speaking for Duquesne Light.

The vote touched off a storm of protest within the subcommittee because its own working group on epidemiology had only just begun a review of the literature on EMFs and cancer and because many members of the subcommittee were absent when the vote was taken. The SC3 meeting was held in Savannah, GA, at the same time as the Department of Energy's annual review of EMF health research.

Dr. Richard Lovely of the Battelle Pacific Northwest Labs in Seattle complained that the standard was being "railroaded" through the subcommittee. And Dr. Paul Héroux of McGill University in Montreal, Canada, an observer at the meeting, said, "I was stunned—they are voting before the epidemiologic review has been done."

Koepfinger's motion passed easily, by a vote of 21-3. Dr. Dennis Hadlock of Science Applications International Corp. in Germantown, MD, explained why he had voted with Koepfinger: "I don't see what the danger is in adopting something on an interim basis that has been researched by ICNIRP." He added that, "I don't think that the epi report will tell us anything that will really help." The three negative votes were cast by Dr. Thomas Budinger of the University of California, Berkeley, the chair of SCC28; Dr. Gregory Lotz of the National Institute for Occupational Safety and Health in Cincinnati; and Battelle's Lovely.

Recent Review Articles

• H. Berg, "Electrostimulation of Cell Metabolism by Low Frequency Electric and Electromagnetic Fields," *Bioelectrochemistry and Bioenergetics, 31*, pp.1-25, 1993.

• N. Guzelsu and W.R. Walsh, "Piezoelectric and Electrokinetic Effects in Bone Tissue–Review," *Electro- and Magnetobiology, 12*, pp.51-82, 1993.

• *Journal of Cellular Biochemistry, 51*, 1993. Included are articles by: Ross Adey on "Biological Effects of [EMFs]" (pp.410-416); Ivan Cameron and coworkers on "Environmental Magnetic Fields: Influences on Early Embryogenesis" (pp.417-425); Reba Goodman, Yuri Chizmadzhev and Ann Henderson on "[EMFs] and Cells" (pp.436-441); Jerry Phillips on "Effects of [EMF] Exposure on Gene Transcription" (pp.381-386); Russel Reiter on "Static and [ELF EMF] Exposure: Reported Effects on the Circadian Production of Melatonin" (pp.394-403); and James Weaver on "Electroporation: A General Phenomenon for Manipulating Cells and Tissues" (pp.426-435).

• J. Lee et al., *Electrical and Biological Effects of Transmission Lines: A Review*, Portland, OR: Bonneville Power Administration (BPA), 1989 (revised 1993), 107 pp. For a copy of the report, contact: BPA, PO Box 3621, Portland, OR 97208, (800) 622-4520. (BPA plans to revise the report completely over the next year.)

• H. Matsumoto, ed., *Modern Radio Science: 1993*, New York: Oxford University Press, 1993, 249 pp. Included is an article by Ross Adey on "Electromagnetics in Biology and Medicine" (pp.231-249). Available for $37.50 from: Oxford University Press, 2001 Evans Rd., Cary, NC 27513, (800) 451-7556.

• J. McCann et al., "A Critical Review of the Genotoxic Potential of [EMFs]," *Mutation Research, 297*, pp.61-95, 1993.

• T. McManus, *[EMFs]: A Review of Recent Developments in Research and Public Attitudes, and the Response of Authorities to These Developments*, Dublin, Republic of Ireland: Irish Department of Energy, 1992, 267 pp. For a copy of the report, contact: Dr. Thomas McManus, Irish Department of Energy, 25 Clare St., Dublin 2, Republic of Ireland, (353+1) 715233.

• M. Misakian et al., "Biological, Physical and Electrical Parameters for In Vitro Studies with ELF [EMFs]: A Primer," *Bioelectromagnetics, Supplement 2*, pp.1-73, 1993.

• J.C. Murphy et al., "Power Frequency [EMFs]: A Review of Genetic Toxicology," *Mutation Research, 296*, pp.221-240, 1993.

• A. Sheppard, *Epidemiologic and Laboratory Research on the Potential Human Health Effects from Exposure to Power Frequency [EMFs]*, St. Paul, MN: Minnesota Environmental Quality Board, August 1993, No.PB 94114485, 71 pp. Available for $19.50 from: National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161, (800) 553-6847.

• W.R. Stone, ed., *Review of Radio Science: 1990-1992*, New York: Oxford University Press, 1993, 814 pp. Included are articles by: Stephen Cleary on "Biophysical Mechanisms of Interaction" (pp.717-735); J.W. Hand and R. Cadossi on "Therapeutic Applications of [EMFs]" (pp.779-796); James Lin on "Diagnostic Applications of [EMFs]" (pp.771-778); Lars-Erik Paulsson on "Human Exposure Assessment and Dosimetry" (pp.797-814); and a group from the U.K.'s NRPB on "Biological Effects of [EMFs] and Radiation" (pp.737-770). Available for $98.00 from: Oxford University Press, 2001 Evans Rd., Cary, NC 27513, (800) 451-7556.

Robert Curtis, the director of the Occupational Safety and Health Administration's Health Response Team in Salt Lake City, voted for the motion to "try to get things moving." But, he explained to *Microwave News*, "People ought to be informed when they are working in fields which result in whole-body exposures of more than 50 mG so they can adopt a strategy of prudent avoidance."

In an interview, Dr. John Bergeron of General Electric in Schenectady, NY, cochair of SC3, said that the members of the subcommittee would now be asked to vote on the adoption of the ICNIRP guidelines. "It gets the discussion going while the epidemiologists are working," he said, noting that, "At the moment, we are paralyzed" due to the ambiguous results of the epidemiological studies. The SCC28 review of the epidemiological literature is being sponsored by the Department of Defense.

Even before the meeting, Dr. Asher Sheppard, a consultant based in Redlands, CA, protested to the IEEE the simultaneous scheduling of the SC3 and DOE meetings, which forced him to miss the session. He wrote that he was "outraged" by the conflict and noted that it "violates the integrity of the standards process and may undermine confidence in its work."

Indeed, a number of SC3 members were attending the DOE scientific presentations at the time the SC3 vote was taken. Sheppard, Lovely and Dr. Mary Ellen O'Connor of the University of Tulsa, OK, president of the Bioelectromagnetics Society, are in the process of drafting a letter to the IEEE citing their objections to the scheduling of the subcommittee meeting.

ICNIRP adopted its exposure guidelines on an interim basis in 1989 and reaffirmed them earlier this year when it reiterated its position that research to date is inadequate to conclude that EMFs pose a cancer risk (see *MWN*, M/J89, J/F90 and M/J93). The guidelines, which seek to limit EMF-induced body currents, also specify standards for exposures to electric fields.

California PUC Issues Rules, Utilities Plan Mitigation Steps

The California Public Utilities Commission (PUC) has adopted an interim EMF policy that asks utilities to eliminate "unnecessary" exposures from new power lines if the mitigation costs no more than 4% of a project's total budget. Whether to reduce EMFs on existing lines will be addressed at a later date. The November 2 decision commits $7 million for spending on EMF research and education in the state. The policy also requires:

- that PUC staff hold public workshops to help utilities develop guidelines that specify techniques for reducing EMFs;
- that utilities develop a consistent policy for measuring EMFs in the workplace and at home, and that customers receive this service free of charge;
- that the Department of Health Services (DHS), which will manage the research and education programs, should determine how utilities, ratepayers, local government and the public can play a role in developing the programs;
- that utilities should contribute to experimental research conducted under the five-year, $65 million national EMF research and communications program—but does not specify how much they should contribute.

The order concludes a process that began nearly three years ago when the PUC opened its investigation of EMF health effects. A 17-member PUC consensus group made up of utility representatives, health officials and members of citizens groups and labor unions was charged with developing recommendations for interim EMF policies. The group issued its report in March 1992, and PUC Judge Michael Galvin presented a policy proposal last summer based on the group's conclusions (see *MWN*, N/D91, M/A92 and J/A93).

California is following the lead of other states in requiring EMF mitigation, though its plan is the most detailed and comprehensive to date. Two years ago, Wisconsin was the first state to order utilities to use low EMF designs in new or upgraded facilities (see *MWN*, J/F92 and M/J92). Soon afterward, Colorado asked utilities to design and locate facilities using methods to mitigate "involuntary" exposures to the public (see *MWN*, M/J92).

While some question the 4% cost cap specified in California's new policy, utilities say that they can mitigate magnetic fields significantly—in some cases up to 60%—at minimal expense. "A lot can be done to cut EMFs [by spending] on the order of 1 or 2%," said Joe Thompson, an engineer with the Los Angeles Department of Water and Power, who was part of the PUC consensus group.

Thompson said that the utility had reduced EMFs from 57 mG to 27 mG at the edge of a right-of-way (ROW) of a 500 kV line for little more than 1% of the project's cost. This was accomplished by raising parts of the line and by extending the ROW along a small section, he said.

In his July proposal to the commission, Galvin recommended that utilities be required to reduce EMFs by at least 4%. The PUC rejected this formula in its November order: "It would be inappropriate to adopt or set a specific numerical standard until there is a scientific basis for doing so."

Martha McNeal, EMF program director at the Pacific Gas & Electric Co. (PG&E) in San Francisco, another member of the consensus group, said that PG&E had originally proposed miti-

Still Skeptical of Cancer Risk in U.K.

Updating its 1992 report, an advisory group of the U.K.'s National Radiological Protection Board (NRPB) has concluded that evidence for an EMF–cancer link is very weak.

The group reviewed the Scandinavian occupational studies and reiterated its position: "Whether the hazard, if one exists, is due to exposure to [EMFs] or to some chemical associated with the work is impossible to decide at the present."

The group also evaluated the Danish and Swedish residential studies (see p.5) and stated that, while they were better than previous efforts, "Any evidence for an association between residential exposure to [EMFs] and cancer was weak and based on very small numbers of cases."

In its 1992 report, the group, chaired by Sir Richard Doll, saw "no firm evidence" of a cancer risk from power frequency EMFs but urged further study (see *MWN*, M/A92). The update, which appears in *Documents of the NRPB, 4*, pp.65-69, 1993, was prepared by the NRPB's Dr. J.W. Stather. The NRPB has also released its "advice" on human exposures to EMFs and RF radiation; details in our next issue.

gating EMFs by at least 15%, because it is a "significant" reduction that can be achieved for less than 4% of a project's cost. She said that the utility supports the 4% cost cap, calling it "a low, responsible financial commitment."

Citizens groups are less enthusiastic about the new policy. Ellen Stern Harris of the Fund for the Environment in Beverly Hills said that utilities should be required to spend whatever it takes to mitigate EMFs. She called the 4% cost cap "an effort at appeasement which should have been rejected by the commission." She did say that she was "hopeful" about PUC's decision to consider reducing EMFs on existing power lines. "There are far more people affected by these lines than by proposed ones," she said. Under the order, people will have 60 days after the ruling goes into effect on December 1 to comment on whether EMFs should be cut on existing lines.

Shirley Linde, who chairs the National EMF Advisory Committee and Citizens for Safer EMFs, a citizens group in Beverly Hills, said that, "At the very least they could have given interim relief to people [who live in] extraordinarily high fields." Linde said that she supported PUC's decision not to charge customers for EMF readings in their homes and workplaces. Linde and Harris were also members of the consensus group.

Diana Brooks of PUC's Division of Ratepayer Advocates said that overall the new policy is "a step in the right direction." She said that she would have liked the commission to authorize a "particular dollar amount" for contributions to the national EMF research and communications program instead of leaving it up to the utilities. In his July order, Galvin had proposed a maximum $4.1 million in contributions to the program.

The new policy calls for more than $7 million for EMF research and education in the state. This includes a four-year, $5.6 million nonexperimental and administrative research program and a four-year, $1.5 million education program. Dr. Raymond Neutra of the DHS in Emeryville, who will manage the programs, told *Microwave News* that the programs will focus on policy analysis, literature reviews, mitigation, epidemiology and exposure assessments.

The PUC's workshops—which are intended to involve the public in the utilities' task of writing EMF guidelines—will cover design, maintenance and operating practices to reduce EMFs. The utilities will also decide which projects do not need to incorporate low EMF designs, such as a new power line in a rural environment. PUC approval of the guidelines is not required.

Copies of PUC's 67-page policy on EMFs, *Decision 93 11 013*, cost $13.40 each, plus tax, from: PUC, Central Files, 505 Van Ness Ave., San Francisco, CA 94102, (415) 703-2045.

New Jersey Seeks 50% Reduction from New High Voltage Lines

A New Jersey panel has issued a draft of proposed rules recommending that EMFs from new power lines of at least 100 kV be cut by 50%. The group is looking at mitigation techniques that "may result in almost no additional cost," according to Deborah Wenke, a member of the state Advisory Committee on Non-Ionizing Radiation, which announced the proposal on October 6.

Wenke said that the advisory group is also concerned about distribution lines, but will most likely address them at a later date. Dr. Daniel Wartenberg of the Environmental and Occupational Health Sciences Institute in Piscataway, NJ, who chairs the advisory committee, told *Microwave News* that he hopes to issue final recommendations by January 19 to the state Commission on Radiation Protection, which will then decide whether to adopt them.

Citizens groups support the advisory committee's efforts, but say that requiring reductions on 100 kV lines will not accomplish very much. Paul Welch of the Committee for Safe Power Lines in Little Silver figures that, at most, one such line is built in the state each year. "More people are affected by distribution lines," he said.

Jersey Central Power & Light spokeswoman Donna Nowcid said that the Morristown-based utility is still evaluating the draft proposal and that she could not comment.

HIGHLIGHTS

Neurological Complaints near Swiss Shortwave Transmitter

Living near a shortwave transmitter can lead to complaints of sleep disorders, reduced concentration, high blood pressure and a general feeling of anxiety, according to a new Swiss government survey. Because there are so few epidemiological studies on the chronic effects of exposure to low-level radiofrequency (RF) radiation, confirmation of these results—detailed follow-up investigations are being planned—could force a major reevaluation of health standards.

A maximum of three 6.1-21.8 MHz transmitters with output powers of 150 kW operate simultaneously at the Schwarzenburg complex, approximately 20 km south of Bern, according to Robert Coray, an expert on electromagnetic compatibility and bioelectromagnetics at Swiss Telecom PTT (Post, Telephone, Telegraph) in Bern. The facility is owned by Swiss Telecom PTT and is programmed by Swiss Radio International.

Dr. Theodor Abelin of the Institute for Social and Preventive Medicine at the University of Bern and Dr. Heidi Howald of the Bern Institute for Industrial Medicine, who jointly ran the health study, asked 215 people, divided approximately equally among three zones around the Schwarzenburg station, to keep a diary of how they felt for an average of 25 days. The researchers tried to control for possible bias among those who knew the transmission schedules by periodically changing the direction of the signals and thereby varying the RF exposures.

The RF radiation levels were measured by Swiss Telecom PTT with the assistance of the Electromagnetics Group at the Swiss Federal Institute of Technology in Zurich, and the population's weighted 24-hour average exposures were estimated.

(The power densities below are the far-field equivalents.) The villagers who live within 900 meters of the transmitters were exposed to an average of 1.4 $\mu W/cm^2$, with a minimum and maximum of 21 nW/cm^2 and 164 $\mu W/cm^2$, respectively. Those living more than 900 meters from, but within 1.5 km of, the transmitters were exposed to 54 nW/cm^2 (4.9-300 nW/cm^2) and those who are more than 4 km away were exposed to 0.54 nW/cm^2 (0.4-0.8 nW/cm^2).

Villagers living close to the station reported more subjective health complaints than those living over 4 km away.

Coray told *Microwave News* that the planned follow-up studies include blood pressure and melatonin measurements in those exposed, melatonin assays of cows near the antennas and surveys of 50 Hz EMFs from power lines and substations. The health of children who attend a school near the transmitters will also be compared with that of youngsters at a school further away. Coray said that melatonin levels would be measured in about 40 people who live near the complex, and in 20 controls.

The complaints from those who live near the facility are similar to those reported by workers exposed to RF and microwave radiation on the job. For instance, in their classic 1976 text, *Biological Effects of Microwaves*, Drs. Stanislaw Baranski and Przemyslaw Czerski wrote: "The chronic overexposure syndrome is characterized by subjective complaints consisting of headaches, irritability, sleep disturbances, weakness, decrease of sexual activity (libido), pains in the chest and general ill-defined feelings of ill-being."

The Swiss study is one of the first epidemiological studies to investigate the health of people living near radio and TV transmitters. Indeed, a recent National Research Council–National Academy of Sciences report on the U.S. Air Force's Ground Wave Emergency Network (GWEN) concluded that the communications system, operating at 150-175 kHz, would have a minimal health impact; that judgment was based in part on the absence of complaints among those living near European low-frequency radio transmitters (see *MWN, M/J93*).

URSI Seeks Health Research on Wireless Communications

The resolution reprinted below was adopted by Commission K on Electromagnetics in Biology and Medicine at the International Union of Radio Science (URSI) meeting in Kyoto, Japan, in September. It was later ratified by the URSI Council, according to Commission K chairman Dr. Paolo Bernardi of the Department of Electrical Engineering at the University "La Sapienza" in Rome, Italy. Commission A is on electromagnetic meteorology. Commission B is on fields and waves.

Commission K, *Considering,*

(a) That there is a rapid development of new technologies such as wireless local area networks (LANs), cellular phones, low-earth-orbiting satellites (LEOS), communication networks (e.g., Iridium), personal communication services (PCS), cordless telephones and other devices, and their wide spread is anticipated;
(b) That there exists scientific uncertainty about potential impact of electromagnetic fields from wireless communication on human health;
(c) That there is public concern about health effects of all electromagnetic devices;

Recommends that broad-based research programs should be established nationally and internationally to address the key issues, namely:
1. What are the interaction mechanisms of weak electromagnetic fields of various characteristics with living systems;
2. What biological effects and particularly potentially harmful effects are caused, and under what exposure conditions;
3. How to evaluate the exposures through proper measurements and dosimetric modeling.

The Commission gratefully acknowledges the promised support of Commission A in the area of the measurements and Commission B in the area of the dosimetric modeling.

Military on Nonlethal Weapons: 'A Very Attractive Option'

Most research into nonlethal weapons takes place under a veil of secrecy, but now and then some clues about it do emerge —if only in the program notes for a research conference.

About 400 scientists who are developing nonlethal technologies—such as radiofrequency (RF) radiation, electromagnetic pulse (EMP), extremely low frequency (ELF) fields, lasers and chemicals—exchanged ideas at a classified meeting hosted by the Johns Hopkins University Applied Physics Lab in Laurel, MD, November 16-17. Presentations ranged from discussions of high-power microwaves (HPM) to a report on "sticky foams," which are proposed as a way of stopping enemy troops.

Dr. Clay Easterly of Oak Ridge National Lab in Oak Ridge, TN, led a session on the use of ELF EMFs. "My major point was that there seem to be some biological sensitivities or responses [to ELF fields] that could in the future be useful for nonlethal technology," Easterly told *Microwave News*. Noting that the conference was closed to anyone without a security clearance, he said he could not discuss the specific effects he referred to in his talk. But he emphasized that information in the open literature can be applicable: "There seem to be some phenomena not associated with thermal effects that could be useful."

Easterly said that, while the military is primarily interested in the use of non-ionizing radiation to disable enemy electronics, his presentation dealt with the possibility of developing measures that would affect people.

Dr. George Baker of the Defense Nuclear Agency in Washington titled his paper "RF Weapons: A Very Attractive Nonlethal Option." But it is difficult to know, based on unclassified information, whether or not this "option" has ever been used. Reports have circulated that the U.S. military has EMP and HPM weapons in its arsenal and that these may have been used during the Gulf War (see *MWN*, M/J92 and S/O92). There were also allegations that non-ionizing radiation was used against the women's peace activist encampment at Greenham Common in the U.K. in the mid-1980s (see *MWN, S/O86*).

The conference, sponsored by Los Alamos National Laboratory in New Mexico, focused on both military and law enforcement applications for nonlethal technologies. Dr. Edward Teller and Attorney General Janet Reno were scheduled as keynote speakers, though Reno was unable to attend and had David Boyd of the National Institute of Justice deliver her talk.

Noting the strong turnout, Los Alamos spokesman Jim Danneskiold said that there will likely be a follow-up conference. (For a report on a 1986 conference on HPM, see *MWN*, J/F87; see also, *MWN*, N/D86.)

Danneskiold also pointed out that Dr. John Alexander, Los Alamos' program manager for nonlethal defense and chairman of the conference, recently presented his ideas to the Council on Foreign Relations in New York City. The group was receptive, he said, and will soon issue a report favoring the development of these technologies.

San Francisco Bans Transmitters on Schools *(continued from p.1)*

clear health basis to proscribe such installations at schools," Neutra wrote in an August 18 letter to Dr. William Lee, director of the city's Bureau of Toxics, Health and Safety. But, he added, "Other than the rental income, why would a responsible public agency go out of its way to expose children to an agent which was not necessary for their education and was not thoroughly studied?" The letter drew sharp criticism from Stephen Carlson, executive director of the Cellular Carriers Association of California (CCAC) in Sacramento.

Smart SMR of California, a Lafayette-based subsidiary of Nextel Communications Inc., had offered to pay $16,800 per year for a lease to put a specialized mobile radio (SMR) transmitter on the roof of George Washington High School in the Richmond section of San Francisco. But at a school board meeting last March, opponents of the project, led by members of a group called the Committee to Investigate Electromagnetic Radiation, objected that the facility would endanger the students. The board delayed action on the proposal, referring the matter to its committee on buildings and grounds. The committee went to city officials for information on the health issues, and the city in turn sought assistance from Neutra, who is acting chief of DHS's environmental health investigations branch in Emeryville.

In his letter, Neutra referred to "some controversial laboratory tests which show changes in normal cell function" after exposure to radiofrequency (RF) radiation that was too weak to heat tissue. And he wrote that, "No one has specifically studied cellular phone exposure in humans." He did not discuss the Smart SMR proposal; rather, he addressed the more general issue of the safety of cellular phone transmitters.

"I find the lack of scientific foundation for the opinions expressed in your letter deeply troubling," CCAC's Carlson responded. In an August 26 letter to Neutra, he asked for a retraction and warned that, "If we have not received such a retraction by Monday, August 30, I will have no recourse but to pursue other avenues to correct the inaccuracies...in your letter."

Neutra did not back down. He responded to Carlson by telephone in September, asking for more information about CCAC's objections, and he sent a formal response on November 24. He appended the letter that Dr. Elizabeth Jacobson of the federal Food and Drug Administration wrote to the Cellular Telecommunications Industry Association (CTIA) last summer (see *MWN*, J/A93), criticizing the organization's "unremittingly upbeat" statements on the safety of cellular phones. Neutra wrote to Carlson that this letter suggested that "not everyone shares your view of the science or that of your consultants." He concluded: "Thus on many of the issues you have raised in your letter, we need to agree to disagree."

After receiving Neutra's response, Carlson was conciliatory. He said he was pleased that Neutra found "no clear health basis" to proscribe the siting of cellular facilities on schools—a statement that was in Neutra's orginal letter to Lee and in his letter to Carlson. Asked if he was satisfied even though Neutra did not make a retraction, Carlson said, "I want to put an end to this back and forth."

While SMR, which operates at 800-950 MHz, is used primarily for two-way radio at present, Nextel and several other companies are building digital systems using these frequencies that will compete directly with existing cellular phone services. The system began operating in Los Angeles last summer and is scheduled to be operational in San Francisco by early 1994.

With the creation of these new networks and the expansion and improvement of existing ones, hundreds of new mobile communications transmitters are being built each year. It is unclear how many face community opposition. CTIA in Washington estimates that in the first half of 1993 the number of sites grew by 12%, to a total of 11,551. In the Bay Area, Nextel is building about 80 new transmitter sites for its digital system, according to John Hayden, Nextel's vice president for marketing.

Carlson said he did not know how many cellular antennas had been sited on schools in California. "There is no clear health basis to proscribe a cellular facility anywhere," he maintained. But he acknowledged that, "from a public affairs and public relations perspective," cellular companies may choose to avoid schools. Indeed, Motorola Inc. of Schaumburg, IL, already has a policy of not siting radio antennas on school property, according to Dr. Quirino Balzano, vice president of the company's land mobile products sector. This policy applies to all two-way radio systems the company installs for its customers, Balzano said.

Smart SMR withdrew its proposal for George Washington High School in July, "because the debate was taking so much time to resolve," Hayden explained. The transmitter would have posed no health risk, Hayden said, but he added that, "You have to respect people's points of view on this."

Even after the Smart SMR proposal was dropped, however, the school board continued to examine the issue. After reviewing Neutra's letter, all members of the buildings and grounds committee agreed that proposals for transmitter facilities should be rejected, according to Yee, who is chairman of the committee. "We have come to the conclusion that it is not good for the kids," he said. Any new proposals would also come before his committee, he added.

Joe Simmons, a property management consultant who works for the schools and who handled the Smart SMR application, confirmed this stance. "We won't approve them," he said. The leases for the four cellular antennas already in place, held by Cellular One and GTE Mobilnet, cannot be broken, Simmons explained, but they will not be renewed. The first of them expires in January, he said.

Opposition Builds to the Siting Cellular Towers on School Property

In dozens of communities across the country, citizens concerned about health hazards are challenging plans for new cellular phone transmission sites, and where they are to be built on or near schools, grass-roots opposition is particularly heated. Here are some examples:

• GTE Mobilnet, a subsidiary of GTE Corp., signed a contract with the Los Gatos (CA) Union School District in January 1992 to erect a 35-foot tower in a utility yard at Fisher Middle School, but local activists opposed the company when it sought approval from the planning commission. The site is adjacent to a play field and about 300 feet from the nearest school buildings, according to Mark Portman, a San Jose attorney who has led the opposition. The city asked for an environmental impact report (EIR), which was prepared by Dr. Jerrold Bushberg of the University of California, Davis, and Dr. Don Justesen of the VA Medical Center in Kansas City, MO, and submitted in May 1993. "There is no scientific basis to contend that harmful effects will result to the environment and public, including schoolchildren, from the installation of the proposed facility," Bushberg and Justesen argued. Cellular transmitters are low-power facilities, they wrote, concluding that emissions from the proposed tower, "even during peak operation, are but a small fraction (approximately 1/200) of the permissible limit." Tower opponents were not satisfied. Though they had agreed to the selection of Bushberg and Justesen originally, Portman said, they learned later that the two had worked for the cellular industry. They "already had a firm opinion on this important issue," Portman wrote in a July 8 letter to the planning commission. Portman, of Westphal, Patrick, DiFranza & Portman, asked Dr. Asher Sheppard, then of the VA Medical Center in Loma Linda, CA, to review the EIR. Sheppard argued that the EIR "misrepresents the situation with respect to chronic exposure," since "almost no research" addresses long-term exposures from low-level sources such as cellular facilities. One study that does bear directly on possible risks from low-level exposures, Sheppard explained, is that done by Dr. Bill Guy and coworkers. They found an excess of primary tumors in rats exposed to weak RF radiation—levels deemed safe by the ANSI C95.1 standard (see *MWN, J/A84, Mr85, N/D86 and J/F93*). "Although the study is, in my opinion, inconclusive on the question of cancer, the questions it raises undermine the basis for the ANSI standard and therefore the position of the Bushberg-Justesen report," Sheppard wrote. In July, the planning commission rejected the EIR and denied the use permit GTE Mobilnet had sought, and in October the town council turned down the company's appeal. Now GTE Mobilnet, which has its West Coast offices in Pleasanton, is suing the town. "We feel that the town did not abide by the California Environmental Quality Act in judging the adequacy of the EIR," explained Peggy O'Laughlin, GTE Mobilnet's attorney. "I think GTE is willing to look at another site for this facility, to satisfy the neighbors and the town," said O'Laughlin, who is with Matteoni, Saxe & Nanda in San Jose. But the planning commission's "arbitrary" rejection of the EIR set a precedent that the cellular industry must challenge, she added. The case was filed November 30 in California Superior Court, Santa Clara County.

• In the small town of Merton, WI, midway between Milwaukee and Madison, opponents of Ameritech's plans for a cellular tower on a high school football field are claiming victory. But the company has not yet given up. Ameritech had offered to build a new press box—reportedly worth about $200,000—in Arrowhead High School's football stadium in exchange for permission to erect a 152-foot cellular tower there. The company had also agreed to annual lease payments. The school board approved the plan, but the Merton planning commission voted 5-1 against it in July, after hearing from Ameritech experts and from community activists, led by Susan McCrone. However, the company still hopes to gain approval for its plan, according to Ameritech spokeswoman Marybeth Johnson. "The school board wants to do it, and it is in a position to go back to the planning commission," said Johnson, who is at the headquarters of Ameritech's cellular division in Hoffman Estates, IL, outside Chicago.

• In Sarasota, FL, opponents of a Cellular One tower to be sited near an elementary school have won the first round. The company still hopes to gain approval, however. In a September 16 letter, the principal of Southside Elementary, John Spielman, called the tower a "wonderful opportunity," noting the proposed lease payments of $14,400 per year and other gifts promised by McCaw Cellular Communications Inc. of Kirkland, WA, which uses the Cellular One name. Opposition built quickly. The proposed tower would have been just a few feet away from a portable classroom and about 100 feet from the main school building, according to Guy Alland, editor of the *Sarasota Eco Report*. In November, Alland and several parents circulated a paper questioning the safety of the facility. Citing a "divisive" atmosphere, Spielman wrote in a November 29 letter that he had canceled an informational meeting scheduled for December 1 and had "ceased negotiating." But McCaw's site acquisition manager, Paul Rozeman, said the school board supports the proposal and the company will pursue it.

• School officials in Moreland Hills, OH, a Cleveland suburb, have also been enthusiastic about siting a cellular tower on school property. The school board voted in November 1990 to approve a request submitted by New Par, which uses the Cellular One name in Ohio and Michigan, for permission to place a transmitter on the grounds of the local elementary school under a long-term lease worth about $600,000. The company, a joint venture of PacTel Corp. and Cellular Communications Inc., also offered more than $50,000 in donations to the school. The proposed tower site was within 100 feet of the school's playground, according to David Goodman, a local businessman who has opposed the tower. The school board sent a letter to parents noting that "cellular communication towers have been placed on the roofs of hospitals, near recreation fields, and in other high-density population areas," but was unable to gain approval. The issue remained unresolved until recently, when the town council passed a nonbinding resolution stating that no application for the siting of a cellular transmitter in Moreland Hills should be considered by the council.

• When plans by a Nynex Mobile Communications Co. subsidiary to site a transmitter in Lincoln Park, NJ, were rejected by the town council, it was the company's second defeat on the same project, according to James Shepard, an attorney who represented the company's opponents. A year earlier, he had worked successfully with residents of nearby Boonton to force the company to withdraw plans for a tower there. But the need for a cell site did not go away, he said, so the company approached Lincoln Park. Here the proposed antenna was to go on a water tower "located smack in the middle of a children's playground" and in the immediate vicinity of an elementary school, Shepard said. The Nynex subsidiary, New York SMSA LP, signed a lease with Lincoln Park in December 1992. But opposition grew while the company sought approvals before the city's Board of Adjustment, and delays there allowed the town a way out. The contract gave either party an option to end the lease if necessary approvals were not received by July 1, 1993. At a meeting in early July, the town council voted unanimously to do just that. Nynex sued the town, but on October 11, Morris County Superior Court Judge Reginald Stanton ruled in favor of the town council. Having failed twice, Nynex "is going to start closing the loopholes" in its contracts, predicted Shepard, who is with the Parsippany firm of Fein, Such, Kahn & Shepard. Fighting these proposals is going to become more difficult, he added.

information from death certificates is a poor surrogate for actual exposure measurements."

Loomis expressed concern over the lack of information on the women's reproductive histories, a potential confounder. "It is likely that these women were not typical," he said. "After all, they were in traditionally male-dominated electrical occupations; they may have had fewer children and had them later—all of which would put them in the high-risk groups."

Nevertheless, the elevated risk seen in this study, and in previous studies on men, is "disturbing," Loomis said. "I think the issue should definitely be pursued." He added that he is looking for an opportunity to collaborate on an ongoing occupational study. Loomis has submitted his paper for publication.

Working with Dr. David Savitz and Cande Ananth, his UNC colleagues, Loomis used the public mortality records from 24 states for the years 1985-1989. Of the 27,882 women who died from breast cancer, 68 worked in electrical occupations. Each case was matched with four controls.

Loomis's presentation prompted a great deal of interest at the DOE meeting in Savannah, GA. Dr. Sam Milham, an epidemiologist formerly at the Washington State Department of Health and now a consultant in Olympia, WA, told *Microwave News* that he had similarly observed more cases of breast cancer among women in electrical occupations in the Washington State occupational data base.

And Dr. Richard Stevens of the Battelle Pacific Northwest Labs in Richland, WA, said, "This should motivate more rigorous exposure assessment of women in the workplace." Stevens is in the midst of a study on the possible association between female breast cancer and exposures to light-at-night and/or EMFs (see *MWN*, N/D91).

Four studies have shown an elevated risk of breast cancer in male electrical workers. In 1989, Dr. Genevieve Matanoski and coworkers at the Johns Hopkins University School of Hygiene and Public Health in Baltimore reported a cluster of breast cancer cases among male telephone technicians (see *MWN*, N/D89 and M/A91). Interestingly, Loomis also found that female telephone workers had a significantly increased mortality due to breast cancer—more than twice the expected rate.

Dr. Paul Demers of the Fred Hutchinson Cancer Research Center in Seattle found a significant sixfold increase in the expected breast cancer rate among male telephone linemen, electricians and electrical power workers (see *MWN*, J/A90). And researchers at the Cancer Registry of Norway in Oslo found that male electrical transport workers, such as railway and tram engineers, had four times the expected rate of breast cancer (see *MWN*, J/F91). In an earlier separate study, Loomis observed a nonsignificant doubling of breast cancer deaths among male electrical workers under the age of 65 (see *MWN*, J/A92).

Dr. Nancy Wertheimer and Ed Leeper were the first to see an EMF–breast cancer connection in their 1982 study of residential EMF exposures of adults (see *MWN*, J/F83 and N/D87). They uncovered a nearly threefold increase among women younger than 55 who lived near high current power lines. "Given that the epidemiological work is piling up, it's time to make a major effort to replicate the German work by Löscher because it seems to supply the first clear animal model showing a power frequency–breast cancer risk," Wertheimer told *Microwave News* in an interview after the Savannah meeting. Dr. Wolfgang Löscher's research team at the School of Veterinary Medicine in Hannover, Germany, found that EMFs could promote the growth of breast tumors in exposed rats (see *MWN*, J/A93).

The EMF link to breast cancer also received a boost when Dr. Robert Liburdy of the Lawrence Berkeley Lab in Berkeley, CA, announced that EMFs can compromise melatonin's ability to control the growth of human breast cancer cells (see *MWN*, J/A92). Indeed, what has become known as the "melatonin hypothesis" may finally provide a mechanism for understanding how EMFs promote cancer (see box on p.5).

Dr. David Blask of the Mary Imogene Bassett Hospital Research Institute in Cooperstown, NY, commented, "The animal, cellular and epidemiological data are all coming together and we have a potential mechanism. It all adds strength to the argument that there may be a breast cancer–EMF link. We need to follow it up."

Congress Orders Long Island Breast Cancer Study

Congress has mandated that the National Institutes of Health study the possible role played by a variety of environmental factors, including EMFs, in breast cancer risks in Nassau and Suffolk counties, New York. "There is still a great need for further research on breast cancer and this is a tremendous opportunity to do it comprehensively," said Dr. Iris Obrams, chief of extramural programs in the Epidemiology and Biostatistics Program at the National Cancer Institute (NCI) and director of the Long Island Breast Cancer Study Project.

NCI and the National Institute of Environmental Health Sciences (NIEHS) will jointly run the study, which will take five years and cost between $10 and $15 million, according to Obrams.

NCI has also awarded $1.25 million to Dr. Lee Caplan of the State University of New York, Stony Brook, to investigate the possible relationship between breast cancer among Long Island women and exposure to EMFs and/or pesticides. Caplan told *Microwave News* that he will examine 250 cases of breast cancer in women who have lived in the same house on Long Island for at least 15 years. "EMFs really have not been studied much in relation to breast cancer," Caplan said, but, "There has been some laboratory work and the biological hypotheses are very plausible." Caplan's four-year effort will begin early next year. Whether the two projects will be integrated has not yet been decided.

The NCI-NIEHS study is a victory for grass-roots activists disappointed by a report issued last year by the federal Centers for Disease Control and Prevention in Atlanta, which stated that the excess of breast cancer in Nassau County, which is 17% higher than in the rest of New York State, could be explained by known risk factors and that further study was not needed (see *MWN*, J/F93).

CONFERENCES

1994 Conference Calendar

January 5-8: **National Radio Science Meeting,** University of Colorado, Boulder. Contact: Prof. E. K. Smith, Dept. of Electrical Engineering, University of Colorado, Campus Box 425, Boulder, CO 80309, (303) 492-7123.

January 20-21: **Electric and Magnetic Fields,** Grand Hotel, Washington, DC. Will be repeated February 7-8 at the Pan Pacific Hotel in San Francisco, CA. Contact: Executive Enterprises Inc., 22 West 21st St., New York, NY 10010, (800) 831-8333.

January 30-February 3: **1994 Winter Meeting of the IEEE Power Engineering Society (PES),** New York, NY. Contact: PES Special Services, IEEE, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855, (908) 562-3881.

February 15-18: **2nd Annual Wireless Symposium and Exhibition,** Convention Center, Santa Clara, CA. Contact: Wireless Registration, PO Box 3379, Frederick, MD 21705, or call Mary Begley, (201) 393-6289.

February 24-25: **Understanding & Controlling ELF/VLF Magnetic and Electric Fields,** Sheraton Tara Inn, Lexington, MA. Contact: Ergonomics Inc., PO Box 964, Southampton, PA 28966, (215) 357-5124.

March 2-4: **9th Annual Convention & Exposition of Cellular Telecommunications Industry Association (CTIA),** Convention Center, San Diego, CA. Contact: CTIA Wireless '94, PO Box 3379, Frederick, MD 21705, (202) 785-0081.

March 5-9: **1st Meeting and Exhibition of the Society of Magnetic Resonance (SMR),** Loews Anatole Hotel, Dallas, TX. SMR was formed when SMRM and SMRI merged; see pp.16-18. Contact: SMR, 213 W. Institute Pl., Suite 501, Chicago, IL 60610, (312) 751-2590.

March 14-15: **3rd Nordic Workshop on Biological Effects of Low Frequency Electromagnetic Fields,** Umeå, Sweden. Contact: Dr. Kjell Hansson Mild, National Institute of Occupational Health, Box 7654, S-907 13 Umeå, Sweden, (46+90) 165098.

March 14-16: **1994 EPRI EMF Seminar: Focus on Research,** Marriott Hotel, Santa Clara, CA. Contact: Robert Banks Associates Inc., EPRI EMF Seminar, PO Box 141049, Minneapolis, MN 55414, (612) 623-4600.

March 20-24: **1994 Conference and Exhibition of the National Association of Broadcasters (NAB),** Convention Center, Las Vegas, NV. Contact: NAB '94, 1771 N. St., NW, Washington, DC 20036, (800) 342-2460.

March 20-24: **1994 Electricity Conference & Exposition,** Westin Harbour Castle Convention Centre, Toronto, Canada. Contact: Canadian Electrical Association, 1 Westmount Sq., Suite 1600, Montreal H3Z 2P9, Canada, (514) 937-6181.

March 21: **Reducing EMF Exposure: Alternative Design Techniques,** Stouffer Hotel, Nashville, TN. Contact: Karen Krzmarzick, American Public Power Association, 2301 M St., NW, Washington, DC 20037, (202) 467-2921.

March 29-31: **1994 IEEE National Radar Conference,** Atlanta, GA. Contact: Joseph Bruder, Georgia Tech Research Institute, Georgia Institute of Technology, Atlanta, GA 30332, (404) 528-7745.

April 4-8: **4th International Symposium on Microwave Processing of Materials and Spring Meeting of the Materials Research Society,** Marriott Hotel, San Francisco, CA. Contact: Dr. Magdy Iskander, Dept. of Electrical Engineering, University of Utah, Salt Lake City, UT 84112, (801) 581-6944.

April 5-7: **2nd International Conference on Ultra-Wideband, Short-Pulse Electromagnetics,** Polytechnic University, Brooklyn, NY. Contact: Prof. L. Carin, Weber Research Institute, Polytechnic University, 6 MetroTech Center, Brooklyn, NY 11201, (718) 260-3876.

April 6-7: **30th Annual Meeting of the National Council on Radiation Protection and Measurements (NCRP): Extremely Low Frequency Electromagnetic Fields,** Crystal City Marriott, Arlington, VA. Contact: NCRP, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814, (301) 657-2652.

April 10-15: **1994 IEEE/PES Transmission and Distribution Conference and Exposition,** McCormick Place, Chicago, IL. Contact: Kenneth Bow, Dow North America, PO Box 515, Bldg. B, 3825 Columbus Rd., SW, Granville, OH 49023, (614) 587-4386.

April 21-22: **The Lancet Challenge of Breast Cancer Conference,** Holiday Inn Crowne Plaza, Bruges, Belgium. Contact: Conference Secretariat, Elsevier Science Publishers Ltd., Mayfield House, 256 Banbury Rd., Oxford OX2 7DH, U.K., (44+865) 512242.

April 24-29: **78th Annual Convention of the Federation of American Societies for Experimental Biology,** Anaheim, CA. Four symposia on EMF interaction with biological systems will by held on April 26. Contact: Dr. Allan Frey, 11049 Seven Hill Lane, Potomac, MD 20854, (301) 299-5181.

April 29-May 4: **1994 Joint Meeting of the Radiation Research Society (RRS) and the North American Hyperthermia Society,** Stouffer Hotel, Nashville, TN. Contact: RRS, 2021 Spring Rd., Suite 600, Oak Brook, IL 60521, (708) 751-2881.

May 5-6: **EPRI Workshop on the Measurement of Power System Magnetic Fields,** Lenox, MA. Will be repeated in September. Contact: Mary Fitzgerald, High-Voltage Transmission Research Center, 1000 E. New Lenox Rd., Lenox, MA 01240, (413) 494-4359.

May 22-26: **26th Annual National Conference on Radiation Control,** Hilton and National Convention Center, Williamsburg, VA. Contact: Conference of Radiation Control Program Directors, 205 Capital Ave., Frankfort, KY 40601, (502) 227-4543.

May 22-27: **185th Meeting of the Electrochemical Society,** Hilton Square Hotel, San Francisco, CA. Contact: Brian Rounsavill, Electrochemical Society, 10 S. Main St., Pennington, NJ 08534, (609) 737-1902.

May 23-27: **1994 IEEE MTT-S International Microwave Symposium,** San Diego, CA. Contact: 1994 MTT-S Symposium, c/o LRW Associates, 1218 Balfour Dr., Arnold, MD 21012, or call Cheryl Trondle, (619) 569-5000.

May 30-June 3: **1994 Euro Electromagnetics International Symposium: Electromagnetic Environments and Consequences (EUROEM),** Bordeaux, France. Contact: H.V. Dhur, EUROEM 94, Centre d'Etudes de Gramat, 46500 Gramat, France, (33+65) 105406.

June 1-3: **1994 IEEE Frequency Control Symposium,** Westin Hotel, Boston, MA. Contact: Michael Mirarchi, Synergistic Management Inc., 3100 Route 138, Wall Township, NJ 07719, (908) 280-2024.

June 12-17: **16th Annual Meeting of the Bioelectromagnetics Society (BEMS),** Sheraton Hotel, Copenhagen, Denmark. Contact: Dr. William Wisecup, W/L Associates Ltd., 120 W. Church St., Frederick, MD 21701, (301) 663-4252.

June 14-16: **International Electric Research Exchange Workshop on Underground Cables,** Toronto, Canada. Contact: Dr. J.M. Braun, Ontario Hydro Research Division, 700 University Ave., Toronto M5G 1X6, Canada, (416) 207-6874.

June 15-18: **28th Annual Meeting of the Society for Epidemiologic Research (SER),** Fontainebleau Hilton, Miami Beach, FL. Contact: SER, 2007 E. Monument St., Baltimore, MD 21205, (410) 955-3441.

June 19-24: **1994 IEEE AP-S International Symposium and URSI Radio**

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Science Meeting, University of Washington, Seattle. Contact: Jan Kvamme, Engineering Professional Programs, 3201 Fremont Ave. N., Seattle, WA 98103, (206) 543-5539.

June 20-24: **1994 International Symposium on Charge and Field Effects in Biosystems,** Virginia Commonwealth University (VCU), Richmond. Contact: Kelly Roach, Dept. of Chemistry, VCU, 1001 W. Main St., Box 2006, Richmond, VA 23284, (804) 367-1298.

June 26-30: **39th Annual Meeting of the Health Physics Society (HPS),** Hilton & Towers, San Francisco, CA. Contact: HPS Administrative Services, 8000 Westpark Dr., Suite 130, McLean, VA 22102, (703) 790-1745.

June 27-July 1: **1994 Conference on Precision Electromagnetic Measurements,** Boulder, CO. Contact: Gwen Bennett, National Institute of Standards and Technology, 325 Broadway, Boulder, CO 80303, (303) 497-3295.

June 28-July 1: **12th International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility (EMC),** Wroclaw, Poland. Contact: W. Moron, EMC Symposium, Box 2141, 51-645 Wroclaw 12, Poland, (48+71) 481041.

July 24-28: **1994 Summer Meeting of the IEEE PES,** San Francisco, CA. Contact: PES Special Services, see January 30-February 3, above.

July 25-27: **29th Microwave Power Symposium,** Sheraton Center Hotel, Chicago, IL. Contact: International Microwave Power Institute, 10210 Leatherleaf Ct., Manassas, VA 22111, (703) 257-1415.

August 6-12: **2nd Meeting and Exhibition of the Society of Magnetic Resonance (SMR),** Hilton & Towers, San Francisco, CA. SMR was formed recently in a merger; see pp.16-18. Contact: SMR, 1918 University Ave., Suite 3C, Berkeley, CA 94704, (510) 841-1899.

August 22-26: **1994 IEEE International Symposium on Electromagnetic Compatibility,** Chicago, IL. Contact: IEEE, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855, (908) 562-3875.

August 29-September 3: **1994 Session of CIGRÉ,** Palais des Congrès, Paris, France. Contact: Andrew Corry, CIGRÉ, PO Box 310, W. Hyannisport, MA 02672, (508) 771-0488.

September 5-7: **9th International Conference on Electromagnetic Compatibility,** University of Manchester, U.K. Contact: Louise Bousfield, Conference Services, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, U.K., (44+71) 344-5477.

September 12-13: **1994 EMF Conference and Debate,** Crystal Gateway Marriott, Arlington, VA. Contact: Betsy Hidalgo, *Transmission & Distribution* Magazine, Intertec Publishing Corp., PO Box 12901, Overland Park, KS 66282, (913) 967-1865.

September 18-21: **6th Conference of the International Society for Environmental Epidemiology** and **4th Conference of the International Society for Exposure Analysis,** Sheraton Imperial Hotel, Research Triangle Park, NC. Contact: Jeana Foley, Dept. of Epidemiology, University of North Carolina School of Public Health, CB#7400, McGavran-Greenberg Bldg., Chapel Hill, NC 27599, (919) 966-7438.

September 18-23: **8th Gordon Research Conference on Bioelectrochemistry,** Kloster Irsee, Germany. Contact: Dr. Martin Blank, Dept. of Physiology, Columbia University, 630 W. 168th St., New York, NY 10032, (212) 305-3644.

September 19-20 (date may change): **44th Annual Broadcast Symposium,** Washington, DC. Contact: Gerald Berman, Voice of America, Rm. 4242, Cohen Bldg., 330 Independence Ave., SW, Washington, DC 20547, (202) 619-3771.

September 21-23: **6th International Conference on Harmonics in Power Systems,** Bologna, Italy. Contact: Prof. Gian Montanari, Instituto di Elettrotecnica Industriale, University of Bologna, Viale Risorgimento 2, 40136 Bologna, Italy, (39+51) 644-3471.

September 26-October 2: **12th International Symposium of the Bioelectrochemical Society,** Seville, Spain. Contact: Dr. Martin Blank, see September 18-23, above.

October 2-5: **Work With Display Units (WWDU): 4th International Scientific Conference,** University of Milan, Italy. Contact: WWDU Organizing Secretariat, Via Scheiwiller 1, I-20139 Milan, Italy, (39+2) 55210523.

October 9-14: **186th Meeting of the Electrochemical Society,** Fontainebleau Hilton, Miami Beach, FL. Contact: Brian Rounsavill, see May 22-27, above.

October 12-15: **14th Annual Meeting of the Society for Physical Regulation in Biology and Medicine,** Hyatt Regency, Crystal City, VA. The society was formerly called BRAGS; see p.16. Contact: Society for Physical Regulation in Biology and Medicine, PO Box 64, Dresher, PA 19025, (215) 659-5180.

November 3-6: **16th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS),** Baltimore, MD. Contact: IEEE/EMBS Conference Management Office, 2603 Main St., Suite 826, Irvine, CA 92714, (714) 752-8205.

November 8-10: **1994 JINA International Symposium on Antennas,** Nice, France. Contact: Secretariat JINA 94, CNET-PAB Centre de La Turbie, 06320 La Turbie, France, (33+93) 410229.

Early November: **Annual Department of Energy Contractors Review,** location to be determined. Contact: W/L Associates Ltd., 120 W. Church St., Frederick, MD 21701, (301) 663-1915.

UPDATES

CANCER CLUSTERS

St. Louis Newsroom Cancer Study...NIOSH will send a three-person team to investigate a cancer cluster at the *St. Louis Post-Dispatch* in Missouri on December 13. There was some question as to whether the agency would go because it had not confirmed that the cancers were primary brain tumors—that is, cancer that originates in the brain (see *MWN,* S/O93). In fact, NIOSH recently discovered that at least four of the seven people at the paper diagnosed with brain cancer since 1982 did not have primary brain tumors, which lessens the likelihood that the tumors are related to a common source of exposure, according to NIOSH's Dr. Bruce Bernard, who will lead the investigation. But he said that an on-site visit is important, in part to give the paper's labor and management representatives—who have disagreed about how to approach the problem—a chance to "get the issue out and onto the table." Bernard said that he is dubious about finding a cause for the cluster because the study population is so small and because brain tumors can take decades to emerge, making it very difficult to trace the source. Gene Moss, who has done past NIOSH EMF surveys (see *MWN,* M/A93), will take readings at the *Post-Dispatch,* Bernard said.

GOVERNMENT

Senator Protests EPA Cutbacks... In a letter to EPA Administrator Carol Browner, Sen. Joseph Lieberman (D-CT) urged the agency not to phase out its work on NIER and to issue exposure guidelines for RF/MW radiation. Under its proposed fiscal year 1995 budget, EPA's Office of Radiation and Indoor Air would eliminate all but one staff position for NIER programs (see *MWN,* J/A93). Lieberman stressed that this "would be inconsistent with the agency's responsibility to provide full protection of public health and the environment." He was particularly concerned that

the cutbacks would mean that the agency would fail to issue RF/MW radiation exposure limits. EPA first announced its intention to issue such rules in the 1970s but has never done so, despite the urgings of its own Scientific Advisory Board (SAB) (see *MWN*, J/A91). "Such a failure would disregard the concerns of the public, the recommendation of the SAB, and EPA's own prior conclusions," Lieberman wrote. Lieberman, the chairman of the consumer and environmental affairs subcommittee of the Committee on Governmental Affairs, held a hearing on the possible links between traffic radar and cancer in August 1992 (see *MWN*, S/O92).

MEDICAL DEVICES

Detailed EMI Reports... An FDA scientist has catalogued a long list of examples of how EMI can disrupt or disable medical devices, including critical monitoring and life-support equipment. "Deaths and serious injuries have occurred as a result of electronic medical device performance degradation that was caused by EMI," writes Jeffrey Silberberg of FDA's Center for Devices and Radiological Health in Rockville, MD. In the fall issue of *Compliance Engineering*, he presents brief accounts of more than 100 EMI episodes, ranging from the curious to the tragic. Some involve one piece of hospital equipment interfering with another—an infusion pump affecting patient monitors, for example, or a muscle stimulator causing a chiropractic table to move unexpectedly, resulting in an electric shock to the patient. Others concern transmitters such as cellular phones and two-way radios disrupting the operation of incubators, fetal heart rate detectors, dialysis machines and ventilators. "I think we're looking at the tip of the iceberg," Silberberg said in a telephone interview. While medical device manufacturers are required to report malfunctions to the FDA, he explained, they do not always know that a particular problem could be due to EMI. As awareness of the issue has grown, he said, the number of EMI reports has increased. What can be done to control medical device EMI? In hospitals, he suggests, "Prohibiting sources such as cellular phones, walkie-talkies, and rooftop commercial transmitters from certain areas or from the entire facility should be considered." The FDA has, in recent years, enhanced its in-house testing capabilities and devoted "increased emphasis and effort" to the problem. And manufacturers are being told to do more rigorous EMC testing. The FDA has given special attention to effects on three devices: apnea monitors (see *MWN*, J/A91 and N/D91); anesthetic gas monitors used in surgery rooms; and electric wheelchairs (see *MWN*, J/A 93). For the wheelchairs, Silberberg presents more details than have been available before. In June 1992, he explains, a quality assurance manager who had worked for a major wheelchair manufacturer contacted the FDA and "reported that in his previous position he had received reports of powered wheelchairs driving off curbs and piers unintentionally when a police or fire vehicle, harbor patrol boat, or CB or amateur radio was in the vicinity." With the growth in wireless communications products, Silberberg notes, "The ambient electromagnetic environment continues to intensify." He points out, for example, that cellular phones operating on the new European GSM standard "are expected to produce a 200 Hz tone in hearing aids at a distance of up to 30 meters." At close range, the noise could be as loud as 130 dBA. (See also, *MWN*, S/O85 for a report on cochlear implants and EMI; and see *MWN*, N/D85 for an earlier report on FDA's concern over medical-device EMI.) *Compliance Engineering* is published in Boxborough, MA.

MEETINGS

CTIA Symposium... Organizers of the Cellular Telecommunications Industry Association's (CTIA) health research initiative are expanding their effort to gather the views of a broad range of experts from government, industry and academia. After government representatives boycotted a CTIA session in September, Dr. George Carlo, head of the advisory group that CTIA has established to oversee the $15 to $25 million research program, scheduled an additional meeting for October 27 in Washington that FDA scientists, among others, would attend (see *MWN*, S/O93). That symposium was then delayed until December 14-15. "The focus of this meeting is on possible cancer causation," said Michael Volpe, a spokesman for Carlo. "It will complement the previous meetings on general research needs [in September] and on dosimetry [held in Chicago last July]," he added. Though relations between CTIA and the FDA have been strained in recent months (see *MWN*, J/A93), Dr. Mays Swicord of FDA's Center for Devices and Radiological Health in Rockville, MD, has agreed to chair the first day's discussions. Carlo will lead the second day of the meeting. Federal Focus Inc., a nonprofit group based in Washington, has been brought in to help run the symposium. As with the September meeting, Carlo's group will not disclose who has been invited to the meeting and has barred the media from attending. Carlo had hoped to have his research agenda completed in November, but it has not yet been released. He has, however, scheduled a press conference for December 13 to announce new research projects.

OCCUPATIONAL HEALTH

RF Mitigating Suits... While protective clothing has gained acceptance for reducing MW radiation exposures, Maxwell Safety Products Ltd. of Smithtown, NY, is now selling a material that can also be used in lower-frequency, RF radiation environments —such as radio and television broadcast towers. Joe Amato, Maxwell's vice president for marketing, said he is trying to "create a market" in the broadcast industry for his Naptex fabric, which is made in Germany. "It is the only way to take care of induced current problems," Amato said. To support his position, he points to a recent study by Richard Olsen and Barry Van Matre at the Naval Aerospace Medical Research Laboratory in Pensacola, FL, which Maxwell sponsored. Olsen and Van Matre exposed a human-size model designed for measuring RF exposures to radiation at four frequencies between 2 and 400 MHz, taking measurements with and without the Naptex suit. They found significant SAR reductions. At 29.9 MHz, for example, an average ankle SAR of 15.5 W/Kg without any protection was reduced to 0.7 W/Kg when the model was placed in a full Naptex suit and overshoes. "The full protective ensemble changed out-of-compliance and borderline exposure situations into ones that were not only in compliance but also with a wide margin of

safety," Olsen and Van Matre wrote. Richard Tell, a consultant based in Las Vegas, who has performed his own tests of Naptex, said the material "could provide as much as a 20 dB reduction" in RF fields—a reduction by a factor of 100. "I think it represents a good mitigation approach for people who must, from time to time, be in strong RF fields," he told *Microwave News*. Amato noted that Naptex is also effective at MW frequencies. Previous papers on protective clothing have noted the need for materials capable of mitigating radiation below MW frequencies (see *MWN*, N/D87). Copies of Olsen and Van Matre's report, *Measurements of Ankle SAR and Body-to-Ground Current in a Suit-Protected Human Model for Near-Field Exposures, 2-400 Hz*, are available from: Maxwell Safety, 20 Gilbert Ave., Smithtown, NY 11787, (516) 366-2411.

PEOPLE

Dr. **Genevieve Matanoski** of the Johns Hopkins University School of Hygiene and Public Health has been appointed to a two-year term as the chair of EPA's Science Advisory Board (SAB) Executive Committee. In 1991, Matanoski was the head of the subcommittee that reviewed EPA's cancer report on EMFs and RF radiation. She was later named the chair of SAB's Radiation Advisory Committee....Dr. **Cletus Kanavy**, the chief of the biological effects group at the Phillips Laboratory's Electromagnetic Effects Division at Kirtland Air Force Base, NM, died of acute renal failure on October 14 (see *MWN*, S/O93)....Dr. **Stuart Harvey** and **Murray Walsh** have left Ontario Hydro and started up EMF-RAD, a consulting firm based in Brampton, Canada, outside Toronto. Harvey said that they will provide instrumentation, measurement and mitigation services. ...Dr. **Asher Sheppard** has asked to be relieved as the associate editor for EMF experiments and applications of *Bioelectromagnetics* because of the time pressures of his new consulting business in Redlands, CA. He is being replaced by Dr. **Larry Anderson** of the Battelle Pacific Northwest Labs....**Paul Brodeur** of *The New Yorker* and Dr. **Louis Slesin** of *Microwave News* have each received the Robert Carl Strom Humanitarian Award. The presentations were made at the *3rd Annual National EMR Alliance Conference* in Pittsburgh, November 12-13. The award is presented each year by the Strom Foundation to people or organizations that have increased public awareness of EMF health hazards. The foundation was set up with money Strom received from Boeing to settle his claim that exposure to EMP caused his leukemia (see *MWN*, S/O90). Past winners were Drs. Sam Milham and Abe Liboff.

PROFESSIONAL SOCIETIES

New Names for Old Organizations... In October, the Bioelectrical Repair and Growth Society (BRAGS) changed its name to the Society for Physical Regulation in Biology and Medicine. The new name is designed to reflect the changing interests of the group and to attract a wider range of members, said Bruce McLeod of Montana State University in Bozeman, a past president of the society. "Originally the main focus was on orthopedic applications, such as bone repair, but, as the organization has grown, members have branched out into other fields, such as

nerve regeneration and tissue repair," he explained. The society's 14th annual meeting will be held next October....The Society of Magnetic Resonance in Medicine (SMRM) and the Society for Magnetic Resonance Imaging (SMRI) are joining to become the Society of Magnetic Resonance (SMR). The merger will go into effect on January 1, 1994, with the election of new officers to take place soon afterwards (there may also be a vote to change the society's new name). "The impetus behind the merger was that the two societies were becoming closer together in terms of interests and memberships," said Jane Tiemann, executive director of SMRM. "It made more sense to become one group rather than work against each other." Next year SMR will have two meetings—the first, organized by SMRI, will be held in March, and the second, organized by SMRM, will be held in August. Eventually there will only be one annual meeting, Tiemann said. Initially, SMR will have two offices—SMRM's in Berkeley, CA, and SMRI's in Chicago. Members will be free to form local chapters and study groups on specific subtopics, said Kristen Coe, executive director of SMRI. For details on all three meetings, see pp.13-14.

TAOS HUM

Is It Electromagnetic Noise?... Those who sense the annoying low frequency "sound" that has come to be known as the Taos hum may in fact be "responding to the growing volume of electromagnetic noise" in the environment, according to the scientific team that was assembled last spring to investigate the phenomenon. Extensive measurements of acoustic, seismic and electromagnetic signals, taken at several locations around Taos, NM, "did not detect the source of the hum," the scientists concluded in an August 23 report. But they added: "The team did not eliminate the possibility that some people could be unusually sensitive to radiofrequency or microwave radiation, particularly if modulated...by frequencies below 100 Hz." This hypothesis is "soft," the group's leader, Dr. Joe Mullins of the University of New Mexico (UNM), Albuquerque, admitted in an interview with *Microwave News.* But he added that research on human perception of electromagnetic radiation is inadequate to dismiss the idea. The investigators—from UNM, Sandia National Labs, Los Alamos National Labs and Phillips Lab at Kirtland Air Force Base—spent a week in late May collecting data at sites where the hum is said to be loudest (see *MWN,* M/J93). At one location, they did detect unusually strong signals at 60 Hz and higher harmonics coming from power lines. "It was tantalizing," Mullins said, but they ultimately dismissed this finding. These signals were not present at all locations where the hum is perceivable, Mullins explained, and an audio signal they created, with frequencies and waveforms similar to the power line harmonics, did not sound right to those who hear the hum. "At this point, the focus must be on people's ability to perceive this phenomenon," Mullins said. In the coming months, UNM's Dr. Jim Kelly will be studying the hearing of those who detect the hum. Copies of *Taos Hum Investigation: Informal Report,* August 23, 1993, are available from: Sherry Robinson, UNM Public Affairs, 1805 Roma, NE, Albuquerque, NM 87131, (505) 277-5813. A more detailed report, with all of the data that were collected, has been prepared at Sandia.