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European SAR Wars: Marketing Low-Radiation Phones

"Low radiation is better." So says Hagenuk, a German manufacturer of mobile phones. Hagenuk's new advertising campaign pitches the advantages of its GlobalHandy, which "directs radiation away from the head, thereby providing optimal performance in transmission and reception."

Hagenuk, based in Kiel, is the first company to seek a competitive advantage by touting a hand-held phone that produces low specific absorption rates (SARs) of microwave radiation in the user's head. Hagenuk publicized its low-radiation phones in Germany and elsewhere in Europe this summer (for example, in the London *Times* on September 16). In Asia, its advertisements have run in Indonesia and Singapore.

While Hagenuk's ads compare the SARs from its phones to those of other manufacturers, which have different types of antennas (see p.12), the company does not mention the names of its competitors.

But on August 13, the Norwegian newspaper *Dagbladet* named names. It reported that the Nokia 2110 caused the highest SARs, followed closely by the Motorola 8200 and the Ericsson 337. *Dagbladet* ran the story under the headline THE BESTSELLER GLOWS THE MOST. The same day, the Swedish tabloid *Expressen* picked up the story with an article titled THE PHONES WITH THE WORST RADIATION.

Finland's Nokia referred questions from *Microwave News* to the Swedish

(continued on p.12)

Electromagnetic Anti-Theft Devices Interfere With Pacemakers

The most popular electronic anti-theft system in the U.S. caused interference with over 96% of implanted cardiac pacemakers in recent tests by a Florida cardiologist. In response, the U.S. Food and Drug Administration (FDA) recommended in September that people with pacemakers not linger near the entrances to stores and malls, where anti-theft devices are typically located.

Meanwhile, a German physician reported in August that electronic security systems pose "a potential risk for pacemaker patients."

"Anti-shoplifting systems are safe for people with pacemakers," Sensormatic Electronics Corp. of Boca Raton, FL, declared in the wake of the Florida study. "We have to relate this to what actually happens in the real world," communications director Debbie Collier told *Microwave News*. "This is not a new product. Even the newest technology has been in place for over ten years, and there have been no reports of problems." Sensormatic is a leading supplier of electronic security systems around the world.

In a September interview, Dr. Michael McIvor of the Heart Institute of St. Petersburg in Florida said that an acousto-magnetic anti-theft device caused

(continued on p.13)

« Power Line Talk »

In a recent commentary, Sir **Richard Doll**, the U.K.'s best-known epidemiologist, stresses the potential importance of studies that find weak associations. Writing in the August issue of *Radiological Protection Bulletin*, published by Britain's **National Radiological Protection Board** (NRPB), Doll notes that associations with low odds ratios still "may be socially of great importance," and can "offer major opportunities for the improvement of public health." He cautions that weak links are most often due to chance, bias or confounding and usually do not reflect anything important. But he warns that this fact "is grist to the mill of propagandists who, for a variety of reasons, [may] seek to discredit a weak association that suggests that a particular product may be hazardous." Doll is still reluctant to draw firm conclusions on the EMF-cancer issue (see *MWN*, M/A94 and S/O96). But he does praise an **EPRI** meta-analysis of occupational studies (see *MWN*, J/F 96), which he cites as pointing to an increase of about 10% in the risk of brain cancer, as "a model of what can be done with published epidemiological data." If a few more large occupational studies based on measured exposures show an increased risk, Doll suggests, this "might enable a sufficiently firm conclusion to be reached for action to be taken, even in the absence of any plausible mechanism by which the fields might reproduce disease." In the 1950s, Doll was the first epidemiologist to link tobacco smoking and lung cancer, years before the biological basis of that connection was discovered. On childhood leukemia, Doll's commentary points to four large-scale Scandinavian studies as the most reliable. While this research found associations between EMFs and cancer, Doll believes that the evidence was "not compelling" because of the small numbers of cases. But, he adds, "similar unbiased data for several times as many cases" could be convincing. The article was written before the release of the large-scale National Cancer Institute (NCI) study in the U.S. this past July (see *MWN*, J/A97 and p.6). In September, *Microwave News* asked Doll for his opinion of the NCI study; he replied that he had nothing to add to the July 15 statement from the NRPB's Advisory Group on Non-Ionizing Radiation, which he chairs. That cautiously worded release states that the NCI's results "do not establish" a link between EMFs and childhood leukemia, but adds that the "possibility of an elevated risk cannot...be ruled out."

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Germany's Federal Ministry for Environment, Nature Conservation and Reactor Safety has agreed to fund a nationwide study of childhood leukemia and EMF exposure. The investigation will build on smaller studies in Lower Saxony and in Berlin conducted jointly by Drs. **Jörg Michaelis** and **Joachim Schüz** of the University of Mainz and Dr. **Karl Brinkmann** and coworkers at the Technical University of Braunschweig, which suggested a weak association between EMF exposure and childhood leukemia. However, the regional results suffered from low statistical power because of the small numbers of subjects with high exposures (see *MWN*, J/A97). The national effort will be carried out by the same researchers, who will make a formal announcement of their plans at a press conference in Mainz later this fall. Schüz

told *Microwave News* that he and his colleagues will start with data from a study of childhood cancer by the German Children's Cancer Registry, which has now been going on for three years. "We already have access to the residential histories of about 800 leukemia cases and 2,000 non-diseased children," he stated, "and we will start EMF measurements at the end of this year." Schüz's team took the same approach in Lower Saxony and in Berlin, drawing on cancer registry data for both cases and controls. This kept certain costs to a minimum and made it possible to spend more money on a careful exposure assessment. "We conducted 24-hour measurements at the residence where the child lived longest before the date of diagnosis," Schüz explained, adding that the team will use the same method for the national study. The Berlin study and the combined data were both presented in June at the *2nd World Congress for Electricity and Magnetism in Medicine and Biology* in Bologna, Italy. These findings were originally scheduled for publication in the November issue of *Epidemiology*, but will now appear in January instead.

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The results of two long-awaited epidemiological studies on the possible link between EMFs and female breast cancer are expected at the end of this year or in early 1998. Dr. **Maria Feychting** of the Karolinska Institute in Stockholm, Sweden, will present the results of her and Dr. **Anders Ahlbom**'s study at this year's DOE EMF review, to be held November 10-13 in San Diego. Feychting will give an encore performance at the National Action Plan on Breast Cancer workshop in Bethesda, MD, November 18-19 (see p.18). As for the second study, Dr. **Scott Davis** of the Fred Hutchinson Cancer Research Center in Seattle told *Microwave News* it is "unlikely" that he will announce his findings in November, but he added that they should be ready early next year. Two other epidemiological studies on breast cancer are in progress—one at the State University of New York, Stony Brook, and the other at the University of Southern California in Los Angeles (see *MWN*, S/O96).

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The California Court of Appeal has overturned sanctions imposed on the law firm of **Wylie Aitken** in Santa Ana, CA, ruling that the lower court "abused its discretion" by ordering the "excessive and unjustified" penalties. Wylie Aitken represents plaintiffs in the **Younkin** and **Johsz** EMF-cancer lawsuits against **Southern California Edison Co.** (SCE), and had been ordered to pay for all of SCE's past, present and future expert witness costs in *Younkin* (see *MWN*, J/A96). The firm was hit with the sanctions after one of its attorneys, **Annee Della Donna**, wrote a letter accusing one of SCE's experts of unethical conduct. The expert then refused to testify, which left SCE unable to use a report that the expert had prepared. The Court of Appeal found that it was reasonable for the trial court judge to order that SCE be allowed to use this report as evidence, even without direct testimony to support it. But the other sanctions "grossly outweigh the damage done," it concluded. The court noted that there was no "evidence of secret scheming on the part of Della Donna to de-

liberately deprive defendants of their chosen expert." Instead, it held, "At worst...Della Donna overreacted to what was otherwise a comedy of errors." The appellate panel wrote that to force Wylie Aitken to pay for SCE's experts "could result in defendants spending more on experts than they ordinarily would since they have a 'free ride.'" Moreover, the monetary sanctions "have put defendants in a better position than they would have been [in] had these events never occurred." Thus, it ruled, these sanctions "were purely punitive additions and cannot remain." Della Donna told *Microwave News* that she left Wylie Aitken in the fall of 1996.

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The NIEHS is putting the finishing touches on the second of its three **science review** symposiums. The meeting, slated for January 12-14, 1998, in **San Antonio** will address **epidemiological studies**. The first symposium, held last March in Durham, NC, was on *in vitro* biological effects. At that meeting, physicists and biologists clashed over the possibility of low-level EMF effects (see *MWN*, M/A97). A site and date for the third symposium, on

in vivo effects, has not yet been set. The final product of these reviews will be the NIEHS's report to Congress on EMF health risks. A brochure with more information on the January conference will be available soon. Contact: Dr. Mary Wolfe, EMF RAPID, NIEHS, PO Box 12233, MDED-16, Research Triangle Park, NC 27709, (919) 541-7539, Fax: (919) 541-0144, E-mail: <wolfe@niehs.nih.gov>.

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EMF Keeptrack folded on September 1. The newsletter was published by the Center for Energy Information (CEI), a division of **Central Maine Power** in Winthrop, ME. In an August letter to subscribers, Publisher Alan King wrote that, with the release of the NCI study and the NAS-NRC report, "our mission to bring you objective and timely news on important EMF developments now comes to a close." Highleen Roberts, a CEI staffer, explained to *Microwave News* that there had been "declining interest" now that "this problem has more or less been solved." The CEI's "consumer" newsletter, **Between the Lines**, closed down last year (see *MWN*, J/A93).

EMF—Leukemia Test Lawsuits Discontinued in U.K.

The key lawsuits over electromagnetic fields (EMFs) and childhood leukemia in Britain were withdrawn by the plaintiffs in mid-September. All publicly funded EMF litigation in the U.K. has now come to a halt.

"I am very disappointed to have to discontinue the two lead actions in the U.K., but following the publication of the study by the U.S. National Cancer Institute, it has become clear that we would have very great difficulties in succeeding in court," solicitor Martyn Day told *Microwave News*. (On the NCI study, see *MWN*, J/A97 and p.6.)

The National Grid Co. and Norweb, the utility defendants in the suits, welcomed the move in a joint statement. The NCI study "adds strong weight" to the view that EMFs do not pose a human health hazard, the utilities declared. They asserted that the lawsuits were dropped because the plaintiffs' experts had come to a similar conclusion.

A major study of childhood cancer by Britain's Coordinating Committee on Cancer Research, based in London, is scheduled to be published next year (see *MWN*, J/A91). If the results of that large-scale effort support an EMF-cancer connection, noted Day, "we may be able to return to the legal fray." "But for the time being," he concluded, "we have no option but to drop the claims against the electricity industry here in the U.K."

Legal deadlines required a decision by October on whether to proceed with the two cases. By putting them aside for now, Day and his clients preserved the option of reactivating the suits if they decide that the climate has become more favorable. Last year, Day observed that, "In Britain, the courts are unlikely to consider this issue seriously more than once" (see *MWN*, J/F96).

Day, of Leigh, Day & Co. in London, won funding from the Legal Aid Board in 1993 for his work on the *Studholme* case. Objections from Norweb and the National Grid Co. prompted the board to reverse itself in 1995, but this decision was appealed

and funding was restored (see *MWN*, J/F96). British utilities then discussed the establishment of an £8 million (\$13 million) legal fund to combat EMF lawsuits (see *MWN*, N/D96).

The Studholme family's lawsuit charged Norweb with responsibility for the 1992 death of their 13-year-old son Simon from leukemia (see *MWN*, J/A93 and M/A94). Simon's head was exposed to particularly high EMFs, since he slept with his head on the other side of the wall from the electric meter, through which passed all the electric current used in the home. A 47-year-old neighbor whose bedroom was similarly located had died of leukemia in 1989 (see *MWN*, S/O93). Besides the household electric wiring, the suit also blamed exposure from nearby power lines and an electrical substation.

The second test case was a suit brought by the parents of Tom Loxton, a 12-year-old with leukemia. Their home in the south Birmingham area was located 20 meters away from a 275 kV power line. Day had at first been granted legal aid funding for two other childhood leukemia cases, but he subsequently agreed with the Legal Aid Board not to pursue those until the *Studholme* and *Loxton* lawsuits were resolved. He also represented families in two EMF-brain tumor cases in Wales (see *MWN*, J/A94), but agreed not to proceed with these actions unless his clients in the leukemia cases were successful. With the two lead cases now discontinued, these other suits are in limbo as well.

Day's firm is heavily involved in environmental cases, and the *Financial Times* described him as bringing "fear to British boardrooms by pioneering American-style aggressive litigation" (see *MWN*, J/F96). A 1994 *Guardian* article described his wife as joking that she could not give the police much help if he were murdered: The list of potential suspects would be too long. But unlike U.S. litigators, when Day wins money for his clients, he himself gets none of it. His only financial reward comes from public legal aid funding.

In Germany, Support for Prudent Avoidance: A New EMF Law Aims for "Reasonable" Reductions

Under Germany's new EMF law, children and the infirm must never be exposed to power-frequency magnetic fields above 1 G, or electric fields above 5 kV/m, from new or substantially modified EMF sources.

These limits also apply everywhere that members of the general public remain for "several hours." This broader standard may be exceeded, however, for brief periods and in some outdoor spaces, as long as peak field strengths remain under 2 G and 10 kV/m and the averages under 1 G and 5 kV/m. Existing facilities must comply with these limits within three years.

By prohibiting peak fields in the 1-2 G and 5-10 kV/m ranges near schools, homes, hospitals, day-care centers and playgrounds, the German law ensures that average fields remain "below or at least not substantially in excess" of 100 mG, according to the Federal Ministry for Environment, Nature Conservation and Reactor Safety. The ministry said that it included the restriction "in the interests of precaution"—to protect against "possibly unsafe biological effects" of EMFs below 1 G.

Ordinance 26 of the Federal Emission Control Act, the nation's principal air-quality statute, was adopted on December 16, 1996. When the law took effect on January 1, 1997, Germany became the first country with national, legally binding standards for public exposures to power-frequency EMFs.

The 50 Hz limits follow the recommendations issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 1989 and reaffirmed in 1993 (see *MWN*, M/J89, J/F 90 and M/J93). The ICNIRP guidelines "reflect the recognized and scientifically secure state of knowledge at this time," Environment Minister Dr. Angela Merkel asserted in a July 10, 1996, statement to the German parliament.

Setting limits below ICNIRP-recommended levels "would entail much greater expense without any tangible benefit," Merkel maintained. In her view, those who raise the issue of "alleged health effects" at levels below the ICNIRP guidelines are motivated by "diffuse fears and a nebulous skepticism toward technological innovation."

The environment ministry drafted the new standards in consultation with the German Radiation Protection Office. Dr. Jürgen Bernhardt, who heads the office's medical radiation effects department, has long been a member of the ICNIRP and is currently its chair.

In a commentary published with the text of Ordinance 26, the environment ministry's Wolfgang Kemmer noted that "there are indications" that EMFs have nonthermal biological effects. But Kemmer considered it "at least doubtful" that such effects are significant, and added that a number of "international bodies" have concluded that "there is no connection between everyday exposures to EMFs and an increased incidence of cancer."

Kemmer concluded that the purpose of the EMF law is not to lower exposure limits that already protect public health, but to bring previously fragmented provisions for EMF safety together in a single statute.

The desire to avoid a patchwork of EMF limits in the various

German states provided an important impetus for the new ordinance, according to Dr. Hans-Ulrich Paul, an engineer with RWE, an electric utility. Some states were considering limits that were "frighteningly low—1 mG, for example," Paul told his audience at a conference hosted by the *EMC Journal* in Frankfurt in April.

According to the environment ministry, the German Radiation Protection Commission considers 100 mG to be the lower limit of "reasonable" EMF mitigation. The environment ministry estimated that EMF compliance costs will be about 100 million marks (approximately \$70 million) over the next few years.

"The new ordinance has started a discussion on possible reduction techniques," Dr. Hauke Brüggemeyer of the Ecology Office of Lower Saxony told *Microwave News*. "It turns out that a lot of these reductions, especially for transformer installations, can be made with very little extra cost."

The new rules apply to power lines with voltages above 1 kV and to transformers that step down voltages between 1 kV and 220 kV (transformers for voltages above 220 kV are already covered by a different ordinance). They do not cover noncommercial installations or household appliances. Occupational exposures of electrical utility workers are also outside the scope of the regulations and are covered by occupational health and safety laws.

Ordinance 26 also sets limits for the 16.67 Hz fields generated by electric railways: 3 G for magnetic fields and 10 kV/m for electric fields. Guidelines for high-frequency radiation are also specified.

The largest opposition party in the federal parliament, the Social Democratic Party (known by the German acronym SPD), introduced a resolution last January 15 calling for the prohibition of peak fields above 100 mG near hospitals, residences, schools, day-care centers and playgrounds. The resolution reiterated the SPD's call for the minimization of EMFs "according to the state of science and technology."

According to the newsletter *Elektrosmog-Report* (December 1996), based in Cologne, a legislative attempt to lower the limit for average field strengths to 100 mG in sensitive areas did not succeed, due in part to resistance from electric utilities and railroads.

Citing a dearth of "solid and undisputed" scientific findings on the health hazards of EMFs, the SPD also asked the government to establish an independent panel of experts to direct an intensified research effort. In his commentary, Kemmer dismissed the notion of a scientific split on EMF health effects: "Scientific opinion holds that there are thresholds for radiation intensity below which no damage is possible."

The SPD has long maintained that addressing "long-term biological effects such as have been demonstrated in many studies" should be "the chief regulatory task" of the EMF ordinance.

The SPD resolution was referred to the parliament's environment committee, where it awaits further action. The resolution's prospects for adoption are dim, unless it can win support from Chancellor Helmut Kohl's Christian Democrats or their coalition partners, the Free Democrats.

Personal Injury Suits Over Power Lines Declining; EMF Plaintiffs' Lawyers' Group Now Dormant

EMF-cancer litigation has dropped off markedly from the level of a few years ago, according to lawyers for both plaintiffs and electric utilities. The Electromagnetic Radiation Case Evaluation Team (EMRCET), formed in 1990 to assist EMF plaintiffs, is now all but defunct. Only a few important EMF lawsuits are still pending.

"EMRCET was very useful for those of us involved in EMF cases," said Denver attorney Bruce DeBoskey of Silver & DeBoskey. "It hasn't been active lately because few of us are doing this kind of work." DeBoskey represented Nancy Jordan, whose EMF-lymphoma lawsuit was withdrawn in May due to her declining health (see *MWN*, J/A97).

"We came very close in *Jordan*," DeBoskey told *Microwave News*. "It's very challenging to prove cancer causation. That's just as true for EMFs as it is for any other carcinogen, from chemicals in the workplace to tobacco." DeBoskey said, "If someone came to me with an EMF case, I'd take a good look at it"—but he is not now involved in any EMF litigation.

"It's pretty quiet," said Southern California Edison (SCE) staff attorney John Tinker in Rosemead. "And it seems to be getting quieter and quieter the more scientific information comes out." Tinker remarked that, "Plaintiffs' lawyers are just not interested in pursuing EMF litigation. It doesn't seem worthwhile to them."

SCE currently faces three EMF personal injury cases, but the *Younkin* and *Muir* cases have both been continued, pending the outcome of the third case, *Johsz v. SCE* (see p.2). *Johsz*, which is on appeal, grew out of a cluster of cancer cases in a real estate office in Southern California, and Tinker does not expect oral arguments to begin before March 1998.

"EMRCET still exists as an informal network," said Seattle attorney Michael Withey, EMRCET's founder. But he conceded that as an organization it has been inactive for nearly two years. Withey recently left Schroeter, Goldmark & Bender to start a new firm, Stritmatter, Kessler, Whalen, Withey. He told *Microwave News* he has no EMF plaintiffs at present.

Withey said he now receives two or three times as many calls about cellular phone towers as he does about power lines. But he argued that public concern about power-line health effects has not gone away: "It's not like nobody cares if they put up a new transmission line in a neighborhood—just the opposite. They're not building power lines next to schools anymore." Withey pointed to EMF-property cases as an area of continued legal activity, citing ongoing lawsuits in New York (see *MWN*, J/F97).

"No one joined EMRCET to make a pile of money," attorney Aaron Simon said in an interview. "It was not seen as the pot of gold at the end of the rainbow." Simon, of Kazan, McClain, Edises, Simon & Abrams in Oakland, CA, worked with Withey on the *Zuidema* case (see *MWN*, J/A91 and M/J93). This lawsuit focused on a child with Wilms' tumor, a type of cancer that had not been specifically linked to EMFs. "I never had any illusions about winning a Wilms' tumor case in San Diego," observed Simon, "but we did raise a lot of people's consciousness about the issue, and I feel very proud of that."

Former EMRCET member Kieron Quinn of Baltimore told *Microwave News* that he withdrew from the EMF field about a year and a half ago. When asked about EMF litigation today, he answered, "You'd have to talk with someone who's closer to it."

"It's been several years since a new EMF personal injury case was filed," commented Tom Watson of Watson & Renner in Washington, who represents many utility companies. "I think the results in court have been consistent, and that has sent a fairly clear message to the plaintiffs' lawyers that this is not a fruitful area to pursue." His firm is now involved in only one EMF personal injury lawsuit, *Runge v. Indiana-Michigan Power Co.*, a miscarriage case.

An EMF lawsuit is "an expensive undertaking," noted Watson, "particularly when you have defense firms like ours with substantial resources and experience." Indeed, concerns about potential costs were cited by Leonard Glazer when he recently withdrew his suit against Florida Power and Light (see *MWN*, J/A97).

Watson also pointed to the importance of scientific developments, particularly the recent National Cancer Institute (NCI) study of childhood leukemia (see *MWN*, J/A97). The research review by the National Academy of Sciences-National Research Council (NAS-NRC) was also "helpful from an industry perspective," Watson said, "but the content of it was not that different from what had gone before" (see *MWN*, N/D96). The NCI study was cited by a British attorney in the decision to drop two test EMF cases in the U.K. (see p.3).

Milham Honored in Italy

Dr. Samuel Milham Jr. will receive the Ramazzini Award on October 25 from Italy's Collegium Ramazzini in Carpi for his epidemiological studies on EMFs and cancer.

The collegium is a nonprofit group that addresses environmental and occupational health and safety issues. It was founded in 1982 by the late Dr. Irving Selikoff of the Mt. Sinai School of Medicine in New York City—a pioneer in the study of asbestos and cancer. Dr. Cesare Maltoni of the Institute of Oncology in Bologna, Italy, is the collegium's secretary general.

Each year, the collegium honors a scientist who has made "the greatest contribution to the progress of occupational and environmental medicine." Milham, formerly at the Washington State Department of Social and Health Services, was the first to observe elevated rates of leukemia mortality among EMF-exposed workers (see *MWN*, J/A82).

Past winners include Drs. David Hoel, Alice Stewart and Arthur Upton, as well as Dr. David Rall, the former head of the U.S. National Institute of Environmental Health Sciences (NIEHS), who is serving as the collegium's treasurer.

The day after Milham accepts his award, talks will be given by Canada's Dr. Gilles Thériault, Sweden's Dr. Anders Ahlbom and the U.S.'s Dr. Genevieve Matanoski at an epidemiology workshop chaired by the collegium's president, Dr. Philip Landrigan of Mt. Sinai, and Rall.

NCI EMF Study: The Letter BEMS Would Not Send

In July, Dr. Martin Blank of Columbia University in New York City, president of the Bioelectromagnetics Society (BEMS), asked the BEMS executive committee for permission to send the letter reprinted below to the *New England Journal of Medicine*. The letter criticizes the Journal's handling of the NCI study of power-frequency magnetic fields and childhood leukemia by Dr. Martha Linet and coworkers.

Dr. Betty Siskin of the University of Kentucky, Lexington, BEMS president-elect, told *Microwave News* that the BEMS Executive Committee withheld its approval because the letter did not go through "the appropriate committee—the Public Policy Committee." The chair of that committee, Dr. Richard Luben of the University of California, Riverside, declined to comment. Luben is also on the executive committee.

Microwave News has learned that the six-member executive committee was split evenly on sending a letter. Besides Blank, Drs. Paul Gailey of the Oak Ridge National Lab in Oak Ridge, TN, and Robert Liburdy of the Lawrence Berkeley Lab in Berkeley, CA, were in favor, while Dr. Ben Greenebaum of the University of Wisconsin-Parkside in Kenosha was opposed, as were Luben and Siskin.

To: The Editorial Board
New England Journal of Medicine

Publication of the Linet article (July 3, 1997) has raised concern about the quality of the *New England Journal of Medicine* (NEJM) peer-review process in this instance.

Results of the Linet study have been eagerly awaited by the scientific research community, many of whom are members of the Bioelectromagnetics Society. BEMS is an internationally recognized professional organization with an established record of excellence in the publication and conduct of peer reviews of scientific work in this area. As expected, the Linet paper has been the subject of close scrutiny. I can attest to widespread criticism among mainstream EMF researchers of your conclusion that the paper decisively negates a link between childhood cancer and EMFs, when the reverse appears to be true. The study should report an increase in childhood leukemia at 3+ mG (of 72%). The p-value of the trend has been described in the article as nonsignificant based on a two-sided analysis, when the more appropriate one-sided analysis yields 0.045, or a statistically significant result.

Apparent misinterpretation of the data has resulted in false assurance to readers. The findings yield further support for an association between EMF exposure and childhood leukemia, not the opposite, as reported in the paper.

Competent peer review is essential to maintain confidence in the scientific process. The *NEJM* may wish to reexamine the adequacy of its pool of peer reviewers for EMF papers, and in particular its choice of author for the commentary. Dr. [Edward] Campion's inexpert grasp of basic bioelectromagnetics is evident, and has cast further doubt upon the integrity of the article's scientific worth, the *NEJM*'s review process and the validity of its own conclusions.

Sincerely yours,
Martin Blank, PhD
President (1997-98), Bioelectromagnetics Society

Watson noted that in mid-September in London, U.K., he was a featured speaker at a private conference for British insurance underwriters on the lessons of EMF litigation and their relevance to other environmental lawsuits. "There were over 200 registrants," said Watson, "and maybe that's some indication that this issue is not completely closed." His firm is "very busy dealing with cellular telephone issues," he said, including "providing advice to cellular phone manufacturers."

One important EMF-cancer case that is still pending is Melissa Bullock's lawsuit against Connecticut Light and Power Co. (see *MWN*, J/F92). Bullock lives on Meadow Street in Guilford, CT, the site of a cancer cluster described in Paul Brodeur's article, "Calamity on Meadow Street," which appeared in the July 9, 1990, *New Yorker*. Bullock's attorney, James Horowitz of Koskoff, Koskoff & Bieder in Bridgeport, CT, said that the *Bullock* case is expected to go to trial in about a year.

"Clearly some of the studies that are coming out—and even more, the way they're reported in the popular press—look like they're saying there's no evidence of a connection" between EMFs and cancer, Horowitz said. "But the executive summaries often differ dramatically from what's in the substance of the reports." He contended that, "When you get into the substance, it's clear that epidemiologists are saying there's something going on here," and added, "You continue to get study after study that shows an association."

Postscripts to the NCI Study

The National Cancer Institute's (NCI) epidemiological study of power lines and childhood leukemia continues to be a hot topic (see *MWN*, J/A97 and box at left):

- A commentary by the Standing Committee on Epidemiology of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) concludes that the NCI's findings for measured fields "are suggestive of a positive association" between exposure to EMFs and leukemia risk: "They are in the direction of a positive result but not convincingly so." In contrast to the *New England Journal of Medicine* editorial that accompanied the NCI paper, the ICNIRP panel states that the NCI results "provide some justification for further studies." The committee is chaired by Dr. Anders Ahlbom of the Karolinska Institute in Stockholm, Sweden. Other members include Drs. Elisabeth Cardis, David Savitz, Jan Stolwijk and Anthony Swerdlow. The commentary can be found on the ICNIRP's Web site at: <www.sz.shuttle.de/dm1001/icnirp.htm>.
- Details of the NCI study's exposure assessment effort appear in a paper by a team led by the NCI's Ruth Kleinerman in the September 1997 issue of *Epidemiology* (8, pp.575-583). A paper on the use of wire codes by the NCI's Dr. Robert Tarone is forthcoming, as is a report on static magnetic fields by Dr. William Kaune, a consultant based in Richland, WA.
- The *New England Journal* has accepted a number of letters on the NCI study—including those from Dr. Richard Stevens of the Battelle Pacific Northwest Labs in Richland, WA, and from Dr. Daniel Wartenberg of the Environmental and Occupational Health Sciences Institute in Piscataway, NJ (see *MWN*, J/A97).

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On August 25 the largest telecommunications company in Belgium, **Belgacom**, announced that “major results...are now available” from two cellular phone safety studies that it has sponsored. “The conclusion of all this,” stated Belgacom’s press release, “appears to be that research based on the most authoritative and independent sources has yet to prove the negative consequences of GSM phones on human health.” A **Reuter** dispatch on the press conference, held in Brussels, reported that cellular phones “probably do not cause physical harm, according to a Belgian study.” And the trade journal **RCR** told its readers that “a new study” had found that GSM phones “are unlikely to cause brain cancer.” But one of the Belgacom-funded researchers, Dr. **Luc Martens**, told *Microwave News* that, “It is a little bit too early to give definitive conclusions.” Martens, of the Department of Information Technology at the University of Gent, has been working on dosimetry, and he noted that his team does not yet have any quantitative results. “We will certainly have some definitive conclusions at the end of this year when we have finished our study,” he promised. “I think that the most important (best dosimetry and probably the most ‘in-depth’ work) still has to be written,” stated Dr. **Luc Verschaeve** of the Flemish Institute for Technological Research (VITO), leader of the other Belgacom study. Some of the research his group has done for Belgacom has been published, while other work is “being submitted or in press or not yet submitted,” Verschaeve explained. Though he has yet to conduct a statistical analysis of his results, Verschaeve indicated that they did not appear to point to any synergy with a chemical mutagen, in contrast to his earlier study of close-range exposures from a simulated base station (see *MWN*, N/D96). Martens reported that, “The mobile phones mostly satisfy the limits proposed by CENELEC [the European standards organization]. However, we are not so sure about the accuracy” of the initial results. Last May, Finland’s State Technical Research Center (VTT) issued a press release with the headline NO HEALTH HAZARDS FROM MOBILE PHONES. Only later did it emerge that the VTT experiment on whether cellular phone radiation promotes the growth of cancer in mice did not yet have any cancer results, and that the dosimetry had just begun (see *MWN*, J/A97).

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The magazine **2600**, which bills itself as “The Hacker Quarterly,” has two interesting articles on the cellular phone front in its Summer 1997 issue. “**Omnipoint** in New York City” (14, pp.25-29), by **Syringe**, is a listing of every antenna of the Omnipoint PCS system in New York City, including street addresses and site identification numbers. It is unclear whether this list was obtained by dumpster diving, via computer or by some other method. Inquiries to **2600** by phone, fax and even E-mail all went unanswered. “**GSM Comes to North America**” (14, pp.8-13), by the famed **Phiber Optik**, is described by the author as “a primer on GSM,” though he concedes it is “a little technical for a primer.” Four- and six-letter acronyms hurtle across the page as Optik gives a whirlwind description of how the GSM cellular phone system works. The section on caller authentication announces itself as “The part you’ve been waiting for!” This might

make cellular service providers nervous. But the staff at **2600** argues that while “you can use knowledge in evil and stupid ways, stopping the flow of that knowledge isn’t the way to prevent” such abuses. The issue can be ordered for \$6.25 (\$7.50 overseas) from: **2600**, Subscription Dept., PO Box 752, Middle Island, NY 11953.

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Stamford, CT, has a way of ensuring that new PCS antennas comply with the FCC’s RF/MW radiation standards. It has drawn raves from the community but has the industry running to the state legislature for relief. The key is an RF/MW monitoring program, which, under a 1991 ordinance, is the job of the Stamford Department of Health and a panel of three experts paid for by the applicant. The health department chooses the first expert, the applicant picks the second and these two together select the third. The ambient RF/MW levels at the proposed site are measured, as are the levels at similar nearby sites. Later, the results are presented at a public hearing. If the antennas are approved, the measurements are repeated by the health department four times a year to ensure compliance. “Everybody feels that the process is good,” **Phyllis Mazik** of the Stamford health department told *Microwave News*. “It’s absolutely fantastic,” **Philip Berns**, president of the Environmental Council of Stamford, a citizens group, said in an interview. “It should be implemented all over the country.” The industry, however, is flinching at the length and the financial costs of the process. “It’s cumbersome and I don’t think it’s necessary for all of these sites,” said **Ronald Petersen** of Lucent Technologies in Murray Hill, NJ, who has twice served as an expert. Several companies, including Bell Atlantic NYNEX, MCI and Sprint, successfully lobbied the Connecticut legislature for a bill to bring PCS transmitters under the jurisdiction of the state’s Department of Public Utility Control, which already has authority over cellular antenna siting, according to state Rep. **Janet Lockton**. In June, the bill was defeated, but Lockton expects it to be reintroduced in February at the next session. Mazik, **Henry Kues** of the Johns Hopkins University Applied Physics Laboratory (JHU-APL) in Laurel, MD, and **John Monahan** of the FDA in Rockville, MD, described the Stamford review process in a recent article in the *Johns Hopkins Applied Physics Laboratory Technical Digest* (18, pp.288-294, 1997). “Overall, this process offers a current scientific base that allays many fears and concerns of both the general public and the local government,” wrote Kues, who served as an expert on two Stamford cases, and his coauthors. For a copy, contact: Kues, Research & Technology Development Center, JHU-APL, Johns Hopkins Rd., Laurel, MD 20723, Fax: (301) 953-6904, E-mail: <hak@aplcomm.jhuapl.edu>.

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Two September conferences on opposite sides of the globe had wireless safety as their topic. PERM-IT ’97, held September 8-11 in **Adelaide**, Australia, was jointly organized to address radiation issues by four Australian medical and bioengineering societies. One day of the conference was devoted to **Mobile Phones**

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and Other Communication Devices: Health Issues and Current Research. Speakers included Australia's Drs. Ken Joyner and Peter French, the U.K.'s Dr. Alastair McKinlay and the U.S.'s Dr. Mays Swicord. Five days later and half a world away, an industry conference on **Mobile Phones—Is There a Health Risk?** convened in **Brussels**, Belgium, September 16-17. Featured scientists included France's Dr. Bernard Veyret, Germany's Dr. Gerd Friedrich, the U.K.'s Dr. Camelia Gabriel and the U.S.'s Drs. C.K. Chou, Henry Lai (see p.14), James Lin and James Trosko, as well as U.S. attorney Curt Renner. The collection of papers from this conference can be purchased for £249 (\$400) from: Bookings Dept., IBC Technical Services, 57-61 Mortimer St., London W1N 8JX, U.K., Fax: (44+171) 636-1976.

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While the wireless telecommunications industry impatiently waits for the FCC to rule on moratoriums (see p.10), **Palm Beach County, FL**, has elected to ban new towers from school property. The county school board enacted a 90-day moratorium in March to determine how other counties have handled applications for cellular and PCS towers near schools. The board renewed it in May for another 90 days and on September 3 voted 6-1 to extend the ban "indefinitely." There are eight towers already on Palm Beach County school property that will remain operational for the remainder of their leases. What was surprising to some was that the dissenting voter, **Diane Heinz**, had been an outspoken opponent of towers at the schools. Heinz did not respond to calls for comment, but observers believe that she was protesting the failure to remove the eight existing towers. The board had initially supported putting the towers on schools, but was apparently swayed in part by the efforts of **Families for Appropriate Cellular Tower Sites (FACTS)**, a citizens group based in Boca Raton. "I think we really hit on the health aspect pretty well. We bombarded the school board with health studies," **Candice Brown** of FACTS told *Microwave News*. Brown pointed out that the Palm Beach County school district is one of the largest in the country, serving 130,000 students. "For God's sake, don't put this potentially dangerous technology over the kids," she said. "The burden

COST 244's Koren Dies

Dr. Zlatko Koren, a former Croatian Minister for Science and the founder and chairman of COST 244, the European EMF and EMR research initiative, died suddenly on August 6 from head injuries sustained in a car accident on the Adriatic coast.

Born on August 18, 1942, Koren was educated at the universities of Zagreb and Stockholm. After receiving an appointment at the University of Zagreb, he rose quickly to become a professor of electrical engineering and a vice-dean.

In 1992, Koren led the drive to organize COST 244 on the "Biomedical Effects of Electromagnetic Fields." At the end of the five-year project, a second effort was launched—COST 244bis. In addition, Koren was a member of a University of Zagreb research team that found *in vitro* chromosomal damage due to radar radiation. This finding corroborated a parallel epidemiological study that found genetic abnormalities among radar technicians (see *MWN*, M/J92).

At the time of his death, Koren was directing a Croatian Ministry of Science project on the bioeffects of EMFs and EMR. He was also leading a group that was in the process of drafting a national non-ionizing radiation law for Croatia.

of proof should be on the industry." One of the companies seeking tower space at Palm Beach County schools, **Sprint PCS**, seems unfazed by the ban. "The moratorium is a moot point for us, because we have already decided to locate at other sites," Dan Wilinsky of Sprint PCS in Boca Raton said in an interview. The Palm Beach County ban follows the California Public Utilities Commission's 1995 advice to keep antennas away from schools and hospitals (see *MWN*, N/D95). Last year, New Zealand's Ministry of Education issued a policy statement preventing towers from being built at public schools (see *MWN*, S/O96).

Norwegian Investigation of Birth Defect Cluster Focuses on RF/MW Radiation from Electronic Warfare Systems

The Norwegian navy's investigation into the cause of a cluster of birth defects is centered on exposures to radiofrequency and microwave (RF/MW) radiation from electronic warfare systems. RF/MW radiation is "the one thing we are looking at," said Dr. Jan Helge Halleraker, the chief medical officer at the Haakonsværn Naval Base in Bergen, who is leading the inquiry (see *MWN*, J/A96).

Between 1987 and 1994, 11 children were born with defects—including five with clubfoot—to seamen who served on the *Kvikk*, a motor torpedo boat, Halleraker said. In an interview with *Microwave News*, he pointed out that while the Norwegian navy has 30-40 similar torpedo boats, the *Kvikk* was a "very special ship" because it was the only one with high-power electronic warfare equipment on board.

The Norwegian navy hosted a NATO conference, August 26-28, to discuss the possible role of RF/MW radiation in the cluster. Among those at the meeting were representatives from the Dutch, U.K. and U.S. navies. The conference, which was held in Bergen and in Trondheim, was closed to the press.

"A lot of [RF/MW] measurements have been made," Halleraker said, "and there are a lot more to come." He declined to discuss specific numbers, however. The *Kvikk* was damaged some time ago, but a copy was built in order to measure the radiation levels from radar and communications equipment "all over the ship," according to Halleraker.

While Halleraker is leading the health study team, Helge Olsen, a senior engineer in the technical department of the Royal Norwegian Navy's Materiel Command, is in charge of the mea-

surement effort.

Two epidemiological studies are under way at Haukeland Hospital in Bergen, which, Halleraker stressed, is “an independent institution not linked to the Norwegian navy.” The first will try to see if the *Kvikk* cluster could have occurred by chance: The families of all those who served on navy ships over the last 30 years will be matched with data from the national birth defects registry. The second study is of 300-400 children who were born with clubfoot at the Haukeland Hospital.

Meanwhile, there is renewed interest in another cluster, in which six children with clubfoot were born to employees of the Værlose airport, near Copenhagen, Denmark, between 1989 and 1994. No cause of that cluster was ever found, but Halleraker

said that this investigation “did not look at electromagnetic radiation.”

The *Kvikk* cluster has also drawn attention to a clubfoot cluster, first reported by Dr. Peter Peacock, among children of helicopter pilots at Fort Rucker, AL, in 1969-70. Although there were suspicions that the cluster was linked to radiation from radar, the U.S. Army blocked access to medical records, stymieing the investigation (see *MWN*, J/A96). Halleraker said that he knew the Peacock study “very well.”

Some results of the measurement and epidemiological studies will be made public in November, Halleraker said. For the present, he does not want to speculate about any conclusions. “It’s still a question mark,” he said.

Cell Phone-Brain Cancer Suit by Industry Insider Is Withdrawn

The brain cancer lawsuit brought against Motorola by Debbra Wright was withdrawn on August 8. A former manager with Bell Atlantic Mobile and US West Cellular, Wright had used only Motorola cellular phones. She filed the suit in March 1995 (see *MWN*, M/A95).

“She can’t afford to get the experts to pursue the case, and we can’t afford to put out that money ourselves,” said Wright’s attorney, Robert Holstein of Holstein and Associates in Chicago. “It’s a shame, because she really deserves to have her case heard,” he told *Microwave News*.

“This is the latest in a series of developments exposing the hollowness of this type of claim,” Motorola spokesperson Norman Sandler said in an interview. “In cases up to now, plaintiffs have either been unable to produce witnesses to support their claims, or the witnesses they’ve offered have been unable to withstand judicial scrutiny.”

Wright said her lawyers had told her that to continue with the case, she would have to come up with between \$400,000 and \$500,000, an amount that she could not afford. “I don’t *think* we said that,” responded Aron Robinson of Holstein and Associates. When asked if any other figure had been cited, Robinson said, “I can’t disclose attorney-client conversations.”

Speaking in a September 9 telephone interview, Wright expressed surprise that Holstein’s firm had moved to drop the case. “They never told me,” said Wright. She explained that her attorneys had discussed withdrawal as one possible option, “but there wasn’t any final decision. We had discussed some stuff, but they hadn’t gotten back to me.” She said she only learned of the action when called by *Microwave News*.

The motion to withdraw the case was filed on August 6 and granted two days later. Asked why Wright was never informed, Robinson answered, “I can’t comment on that.”

“There were no settlement discussions,” said Sandler. “We would never have engaged in them, because we were determined to see this thing through on the facts.” As to whether Motorola had received settlement proposals from Wright’s attorneys, Sandler said, “One-way offers do not constitute discussion. I can’t be adamant enough about that.”

Wright’s lawsuit was notable for coming from a former industry insider, someone who was twice named salesperson of the year

for US West’s Southwest region. Shortly after filing suit, she told *Microwave News* that many people in the industry told her they supported what she was doing. Wright described herself as having been “a heavy user” of her cellular phone, and noted that her tumor is located “exactly where I’d been holding the phone.”

The complaint not only charged that phones made by Motorola are responsible for Wright’s brain tumor—it also accused the Cellular Telecommunications Industry Association (CTIA) and its research group, Wireless Technology Research (WTR), of conspiring to mislead the public into thinking that cellular phones had been proven to be safe. As one example, the complaint cited a 1993 CTIA statement that, “There have been thousands of studies that have shown these phones to be safe.” But the trial judge dismissed the claims against the CTIA and WTR last May, leaving Motorola as the sole defendant (see *MWN*, M/J97).

Sandler emphasized that, “Wright was one of four Illinois cases that were withdrawn in August. The others were *Hoffman*, *Pogue* and *Crist*,” all personal injury lawsuits that blamed Motorola phones for causing or aggravating cancer (see *MWN*, J/A93, J/F94 and N/D94). According to Sandler, “That means that out of eleven lawsuits beginning with *Reynard*, only two survive” (on *Reynard*, see *MWN*, M/J92, J/F93 and M/J96). He named the two active lawsuits as the *Rittmann* case in Texas (see *MWN*, M/J96) and the *Busse* class action suit in Illinois (see *MWN*, J/F96). There have been no new cellular phone-cancer claims against Motorola since *Busse* was filed in October 1995, Sandler added.

Sandler’s count does not include the lawsuit filed by engineer Robert Kane against Motorola, his former employer. Kane charges that his brain cancer is due to RF/MW exposure from the testing of a new cellular phone unit that was under development (see *MWN*, J/F94, M/A94, J/A94, M/A95). “The *Kane* lawsuit is a somewhat different matter,” Sandler stated. “We have never considered that a cellular phone case *per se*.”

“We’re going ahead with the Bob Kane case,” said Holstein. “The experts are in place, and we’re gearing up for trial.” While there is no firm trial date yet, he expects it to be in the spring of 1998. “If this industry thinks they’re any better off than tobacco, they should think again,” Holstein contended. “The expertise for cell phones is here right now.” Holstein did not respond to repeated requests for his list of expert witnesses in Kane’s lawsuit.

FCC Reaffirms Health Rules Based on NCRP Limits

The Federal Communications Commission (FCC) is standing by its decision to base its radiofrequency and microwave (RF/MW) limits mainly on those recommended by the National Council on Radiation Protection and Measurements (NCRP) in 1986. The FCC held its ground in the face of an intense lobbying campaign by the electronics and communications industries and the U.S. military.

In a decision released on August 25, the FCC stated that the limits, which it adopted last year, "are appropriate," because they address both safety concerns and the "growing marketplace demand for communications services" (see *MWN*, J/A96).

Industry had urged the FCC to adopt the 1992 ANSI/IEEE standard in its entirety (see *MWN*, M/J94 and M/A96). Among those favoring this approach were the Cellular Telecommunications Industry Association (CTIA), the Electromagnetic Energy Association (EEA), the National Association of Broadcasters (NAB), US West and the Department of Defense. In contrast, the federal health agencies objected to provisions of the ANSI/IEEE standard (see *MWN*, J/F94).

"We are not a health and safety agency," the FCC's Dr. Robert Cleveland told *Microwave News*. For this reason, he said, "We have based our guidelines on the recommendations of the Environmental Protection Agency, the Food and Drug Administration and the National Institute for Occupational Safety and Health." Cleveland is leading the commission's effort to address RF/MW radiation safety concerns.

The FCC used the same argument to answer activists who want the commission to adopt even stronger regulations. "It would be impractical for us to independently evaluate the signifi-

cance of studies purporting to show biological effects, determine if such effects constitute a safety hazard and then adopt stricter standards than those advocated by federal health and safety agencies," the FCC stated in its August 25 decision.

In a major change, the FCC is now requiring that *all* existing facilities be in compliance with its RF/MW rules by September 1, 2000.

A number of communications companies asked the FCC to reinstate its previous blanket exclusion of all paging and cellular base stations. Last year, the commission decided to require routine evaluation of cellular and PCS antennas mounted lower than 10 meters above the ground and with a total output power over 1 kW. It noted that its decision was based on its own calculations, which showed that in some cases there was the potential for over-exposures. "Nothing in the petitions provides new information to indicate that these calculations or analyses are incorrect," according to the FCC.

A major company to come up empty-handed was Hewlett-Packard, which sought a categorical exclusion for certain millimeter-wave devices (see also *MWN*, M/A96 and M/J97). The FCC did bend a little, however, and will now require an evaluation for a device operating above 1.5 GHz only if its effective radiated power is 3 W or more.

The complete text of the FCC's revised rules can be found on the World Wide Web at: <www.fcc.gov/oet/>.

FCC Nixes Broad Federal Preemption of Moratoriums

The FCC has denied an industry request for a blanket preemption of antenna moratoriums and has instead sought comments on whether to ban those of an "unspecified or unlimited duration." In a July 28 public notice, the commission's Wireless Telecommunications Bureau (WTB) explained that the 1996 telecom law does not prohibit all moratoriums, contending that those with a "fixed duration" are "legitimate exercises of local land use authority."

As the wireless industry seeks sites for more than 100,000 new antennas, tensions have grown between the industry and local officials protecting their zoning authority as well as community interests.

The WTB asked for advice on what the maximum length for a moratorium should be, whether to prohibit moratoriums based on health concerns about RF/MW radiation and whether to ban those that prevent new antennas from being installed but allow existing ones to be modified. The deadline for responses was September 26.

Meanwhile, on August 25, the FCC issued a notice of proposed rule-making along with its new RF/MW radiation compliance rules (see above), asking for comment on the types of information local authorities can request regarding emissions.

In December 1996, the CTIA petitioned the FCC to ban all moratoriums directed at antennas for wireless communications.

FCC Guidelines for Evaluating RF/MW Radiation Compliance

The FCC's Office of Engineering and Technology (OET) has released guidelines for evaluating whether transmitters comply with its RF/MW emissions limits. The 129-page bulletin consists of techniques for measuring RF/MW radiation, calculating field levels for proposed antennas and controlling exposures.

According to the FCC, "This bulletin is intended to enable an applicant to make a reasonably quick determination as to whether a proposed or existing facility is in compliance with the limits."

A supplement dealing with radio and TV broadcasters is currently available while a second, for amateur radio, will be issued later.

Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (OET Bulletin 65, Edition 97-01) can be downloaded from the FCC's Web site at: <www.fcc.gov/oet/rfsafety>; or it can be purchased for \$35.95 plus postage from: International Transcription Service Inc., 1231 20th St., NW, Washington, DC 20036, (202) 857-3800, Fax: (202) 857-3805.

Industry Asks for Federal Preemption for Digital TV

The broadcasting industry wants to stop state and local governments from blocking digital television (DTV) antennas that meet the FCC's RF/MW radiation standards—that is, it is seeking an exemption similar to the one won by the wireless industry in the 1996 telecommunications act (see *MWN*, M/A96 and M/J96).

On August 19, the commission asked for public comment on a May 30 petition from the NAB and the Association for Maximum Service Television (AMST) seeking federal preemption. The FCC has set a December 1 deadline for responses.

In addition, the NAB and the AMST asked the FCC to ensure that state and local authorities act on DTV siting applications within 21 to 45 days. The commission has already ordered the four TV networks to begin DTV broadcasting in the top 10 U.S. markets by May 1, 1999.

The FCC's LSGAC does not support the industry's proposal, arguing in a July 25 statement that it "far exceeds the scope of any problem the NAB and AMST allege and is based on 'facts' that are misleading." In particular, the committee pointed to what it called the "ridiculously short time" for local authorities to handle siting applications.

The CTIA also asked that the FCC, not the courts, have jurisdiction over moratorium disputes. The petition received significant support from the industry, including AT&T Wireless, the Personal Communications Industry Association, Prime Co. Personal Communications, Sprint Spectrum and US West Inc.

The FCC's Local and State Government Advisory Committee (LSGAC) has a different outlook. In a July 15 submission, Kenneth Fellman, chairman of the LSGAC, stated that moratoriums are necessary to give local authorities time to amend their zoning rules or adopt new siting policies.

Not surprisingly, the CTIA was disappointed with the FCC's indecision. "Further comment spells further delay....Now is the time for action, not inquiry," CTIA President Thomas Wheeler said in a prepared statement.

Fellman, too, was unhappy that the FCC is still seeking comment, though for different reasons. "We're disappointed that it's still pending," he said in an interview. "We think the statute is very clear that these disputes should be handled in the courts. We're not denying that there is a problem and that some of these moratoriums are too long. Preemption is not the answer."

Susan Potts, mayor of Medina, WA—which enacted a moratorium five days after the telecom act was signed in February 1996 (see *MWN*, M/J96)—also criticized the FCC for not shelving the CTIA petition. "The courts have the ability to determine if moratoriums are unreasonable or were not enacted in good faith," she wrote in a September 9 letter to the FCC. "This is adequate protection for the wireless industry."

Sprint Spectrum challenged the Medina moratorium in court but lost when the judge ruled that the six-month period constituted a "reasonable period of time." Medina adopted an ordinance on siting issues in July 1996 and two months later followed

up with a second moratorium to evaluate impacts on property values (see *MWN*, N/D96). The second moratorium expired, and this May Medina amended its ordinance to require that towers be set back 500 feet from property lines.

On September 10, Concerned Communities, a group of 160 cities and counties representing 9 million people in 11 states, also asked the FCC to deny the CTIA petition. The group agrees with the LSGAC and Medina, and asked that the FCC not retain the authority to determine whether moratoriums violate the rights of wireless service providers.

The moratorium issue has been a contentious one since the telecom act was passed. This February, a year after it was signed into law, the FCC held a public forum on siting issues, which was attended by both industry and citizens groups (see *MWN*, J/F97). In July, the CTIA counted 226 cities and counties with moratoriums in place, but the association reports that the number has recently dropped to 165.

Russians Find MW Exposure Leads to Memory Failure

Exposure to 10 GHz microwaves can cause memory failure in chicks, according to a study led by Dr. Yuri Grigoriev of the Institute of Biophysics at the State Research Center of Russia in Moscow. Grigoriev also found a dose-response effect on the chicks' ability to imprint, a process in which young animals learn behavioral patterns.

"The results are very important for estimating the influence 10GHz radiation can have on the nervous system, especially among fetuses and newborns," Grigoriev told *Microwave News*. Very little research has been done at these microwave frequencies.

Grigoriev did three sets of experiments, all run blind. The incubating chicken embryos were exposed for 30 minutes to power densities ranging from 0.4 to 10 mW/cm². Some 20-24 hours after hatching, the chicks were given an imprinting stimulus—either a flashing light or a moving object.

The first group of chicks was exposed to power densities of 1, 8 or 10 mW/cm² beginning on the fifth day of incubation. Four of the seven chicks exposed to 1 mW/cm² imprinted, compared to nine out of ten controls. None of the 15 chicks in the 8 and 10 mW/cm²-exposed groups imprinted, while all 17 of their control counterparts did so successfully.

In a second series of tests, Grigoriev exposed the chicken embryos to 1 mW/cm² beginning on the 16th day of incubation. Only ten of 17 exposed embryos imprinted, while 17 of the 19 controls did so. A third group was exposed to 0.4 mW/cm², beginning on the 19th day. In this case, 17 of 18 controls imprinted, compared to 13 of the 18 exposed chicks.

Grigoriev believes that imprinting studies are useful for investigating memory function. "Both 8 and 10 mW/cm² radiation suppress the possibility of imprinting almost completely," he explained. "Power densities of 0.4 and 1 mW/cm² can influence the formation of memory." Grigoriev, who is also studying the effects of modulated signals, presented his results in June at the *2nd World Congress for Electricity and Magnetism in Biology and Medicine* in Bologna, Italy (see *MWN*, J/A97).

Mobile Telecommunications Association in Stockholm. An association statement noted that: Small differences in the measured radiofrequency (RF) radiation emissions among various manufacturers and among models made by the same manufacturer “do not mean there are differences in safety.” It added that, given the “large safety factor” used to set safety standards, “the small differences between products have little practical relevance.”

The Forschungsgemeinschaft Funk (FGF) in Bonn, Germany, which sponsors health studies on RF from wireless devices (see *MWN*, N/D94), did not respond to a request for comment.

“The rankings lack any relevance to health. The way they have been presented may mislead or confuse consumers,” Norman Sandler, director of global strategic issues at Motorola in Schaumburg, IL, told *Microwave News*. “We take strong exception to any suggestion that our phones are unsafe or that other phones are safer—as long as they all meet recognized exposure standards.”

Dagbladet did not cite specific SAR numbers. Indeed, the newspaper highlighted the omission with its headline NEW REPORT ON MOBILE PHONES IS KEPT SECRET.

Dr. Niels Kuster of the Swiss Federal Institute of Technology (ETH) in Zürich, made the SAR measurements for Hagenuk, but he declined to reveal his findings. “I am bound by a nondisclosure agreement and I cannot discuss our test results,” Kuster told *Microwave News*.

Hagenuk commissioned a second set of measurements from the Institut für Mobil- und Satellitenfunktechnik (IMST) in Kamp-Lintfort, near Düsseldorf, Germany. The IMST’s Matthias Rittweger would only say that the test results were proprietary and therefore could not be released. Hagenuk did not respond to a request for the test data.

But the first set of SARs from currently marketed wireless

phones will be available soon. On October 14, *Kassensturz*, a Swiss television consumer magazine show, will disclose the SARs from 15 hand-held phones. The measurement results come from Kuster’s Laboratory for EMF and Microwave Electronics at the ETH. Simultaneously, these same SAR results will be featured in the Swedish newspaper *Aftonbladet*.

Hagenuk’s brochure features measurement data from two different types of hand-held phones, as well as its own, in four different positions (see below). Note that the “touch use” position occurs when the phone touches the user’s cheek.* Kuster explained that, “If high currents flow in the device, then the maximum SARs will occur in the touch position, but if the device is current-free, the highest SARs are found in the 100° position.”

In contrast to phones with helical or extractable antennas, the Hagenuk antenna is built into the handset—a so-called planar inverted-F antenna, a design pioneered by Dr. Jørgen Bach Andersen of the Center for Personkommunikation at Aalborg University in Denmark (see *MWN*, J/F95).

Many other companies are known to be working on low-SAR phone designs. Hitachi and Mitsubishi, for instance, have each won patents for phones that reduce users’ exposure to radiation (see *MWN*, N/D96).

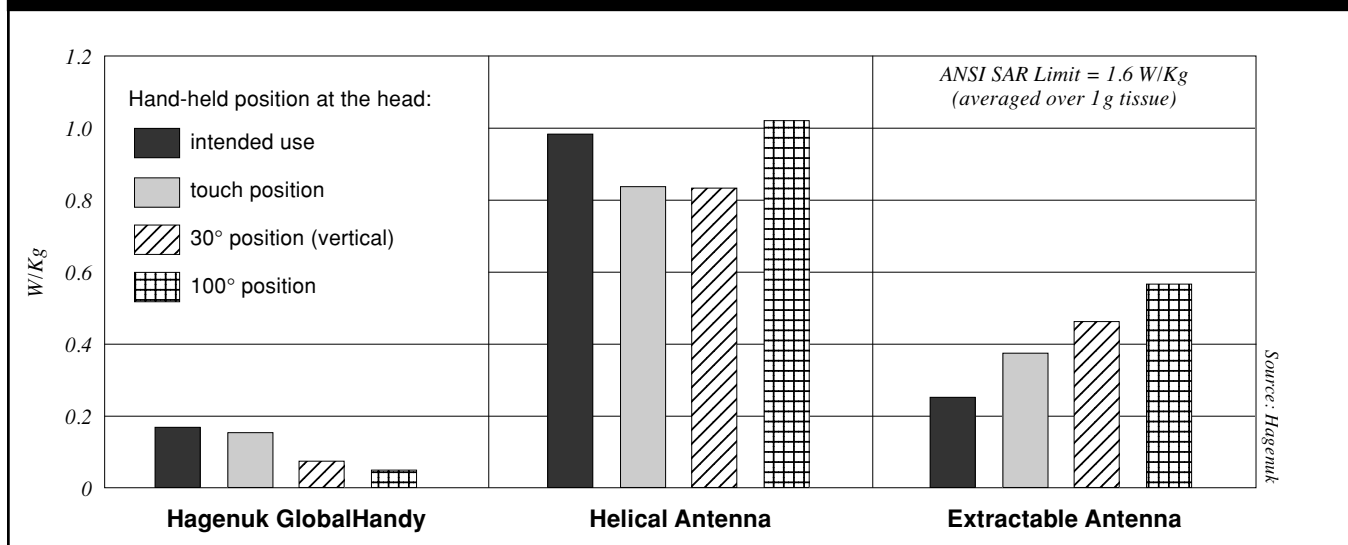
The symbol of Hagenuk’s new advertising campaign—“Antenna? No Thanks”—is a play on a German antinuclear slogan: “Nuclear Power? No Thanks.” The nuclear industry responded to that with its own slogan: “Stone Age? No Thanks.”

* For a detailed description of these test positions, see the chapter on “Experimental and Numerical Dosimetry,” by Drs. Niels Kuster and Quirino Balzano, in *Mobile Communications Safety*, edited by Kuster, Balzano and Dr. James Lin, published by Chapman & Hall, 1997.



“Low Radiation Is Better,” says Hagenuk.

Maximum SARs of GSM-Hand-Helds Relative to ANSI Standard



electromagnetic interference (EMI) with the pacemakers of 48 of 50 people, the highest rate of all the security systems tested. A different magnetic-based system caused EMI in four out of 50, while radiofrequency devices caused no interference at all.

"The good news," said McIvor, is that implanted defibrillators appeared immune to EMI from all security systems. McIvor's team did not test metal detectors or a microwave anti-theft system made by 3M Co. and used in bookstores and libraries.

Joanne Barron, a radiation protection officer at the FDA's Center for Devices and Radiological Health (CDRH) in Rockville, MD, noted that "serious extended symptoms" were not observed in McIvor's study. "But to be on the safe side," she told *Microwave News*, "we suggest that people with pacemakers, especially those dependent on the devices, take some simple precautions." The FDA recommends walking directly through anti-theft systems, without pausing between the transmitter columns, and advises against standing near or leaning on the columns. Barron noted that anti-shoplifting systems may be hidden behind walls, so the FDA urges people with pacemakers "not to linger near the entrances and exits of commercial establishments."

McIvor said that EMI from security systems may become more common, since there is now a trend towards more powerful anti-theft systems that can cover wider areas—"like the 20-foot-wide entrance to a mall, or the 40-foot stretch across a loading dock."

"We live in an ocean of electromagnetic radiation," McIvor told *Microwave News*. "Most of the time it just passes through our bodies, but the pacemaker is like a pillar on a pier, where the waves crash up against it."

The most serious type of EMI with pacemakers, McIvor explained, occurs when the pacemaker mistakes an outside signal for a heartbeat. "If that happens, it'll turn itself off, and that's a particular problem if you're pacemaker-dependent," he said. "We saw this in a few patients, and when it happened they would get dizzy." The problem disappeared when people moved out of the anti-theft system's field. "But if the pacemaker stopped," he added, "the natural tendency was for people to reach out and steady themselves—by holding on to the anti-theft device. That's exactly what you don't want to do." He cited the case of a woman in Germany who passed out when she was delayed in the field of an anti-shoplifting system, due to crowding at a store entrance.

John Casamento of the CDRH's electrophysics branch said that he recently spoke with the doctor of a Phoenix woman who repeatedly encountered EMI at a local K-Mart. Whenever she passed through the store's anti-theft system, her pulse sped up to 175. McIvor explained that this type of interference occurs in a dual-chamber pacemaker when it speeds up to keep pace with an outside signal.

Acousto-magnetic anti-theft devices are prone to cause EMI for two reasons, according to McIvor. First, they use a 58 kHz signal, which pacemakers are not programmed to detect as interference: "When EMI standards were set for pacemakers in Europe, that frequency was left out." The U.S. has no formal standards in this area, but U.S. manufacturers have followed European norms. "The other thing that creates a problem for acousto-magnetic systems," he said, "is that they're pulsed at 60 Hz, a frequency that's especially likely to confuse the pacemaker."

"The acousto-magnetic devices are the number one seller," Mc-

Ivor commented. "There are 90,000 of them in the U.S., so there's lots of potential for interaction." Roughly 1 million people in the U.S. have implanted pacemakers. "You can't tell whether a device is an acousto-magnetic system by looking at it," said Judith Reddinger of the Heart Institute, who also worked on the study.

Sensormatic is the only company that makes acousto-magnetic devices, though it also produces systems that use other technologies. The company's press release on McIvor's study was headlined RESEARCH STUDY CONFIRMS SAFETY OF ANTI-SHOPLIFTING SYSTEM. Sensormatic's Collier said the press release "was approved by Dr. McIvor."

"What I remember telling them is that everything they said is true—but it isn't the way I would have said it," McIvor told *Microwave News*. "Their focus is, 'Did anyone die?' No, but we wouldn't let our patients sit in the field long enough to even get close to that. That wasn't the point. The point was, is there an interaction or not—and there were lots of interactions."

Sensormatic did not, however, disagree with the FDA's new recommendations. In fact, Collier said that the company had encouraged pacemaker manufacturers to use similar advice in patient education. But she stressed that, "All of our systems meet government standards worldwide. We've also sponsored independent testing that shows there is not a problem, either in the lab or in the real world."

McIvor's advice parallels that of the FDA, and he said people with pacemakers need not avoid anti-theft systems altogether. "If I were pacemaker-dependent, I'd still feel comfortable walking through one of these systems, as long as I didn't stop," he said. "I'd feel *more* comfortable," he added, "if it wasn't an acousto-magnetic device."

The CDRH's Barron stated that from 1987 to 1995, the FDA received 12 formal reports of anti-theft systems interfering with pacemakers. She called this a low number, but added that since the effects were transient, a large number of reports would not be expected. Howard Bassen, chief of the CDRH's electrophysics branch, said he is mapping the fields created by different types of anti-theft systems and plans to publish the results. Bassen's Web site, devoted in part to medical-device EMI, can be found at: <<http://home.att.net/~hibatt>>.

McIvor presented his initial results on May 10 in New Orleans at the *18th Annual Scientific Sessions of the North American Society on Pacing and Electrophysiology*, and at the *Europace '97* conference, held June 8-11 in Athens, Greece. The completed study has now been submitted for publication (On earlier studies, see *MWN*, M/J95.)

On August 29, at the *18th Congress of the European Society of Cardiology* in Stockholm, Sweden, Dr. Andreas Wilke of Marburg University in Germany described how he exposed 53 people with implanted pacemakers to a range of security systems. Wilke observed EMI in as many as 13% of the subjects in the "real-world" tests. "Unconsciousness can result" when a pacemaker mistakes EMI for "a physiologic heart action" and switches itself off, Wilke stated. He noted that this did not occur in his study, "as the pacemaker inhibitions...were only short."

Wilke recommends that people with pacemakers "avoid close proximity" to electronic security systems. He told *Microwave News* that he has submitted his study for publication.

FROM THE FIELD

Clippings from All Over

"We've gotten heavily into religion. We're building church steeples across the country."

—Tim Ayers, spokesperson for the CTIA, on the increasing number of cellular phone towers being built on tall buildings, including churches, quoted by Lorilyn Rackl in "High-Tech Dandelions," *Daily Herald* (IL), p.6, July 10, 1997

Why not just build more transmission lines? "It's easier to get permission to build a new generating plant than a new transmission line," says Jack Feinstein, a Con Ed vice president. Cheaper too: Running a new 345,000-volt power line underground from Yonkers to midtown Manhattan would cost \$650 million [\$32 million per mile], Feinstein says.

—Brian O'Reilly, "Transforming the Power Business: The Bloated, 120-Year-Old Electric Power Industry Isn't Just Being Deregulated—It's Being Revolutionized. The Impact on Business Will Be Huge," *Fortune*, p.152, September 29, 1997

"It's unnatural to use a wired phone."

—Hermann Bluestein, head, MCI wireless strategy and development, quoted in "Airborne: Within Five Years Almost One in Three Telephones Will Be Mobile," in *A Survey of Telecommunications—A Connected World*, *The Economist*, p.19, September 13-19, 1997

"The wireless industry has exerted far more interest and seriousness in looking into this than the broadcasters ever did. Many broadcasters yawn and roll over. The wireless industry has really snapped to, even though they are considerably lower-powered systems."

—Richard Tell, consultant and former chief, electromagnetics branch in EPA's Office of Radiation Programs, on the wireless industry's efforts to comply with FCC rules on RF emissions, quoted in "Remarkable," *Wireless Week*, p.171, September 8, 1997

EPA on RF/MW Policy

July 31, 1997

To the Editor:

I would like to comment on an item in the May/June 1997 issue of *Microwave News* (p.7) in which a reference is made to an article in the trade publication *RCR* about a "deal" which supposedly assured the wireless industry that "EPA would remain in the background on RF safety issues."

First of all, the thought that EPA would agree to "remain in the background" and not speak out on any safety issue relevant to public health (and RF radiation exposure is a legitimate public health issue) is an affront to EPA and personally insulting to me and, I would think, to all EPA employees.

Secondly, there should be no confusion about EPA's position with regard to RF exposure issues. The EPA position was clearly stated in the agency's November 1993 comments to the FCC [see *MWN*, J/F94], and they remained consistent throughout the period during which the FCC completed its regulatory process. My letter to David Fichtenberg, cited in your May/June 1997 issue, did nothing more than repeat statements in EPA's November 1993 comments to the FCC.

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<hankin.norbert@epamail.epa.gov>

Headline Bonanza

"Even a temporary change in neural functions after RFR [RF radiation] exposure could, depending on the situation, lead to adverse consequences. For example, a transient loss of memory function or concentration could result in an accident when a person is driving. Loss of short-term working memory has indeed been observed in rats after acute exposure to RFR.*"

—Excerpt from "Neurological Effects of Low-Level Microwave Radiation," a presentation by Dr. Henry Lai, University of Washington, Seattle, at *Mobile Phones—Is There a Health Risk?*, Brussels, Belgium, September 16-17, 1997 (see pp.7-8)

* H. Lai, A. Horita and A.W. Guy, "Microwave Irradiation Affects Radial-Arm Maze Performance in the Rat," *Bioelectromagnetics*, 15, pp.95-104, 1994

MOBILE PHONES ARE BLAMED FOR LOSS OF MEMORY

—Headline from *The Daily Mail* (U.K.), September 22, 1997

MOBILE PHONES ARE A FORGETTABLE EXPERIENCE

—Headline from *The Sunday Times* (U.K.), September 21, 1997

NEXT THING IS, YOU'LL FORGET YOUR NUMBER

—Headline from *The Independent* (U.K.), September 22, 1997

"I don't know what it is, but it works. I figure it can't hurt me, and it may help me."

—Steve Atwater, Denver Broncos safety, on his use of magnet therapy, quoted by Sal Ruibal in "Ironclad Cures for Pain? Athletes Put Their Faith in Power of Magnets," *USA Today*, p.3C, August 20, 1997

"It is downright shocking that the FCC has moved to assist broadcasters to site antennas to deliver *I Love Lucy* reruns, but has done nothing to assist wireless consumers to call 911 or tell a family member they're running late. Not only has this commission's inaction had an impact on delaying competition, it is affecting people's lives."

—Thomas Wheeler, president and CEO, CTIA, on the FCC's position toward local cellular phone tower moratoriums, quoted in a CTIA press release, September 11, 1997

RF PERFORMANCE OF A 418-MHZ RADIO TELEMETER PACKAGED FOR HUMAN VAGINAL PLACEMENT

—Title of a paper by researchers at the University of Ulster, Northern Ireland, published in *IEEE Transactions on Biomedical Engineering*, 44, pp.427-430, May 1997

"We can't all just turn the lights off. Let's be grown-up about it and agree that there might be a risk here. We need to get away from this trench warfare between industry and science."

—Alan Fisher, attorney, Dibb Lupton Alsop, London, U.K., quoted by Janina Clark in "Polarised Views on EMF: Might Electromagnetic Fields Be the Insurers' Nightmare of the Next Century," *Reinsurance* (U.K.), p.14, August 1997

Ostensibly, the concern is that the towers could cause cancer by emitting low-level microwave radiation—a premise for which there is no solid evidence. But it doesn't take a clairvoyant to see the real driving force behind the protests is much more practical: property values.

—John Grogan, "Cellular Addicts Must Pay Towering Price," commentary, *Sun Sentinel* (FL), September 5, 1997

UPDATES

BROADCAST RADIATION

Infertility Near TV and FM Transmitters... Living near a broadcast antenna farm can cause irreversible infertility in mice, according to a study by a Greek research team. Writing in *Bioelectromagnetics* (18, pp.455-461, 1997), Drs. Ioannis Magras and Thomas Xenos of Aristotle University in Thessaloniki report on 18 breeding pairs of mice—12 pairs situated at different locations in the vicinity of an antenna farm in Thessaloniki and 6 control pairs about 6 miles away. The exposed mice were divided into two groups, 6 pairs close to the antennas and 6 pairs about 1 mile away, in the village of Chortiatis. Nearly 100 television and FM-radio transmitters are located at the antenna farm, with a total power output of about 300 kW. The researchers state that RF/MW power densities for the exposed groups ranged from 0.17 $\mu\text{W}/\text{cm}^2$ to 1.05 $\mu\text{W}/\text{cm}^2$, but they do not cite specific measurements for each location. The controls, the authors note, were exposed to RF/MW levels that were about 10,000 times lower. Each pair of exposed animals was bred four times and then moved to the control site for a fifth mating. The authors saw a “progressive decrease” in the average number of offspring per litter among both sets of exposed mice. The 6 pairs that were a mile from the antenna farm were infertile by the third breeding and never recovered. The 6 pairs closest to the antenna farm had a decreased number of offspring in the third and fourth attempts and had none in the fifth breeding. For reasons Magras and Xenos do not explain, the controls were bred only *once*, yielding an average of 8 offspring per litter. Nor do they discuss the apparent lack of a dose-response relationship: The mice that were a mile from the farm became infertile faster than those that were closer. Magras and Xenos state that because the 12 pairs had no issue after being moved to the control site, the effect on fertility appeared to be irreversible, and they speculate that the infertility could be “attributed to an intrauterus death of the irradiated embryos in the early stages of the prenatal development.” Interestingly, the offspring of the exposed animals were generally longer and heavier

and had more vertebrae than those of the controls. The findings complement those from a laboratory study on rats conducted by Dr. Santi Tofani more than ten years ago. Tofani, of the Public Health Laboratory in Ivrea, Italy, and his colleagues found that rats exposed to 100 $\mu\text{W}/\text{cm}^2$ of 27.12 MHz radiation had reproductive problems and their offspring had developmental defects (see *MWN*, N/D86).

DOPPLER WEATHER RADAR

DEIS for NYC Airports... A terminal doppler weather radar (TDWR) planned for New York City would directly irradiate apartment towers less than three miles away. Raytheon Co. of Lexington, MA, will build the radar, designed to serve both JFK and La Guardia airports, at a U.S. Coast Guard air station on the southern edge of Long Island. According to the draft environmental impact statement (DEIS) for the facility, prepared by SRI International in Menlo Park, CA, and issued by the FAA in August, the TDWR generates a narrowly directed beam at 5.60-5.65 GHz, and its transmitter has a maximum pulse power of 300 kW. High-rise apartment buildings in Rockaway Park in Queens, some 13,000 ft. from the antenna, would stand in the path of the beam, as would the control tower at JFK. The beam’s energy is concentrated in 1.1 μsec pulses, with a repetition rate of 1,066-1,672 pulses per second in normal operation and a maximum frequency of 2,000 Hz. The radar’s duty cycle is 0.22%. The peak power of the pulses is orders of magnitude greater than the average power density of the signal. The DEIS does not specify the peak power density at the Rockaway location, but it estimates that it would be 10 mW/cm^2 at a distance of 11,770 ft. from the antenna. Averaged over six minutes, as allowed under the 1992 ANSI/IEEE standard, the power density of the signal at the apartment towers would be 0.016 $\mu\text{W}/\text{cm}^2$. The draft contains some sweeping statements that do not receive further substantiation. For instance, it asserts that, “The results of many experimental investigations indicate existence of threshold levels above which

“MICROWAVE NEWS” FLASHBACK

Years 15 Ago

- ANSI approves a new safety standard for RF/MW radiation based, for the first time, on SARs. In the 30-300 MHz range, the new exposure limit is 1 mW/cm^2 —ten times below the old limit.
- The broadcasting and communications industries ask the FCC to set an interim guideline for RF/MW exposures to stop the adoption of a patchwork of state and local standards.

Years 10 Ago

- On October 6, a congressional subcommittee holds hearings on the possible health risks of power lines. In his opening statement, Dr. Robert Becker, author of *The Body Electric*, charges that most EMF animal experiments have been “designed, deliberately in advance, to yield negative results and any positive results obtained have not been reported or their release has been long delayed.”
- The Portland, OR, City Council adopts a 200 $\mu\text{W}/\text{cm}^2$ standard

for RF/MW exposure—a limit five times more stringent than the one endorsed by ANSI in 1982.

- Dr. Robert Birge of Carnegie-Mellon University in Pittsburgh finds that a family of compounds present in the eye can absorb some specific frequencies of RF radiation. The research is quickly classified by the military due to its implications for “stealth” technology.

Years 5 Ago

- Responding to epidemiological studies by Drs. Anders Ahlbom, Maria Feychting and Birgitta Floderus, the Swedish government announces that it “will act on the assumption that there is a connection” between power-frequency EMFs and childhood cancer.
- Congress authorizes \$65 million for an EMF research and public information program, later to be called EMF RAPID.
- Reports from the Hawaiian Department of Health and from the EPA support earlier findings that a leukemia cluster near the Navy’s Lualualei antenna farm on Oahu was not due to chance.

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biological effects occur." It also maintains that, "Because of the ubiquitousness of RFR [RF radiation] in the environment from natural and man-made sources, exposure of humans to RFR cannot be easily measured or controlled." A review of RF/MW bioeffects, contained in an appendix to the DEIS, is largely identical to that of a DEIS prepared by SRI on digital television (DTV) broadcasting from Sutro Tower in San Francisco (see *MWN*, J/A 97), even though the DTV waveforms are quite different from those of doppler radar. SRI's principal bioeffects consultants are Dr. Peter Polson and Louis Heynick. TDWR detects low-altitude wind shears, which are blamed for a number of fatal crashes of commercial aircraft. The projected installation is one of 45 such facilities commissioned by the FAA for airports around the U.S. As of May 1997, 24 were in service and 16 were under construction. The FAA shelved an earlier plan to build a separate doppler radar for each New York airport in response to opposition from communities near the preferred sites and from their elected officials, including Sen. Alfonse D'Amato (R-NY). The new plan has also run into opposition. Roberta Sherman, who resides in nearby Mill Basin in Brooklyn, told a local newspaper that, "We have nothing against the tower or airplane safety, but we do not want the radar near our children." Public hearings on the New York radar were held in New York City September 17 and 18. The FAA will accept comments on the DEIS until October 10. For further information on the planned facility and to obtain a copy of the statement, contact: FAA Office of Public Affairs, Federal Bldg. No.111, JFK Airport, Jamaica, NY 11430, (718) 553-3010, Fax: (718) 995-5710.

EUROPEAN COMMISSION

Report on NIR and Health...The EC's *ad hoc* working group on public exposures to non-ionizing radiation (NIR) has issued a report on potential health effects of EMFs and RF/MW, optical, IR and UV radiation. The panel, chaired by Dr. Alastair McKinlay of the U.K.'s National Radiological Protection Board (NRPB), includes four other NRPB members, as well as Germany's Dr. J. Bernhardt and R. Matthes, and Italy's Drs. G. Mariutti, M. Grandolfo and P. Vecchia. Epidemiological studies "point to an association between cancer and electromagnetic field exposure" that merits further research, the report states, but they "fall short of determining causation." (This was written prior to the release of the U.S. NCI study.) The group recommends further research on health effects in all NIR frequency bands. The 163-page report, *Non-Ionizing Radiation: Sources, Exposure and Health Effects*, is available in the U.S. from: Unipub, 4611-F Assembly Dr., Lanham, MD 20706, (800) 274-4888, Fax: (800) 865-3450. Or contact: Office for Official Publications of the European Commission, L-2985 Luxembourg.

ICNIRP-WHO

RF Seminar...The ICNIRP and the WHO have published the proceedings of their *International Seminar on Biological Effects of Non-Thermal Pulsed and Amplitude Modulated RF Electromagnetic Fields and Related Health Risks*, held in Munich, Germany, November 20-21, 1996. The proceedings, edited by Dr. Jürgen Bernhardt and Roger Matthes, the chair and secretary, re-

spectively, of the ICNIRP, and Dr. Michael Repacholi, head of the WHO EMF Project, include 20 papers on biophysical mechanisms and health studies. A consensus statement that called for more epidemiological and *in vitro* studies, while noting that there is "scant" evidence for an RF/MW-cancer link, was drafted by the 44 attendees and submitted to *Bioelectromagnetics* in April. The statement was later revised, following the release of the Repacholi study showing an increase in lymphoma among GSM-exposed mice (see *MWN*, M/J97). The volume, which costs \$40.00 plus shipping, is available from Matthes at: Institute of Radiation Hygiene, Federal Office for Radiation Protection, Ingolstädter Landstraße 1, D-85764 Oberschleißheim, Germany, (49+89) 3160-3288, Fax: (49+89) 3160-3289, E-mail: <rmatthes@bfs.de>. For more information, look up the ICNIRP on the World Wide Web at: <www.sz.shuttle.de/dm1001/icnirp.htm>.

Risk Seminar...The ICNIRP is gearing up for its next seminar, *Risk Perception, Risk Communication and Its Application to EMF Exposure*, slated for October 22-23 in Vienna, Austria. The seminar is intended to help government officials deal with public concerns over EMFs through risk assessment. The WHO, the Austrian Ministry of Health and Consumer Protection and the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety are providing support for the meeting. More information and a registration form are available on the ICNIRP's Web pages or by contacting Roger Matthes (see above).

MEDICAL APPLICATIONS

Pulses for Tremors...The FDA has approved a surgically implanted device that electrically stimulates the brain to reduce the shaking caused by Parkinson's disease and "essential tremor," another nervous disorder. The device, produced by Medtronic Inc. in Minneapolis, uses an electrode placed in the thalamus, the region of the brain that controls movement. The electrode is connected by a thin wire to a pulse generator, which is placed near the collarbone. A stream of pulses from the electrode jams tremor-causing signals from the thalamus. Operating parameters vary from patient to patient, Don Harkness, a clinical program manager at Medtronic, told *Microwave News*. Typically, the pulses are 90 μ sec wide, with a voltage of 2.5-3.0 V. In most patients, the pulses are repeated at either 130 Hz or 185 Hz. Each half of the thalamus controls one side of the body, and therefore a two-electrode system is needed to calm all tremors. The FDA, however, did not approve the use of twin electrodes. The agency is requiring Medtronic to further study their safety, as well as the long-term effects of the electrical pulses on brain tissue. According to Medtronic's Jessica Stoltenberg, both single-electrode and bilateral versions of the pulser have been approved for use in Europe, Canada and Australia.

Microwaves for Hair Removal...Microwave Medical Corp. in Simi Valley, CA, has received the go-ahead to begin clinical safety tests of a procedure that it claims can permanently remove unwanted hair with microwaves. Dr. Robert Spertell, the company's chief scientist, told *Microwave News* that the technique uses pulsed radiation above 2 GHz, but declined to be more specific while patents are pending. In a press statement, Spertell did report that he observed "complete destruction" of hair follicles in

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New Scientist (U.K.), October 7, 1995



Microwave News, July/August 1994

“Digital Cellular Phones Can Disrupt Implanted Pacemakers”

“Cellular Phones May Affect Use of Pacemakers”

Wall Street Journal, April 28, 1995



Microwave News, November/December 1995

“Higher Leukemia Rates Among Those Living Near Australian TV Towers”

“Living Near TV Towers a Leukemia Risk for Children, Claims Researcher”

Sydney Morning Herald (Australia), December 10, 1996

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preclinical tests. Independent Review Consulting in San Anselmo, CA, which evaluates clinical testing in the institutional review board system in the U.S., gave permission to Microwave Medical to run clinical trials. Microwave Medical hopes to market the system in Europe, South America and Canada, as well as in the U.S.

MEETINGS

Breast Cancer Workshops...The National Action Plan on Breast Cancer (NAPBC) is organizing two November workshops on radiation and breast cancer in the Washington, DC, area. *A Workshop on Electromagnetic Fields, Light-at-Night (LAN) and Human Breast Cancer* will be held November 18-19. Sweden's Dr. Maria Feychting will present the results of her long-awaited epidemiological study (see p.2). The cochairs of the workshop planning committee are Dr. Robert Liburdy of the Lawrence Berkeley Lab in Berkeley, CA, and Dr. Richard Stevens of the Battelle Pacific Northwest Labs in Richland, WA. Immediately preceding the EMF-LAN workshop, on November 17-18, the NAPBC will sponsor *A Workshop on Medical Ionizing Radiation and Human Breast Cancer*. Attendance at each meeting is free but will be limited to 125 people. For more information, contact: NAPBC, U.S. Public Health Service's Office on Women's Health, 200 Independence Ave., SW, Room 718F, Washington, DC 20201, (202) 401-9587; or look up the NAPBC on the World Wide Web at: <www.napbc.org>.

PEOPLE

Dr. **Merril Eisenbud** died on August 16 of leukemia. The first director of the Atomic Energy Commission's health and safety lab in 1947, he later taught at New York University's (NYU) Institute of Environmental Medicine. Dr. **Asher Sheppard** and Eisenbud wrote the first book on EMFs and health, published in 1977 by NYU Press: *Biological Effects of Electric and Magnetic Fields of Extremely Low Frequency*. In the late 1970s, Eisenbud was a member of the Electromagnetic Radiation Management Advisory Council (ERMAC), a federal committee that was first based in the White House and later transferred to the NTIA.

WIRELESS

EPRI on RF/MW Radiation...The Electric Power Research Institute has advised its members to take a close look at RF/MW sources on their properties and rights-of-way, and at possible RF/MW exposure of their employees. A report prepared by EPRI's Dr. Charles Rafferty and Ronald Skelton identifies "issues of possible concern" associated with RF/MW sources, focusing on cellular and PCS phones and base stations. The report also covers standards for exposure, as well as ongoing research on possible health hazards. Rafferty and Skelton caution that, "It is possible for workers to be exposed to fields exceeding U.S. standards if they work in close proximity" to base stations. They advise utilities to ensure that exposures do not exceed the ANSI/IEEE standard, by reviewing and modifying work practices and by training employees. Copies of the report, *Health and Safety Issues of Radiofrequency Fields from Wireless Communications Devices*, are available from: EPRI Distribution Center, 207 Coggins Dr., PO Box 23205, Pleasant Hill, CA 94523, (510) 934-4212.

VIEWS ON THE NEWS

Pulling the Plug on EMF Bioeffects Research

It is a little early to hold a funeral for EMF bioeffects research—but not by much. Never well-funded, the field is losing its major sources of support. The DOE program is slated to close, and the RAPID research effort will end soon (see *MWN*, M/J97). The industry-funded EPRI has money troubles of its own.

EMF bioeffects work is winding down, but not because there is no risk to public health. The evidence for health effects has in fact never been stronger. The opposition to EMF research has little to do with science, but its partisans have waged an aggressive campaign to pull the plug on further funding.

Most scientists doing work in bioelectromagnetics have stayed quiet. The result has been a one-sided argument, with consequences that confirm the old saying: “Silence gives consent.”

For example, last July an editorial in the *New England Journal of Medicine* by Dr. Edward Campion declared that “it is time to stop wasting our research resources” on EMF studies (see *MWN*, J/A97). Campion made clear that this sweeping recommendation applies to *all* types of EMF health research. Yet the Bioelectromagnetics Society (BEMS) was too indecisive to respond. The BEMS board may not have agreed with all of Dr. Martin Blank’s letter (see p.6), but surely there should have been some response.

The NAS–NRC report on EMFs led to headlines declaring that the issue was settled, but again BEMS said nothing (see *MWN*, N/D96). And the group gave only a weak, indirect answer to the American Physical Society’s call for slashing EMF research (see *MWN*, M/J95).

But BEMS’ timidity is not the problem—it is a symptom. The real issue is that the atmosphere in this field has been corrupted by dependence on industry and the military for funding. (The DOE and RAPID programs are only partial exceptions.) In such an environment, there is great pressure, both explicit and silent, to be a “team player.” Those who never offend the patrons of research become known as responsible and objective—part of the scientific mainstream. Those who follow the data wherever it goes can be marginalized, and find it harder to get grants.

This leads to silence, even in the face of blatant attacks on scientific inquiry. When Dr. Gilles Thériault of McGill University reported a tenfold increase in lung cancer risk among utility workers with the greatest exposures to high-frequency transients, the study’s sponsor, Hydro-Québec, blocked his access to the data (see *MWN*, N/D94). Imagine what would happen if Dow Chemical reacted that way to a pesticide study. Yet not a single member of the EMF community publicly condemned Hydro-Québec’s outrageous behavior.

Research can be sabotaged in other, less obvious ways. For example, studies of EMF health effects are rarely followed up, even when they point to significant risks. Dr. Eugene Sobel of the University of Southern California has linked EMF exposure to three-to-fourfold increases in the risk of Alzheimer’s disease in four different worker populations (see *MWN*, J/F97). Dr. Anthony Miller of the University of Toronto has found that when both electric and magnetic fields are taken into account, EMF exposures on the job are linked to a leukemia risk up to 11 times higher than expected (see *MWN*, J/A96). In both cases, interest in funding further study has been less than overwhelming.

With good reason, scientists trust a result only after it has been independently replicated. Studies that had not been repeated were ignored by the NAS–NRC EMF panel. So without funding for replication, Sobel’s and Miller’s work can be ignored.

Of course, lip service is paid to the need for follow-up. The president of EPRI declared that Dr. Genevieve Matanoski’s results on cancer among telephone line workers “clearly warrant further study” (see *MWN*, M/J93). Yet when Matanoski, of Johns Hopkins University, sought funding for such research, EPRI’s checkbook stayed closed.

Criticizing the powers-that-be is not considered a smart career move. You can find yourself labeled an ideologue, or even a purveyor of “junk science”—when, in fact, this better describes those who want to shut down EMF research.

The *New England Journal* editorial is an example of how distorted the atmosphere has become. The *Journal* hailed the National Cancer Institute’s recent study of EMFs and childhood leukemia—and then lumped together concerns about EMFs, radar and cellular telephones. If anyone cited a study of cellular phone radiation and brain cancer as evidence that power lines cause leukemia, they would be ridiculed. Yet Campion makes a similar argument and gets away with it.

Bioelectromagnetics researchers believe they have little to gain by taking part in public disputes. Many honest researchers just keep their heads down and get funding wherever they can. Other talented scientists have quietly left the field.

With few alternative sources of support, it is easy to adopt the mental habit of not biting the hand that feeds you. But with calls to cut EMF research growing louder and winning more support, the habit does not do science or public health much good. These days, it looks like EMF researchers are reluctant to bite the hand that starves them.

The electromagnetism of life is a vastly understudied subject—compared, for example, to biochemistry. Lack of support for EMF research not only keeps us ignorant of possible risks, it deprives us of technology that could help fight injury and disease. FDA-approved devices to help bone repair are just a hint of what might be possible if the field got appropriate attention.

EMF bioeffects research does not have to die. But if it is to have a future, scientists who believe that bioelectromagnetics is worthy of serious study cannot remain silent. Society will never give this field the support it deserves if the scientists involved in it do not speak out—loudly—to defend its importance.

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