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Digital Mobile Phone Radiation Boosts Cancer Rate in Mice

Twice as many mice exposed to microwave radiation developed lymphoma as did controls, according to an Australian study sponsored by Telstra, formerly called Australian Telecom. The radiation was designed to mimic signals from GSM digital mobile telephones.

One hundred transgenic mice—which were bred to be especially susceptible to lymphomas—were exposed to 900 MHz pulsed radiation for two 30-minute periods per day for up to 18 months. At the end of the experiment, 43% of the exposed mice had lymphoma, as compared to 22% of the unexposed controls. The exposed mice also developed cancer more quickly.

In a paper published in the May issue of *Radiation Research*, Dr. Michael Repacholi and his coauthors call the increased incidence of lymphoma among the exposed mice “highly significant.” They add that it is very unlikely that the faster onset of cancer was due to chance.

“I believe this is the first animal study showing a true nonthermal effect,” Repacholi told *Microwave News*. “I am pushing for its replication and extension.” Repacholi, the director of the International EMF Project at the World Health Organization (WHO) based in Geneva, Switzerland (see p.8), is on leave from the Royal Adelaide Hospital in Adelaide, Australia.

“It’s an interesting study. However, you can’t draw any conclusions about

(continued on p.10)

Views on the News

Secrecy vs. Public Health: Industry Must Not Set the Standard

Imagine this: A company marketing a new fat substitute sponsors a study on its safety. The researchers discover that when rats are fed the fat substitute, their cancer rate doubles. But this finding is kept secret for the next two years. The researcher who led the study even chairs a conference on the safety of fat substitutes, but does not mention his own results. He gives an advance report to the company that sponsored him (as required by contract), but the public and the government are kept in the dark for several more months. In the time between the end of the experiment and the public announcement of its results, sales of the fat substitute double.

Change “fat substitute” to “cellular phone,” and you have the story of Dr. Michael Repacholi’s recent study, sponsored by the Australian telecom giant Telstra.

Withholding important health data from the public is, to be blunt, unethical. This is as true for wireless phones as it is for food additives or medicines.

Of course, one study cannot be the basis for definitive judgments about human health. But we reach clear conclusions by gaining *more* information,

(continued on p.19)

« Power Line Talk »

Walking down the corridors of the DOE headquarters in Washington, one can see clear signs of an agency in transition—including the winding down of the EMF program. Furniture is stacked up next to cartons of books, reports and papers waiting to be moved or to be put in storage. Dr. **Imre Gyuk** is now the DOE's last EMF staffer in Washington. **Lynne Gillette** has left her post as EMF RAPID research manager to become the program manager for biomass power in the DOE's Office of Solar Thermal, Biomass Power and Hydrogen Technologies. Dr. **Paul Gailey** of the Oak Ridge National Lab in Tennessee will watch over the RAPID engineering projects as they near completion. The DOE is planning to stop all EMF research in September 1998, the end of fiscal year 1998 (see *MWN*, M/A97). Congress appears to be willing to fund the DOE's last year of EMF work: \$4 million for RAPID and \$4 million for Gyuk's mechanisms program. "We are confident that we will get the budget we asked for," Gillette said at the National EMF Advisory Committee meeting in Washington on May 1, her last public appearance in an EMF context.

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If the DOE program does close down, this year's **EMF health effects review** will be the last. "We are waiting to see what happens," said Dr. **William Wisecup**, who has organized the meetings since the first in 1979. "We only had 25 people and we met in the basement of the DOE," he said. Since then, attendance has grown, peaking a couple of years ago at close to 400. This year's review will be held November 9-13 at the Holiday Inn by the Bay in **San Diego**. After the review, the NIEHS's Dr. Michael Galvin will host a grant-writing workshop and there will likely be a meeting of the National EMF Advisory Committee. For more information on the review, contact: Dr. William Wisecup, W/L Associates, (301) 663-4252, Fax: (301) 371-8955, E-mail: <75230.1222@compuserve.com>.

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Dr. **Om Gandhi** made some waves at the science symposium held by the NIEHS in March. He challenged one of the most basic objections to EMF health effects raised by some physicists. Gandhi reported that the fields induced in the human body by power lines and appliances—indeed, essentially *all* strong EMF sources—are much larger than the fields generated naturally in-

side the body. Or, in the jargon of the trade: The exogenous EMFs dwarf the endogenous fields. Gandhi, who is at the University of Utah in Salt Lake City, used a computer model to calculate the electric and magnetic fields in the 41-70 Hz frequency band from internal and external sources. The human heart is the strongest and most consistent source of EMFs, but even its fields in other organs are hundreds of times smaller than those induced by standing under a high-voltage power line or by using a hair dryer. "My assumption was that what is already in the body is pretty substantial, but that turns out to be incorrect," Gandhi said in an interview. He noted that he was "surprised" by his results. "It is time for people to reject false assumptions," he said.

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Sweden's Dr. **Birgitta Floderus** has moved just across town from the National Institute for Working Life (NIWL) to the Institute of Environmental Medicine at the **Karolinska Institute** in Stockholm, where she will work with Dr. **Anders Ahlbom's** research group. She is continuing her epidemiological studies of the possible health effects of EMFs. While at the NIWL, Floderus was the principal author of a landmark study on occupational exposure to EMFs and cancer (see *MWN*, S/O92).

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After a short break from EMF litigation, **Mark Warnquist** has jumped back into the fray. Warnquist has joined the Washington-based law firm of **Watson & Renner** and will head its new office in Denver. "I am quite excited about joining Watson & Renner's 'scientific SWAT team,'" he commented. Founding partner **Tom Watson** has the largest EMF law practice in the U.S.; Watson and Warnquist had worked together on EMF cases at Crowell & Moring, also based in Washington. Last summer Warnquist left the Denver office of **LeBoeuf, Lamb, Greene & MacRae**, where he was central to utility company victories in the *Pilisuk* and *Glazer* leukemia cases (see *MWN*, M/J95 and M/J96). Two other EMF specialists from LeBoeuf, Lamb's Denver office are moving to Watson & Renner along with Warnquist: lawyer **Chad Neuens** and epidemiologist-researcher **Warren Sateren**.

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"Despite the repeated assertions of reputable scientists that [prudent avoidance] expenditures are virtually pointless, utilities and the government continue to pour additional funds into studies of the possible health effects of EMF[s]." So writes Dr. **Cassandra Chrones Moore** in *Haunted Housing: How Toxic Scare Stories Are Spooking the Public Out of House and Home*, newly published by the **Cato Institute** (\$11.95). The book focuses on radon, lead, asbestos and EMFs, giving much attention to the views on EMFs of Drs. **John Moulder** and **David Hafemeister**. Moore, formerly with the National Association of Realtors, is now an adjunct scholar at Cato and at the **Competitive Enterprise Institute**, both in Washington. She warns that the "drive to mitigate questionable environmental hazards penalizes...all taxpayers." To order the book, call (800) 767-1241 or (415) 541-9780.

Ross Adey Resigns from the VA

On May 2, Dr. Ross Adey resigned from the VA Medical Center in Loma Linda, CA, where he was the associate chief of staff for research and development.

For 20 years, Adey led a research team working on the biological effects of EMFs, principally for the DOE. More recently, his group at the VA has been doing health research on RF/MW radiation for Motorola. "The research will continue at the VA for the present time," Adey told *Microwave News*.

EMF–Breast Cancer Lawsuit Is Dismissed in New York

On April 7 a state court dismissed a lawsuit blaming a New York utility for an office worker's fatal breast and ovarian cancers. Shirley Marano had been exposed to electromagnetic fields (EMFs) from transformers one floor below her office at the national headquarters of the Columbia Broadcasting System in New York City. The suit charged that Consolidated Edison (Con Ed) was therefore responsible for her death (see *MWN*, M/A94).

"We're pleased with the result," Con Ed spokesperson Joseph Petta said from his office in New York City. "We feel that there is no reliable scientific proof that EMFs cause cancer." Petta told *Microwave News* that this was the first time Con Ed had faced an EMF-related personal injury claim.

"It was frustrating, because it was a winnable case in other circumstances," said Mitchell Perry of the law offices of Leopold Kaplan in New York City, who represented Marano's family. "Ms. Marano was someone who was very healthy. And then within 18 months of being transferred to a room right over two transformers, she started feeling the symptoms. In another 18 months she was dead." Perry said in an interview that some areas in the office had EMFs as high as 150 mG.

Con Ed's motion for dismissal argued that the suit was not based on sufficient legal evidence, and Judge Alice Schlesinger agreed. Schlesinger cited the deposition by Con Ed's expert witness, Dr. Darwin Labarthe of the School of Public Health at the University of Texas, Houston, in her ruling: "Dr. Labarthe...maintains that there is no scientific basis upon which to conclude that breast cancer can be caused by EMF exposure."

Perry introduced an affidavit from Marija Hughes, a technical information specialist for the Occupational Safety and Health Administration in Washington. But Judge Schlesinger was not impressed with Hughes's qualifications as an expert witness: "Ms. Hughes may well be knowledgeable in the area of EMFs but she is not a doctor nor a scientist. Rather, she is a librarian who has compiled information in the area."

"Marija Hughes was initially utilized in my background research," said Perry. "She was not the expert we would have used had we gone to trial." Perry said that there had been discussions with other expert witnesses. "But practical considerations governed the handling of this case. It was a decision made with the family, considering the potential expense and duration of the proceedings, the long odds we faced and the suffering they had already endured." The deadline for an appeal has now passed.

Judge Schlesinger was also impressed by a friend-of-the-court brief filed by the Atlantic Legal Foundation (ALF), a pro-business group that has intervened in recent EMF cases in California (see *MWN*, N/D95 and M/A97). The judge noted that the 12 scientists signing the ALF's brief contend that, "Con Ed's generators emit very low-level non-ionizing radiation which does not cause damage to human tissue."

The ALF's general counsel, Martin Kaufman, said that his organization intervened in the case because "we thought it would be useful to have a state trial court apply *Daubert*-type principles—that is, to act as a gatekeeper against inappropriate scientific evi-

Savitz Adds to Evidence Linking EMFs and Lou Gehrig's Disease

Dr. David Savitz has found new evidence for an association between EMF exposure and amyotrophic lateral sclerosis (ALS), a neurodegenerative disorder more commonly known as Lou Gehrig's disease. Savitz will present his results at the *30th Annual Meeting of the Society for Epidemiologic Research*, which will be held June 11-14 in Edmonton, Canada.

Savitz examined data on 140,000 employees of five electric utilities, which he and coworkers had gathered for a previous study of EMF exposure and cancer (see *MWN*, J/F95). Employment for 5-20 years in jobs with EMF exposures was associated with a doubling of the risk for ALS. Those with more than 20 years of exposure faced three times the risk of the rare disease, a statistically significant finding.

Savitz also found that EMF exposure was "weakly related to Alzheimer's disease, particularly with a latency of 20 years."

In 1995, Drs. Zoreh Davanipour and Eugene Sobel first reported evidence of an association between EMF exposure and ALS (see *MWN*, N/D95 and J/F97). Sobel presented the first evidence of an EMF–Alzheimer's connection in 1994, a link which he has now detected in four separate groups of Alzheimer's patients (see *MWN*, J/A94).

A study in Sweden by Dr. Maria Feychting also showed an EMF–Alzheimer's association, though there were some inconsistencies between her findings and Sobel's (see *MWN*, J/F97).

"I think the ALS results in our study are intriguing," Savitz told *Microwave News*. "The Alzheimer's results are less so, but they're probably enough of a basis to argue for a study with good diagnostic information, like Sobel's, and good exposure data, like ours."

Neurodegenerative disease was listed as the underlying cause in 97 deaths in Savitz's study population, and was a factor in another 206; of these, ALS was the underlying cause in 28 deaths, and was a factor in 33 others.

Savitz's work was funded by the Electric Power Research Institute.

dence." He said he was also glad to see the ALF's position accepted in a jurisdiction beyond California.

Among the studies cited by Hughes was Dr. Samuel Milham's analysis of a cancer cluster in a California office located over electrical transformers, in which cancer risk rose with the number of years in the office (see *MWN*, S/O96).

Marano was diagnosed with ovarian cancer in 1990 and with breast cancer in June 1993. She filed suit against Con Ed in November 1993. After her death in June 1994, the suit was continued by her estate, represented by her sister, Myrtle Vaughters, and her brother, Donald Morris; the case is now known as *Vaughters and Morris v. Consolidated Edison*.

EPRI EMF Shielding Software

The Electric Power Research Institute (EPRI) has developed computer software that can estimate the effectiveness of multi-layered metallic shields in attenuating magnetic fields.

Called *Layers*, the program predicts the ability of a shield to reduce magnetic field levels based on the metals used, the shield's shape and thickness, and the frequency and strength of the ambient field.

According to an EPRI user's manual, a single layer of 0.05-inch-thick cylindrical steel can reduce a 100 mG, 60 Hz field to 51.3 mG. But an aluminum shield of the same shape and thickness is somewhat less effective—lowering the field strength to 58.1 mG. When aluminum and steel are combined to form a 0.05-inch-thick shield, however, the field strength falls to 49.9 mG. Several layers can be used with interspersed air gaps to reduce the fields even further.

Layers is based on an algorithm developed by Dr. James Hoburg of the Electrical and Computer Engineering Department at Carnegie-Mellon University in Pittsburgh. Hoburg devised it for

Electric Research and Management Inc. in State College, PA, which was under contract to EPRI.

"[T]he algorithm is useful for predicting the shielding of ducts, conduits or enclosures that are used in actual shielding applications," according to a paper by Hoburg and colleagues that was presented on February 3 at the *IEEE Power Engineering Society 1997 Winter Meeting* in New York City.

The program was tested at EPRI's Power Delivery Center in Lenox, MA, and was found to give calculated values that were in good agreement with actual measurements. "It's a very versatile computational tool that accounts for both the thickness and dimensions of the shield," Hoburg said in an interview.

At this time, *Layers* is available only to sponsors of EPRI's EMF Management Program, according to EPRI's Frank Young in Palo Alto, CA. He added that it may be released later for use by consultants and government officials.

The *Layers User's Guide* has been published by EPRI. For more information, contact: EPRI Software Distribution Center, 11025 N. Torrey Pines Rd., Suite 120, La Jolla, CA 92037, (800) 763-3772.

New Epidemiology: Residential and Workplace Studies in Norway, Taiwan, U.K. and U.S.

Adult Leukemia Risk in Taiwan Residential Study

A residential study in Taiwan has found a significant increase in adult leukemia among those with high exposures to EMFs, and a significant trend of higher risk with increased EMF exposure.

"The excess risk was concentrated in cases of acute lymphoid leukemia" (ALL), report Drs. Chung-Yi Li of Fu-Jen Catholic University in Taipei, Taiwan, Gilles Thériault of McGill University in Montreal, Canada, and Ruey Lin of National Taiwan University in Taipei, writing in the January issue of *Epidemiology* (8, pp.25-30, 1997). They found no clear association between EMF exposure and either brain tumors or female breast cancer.

Magnetic field levels at the time of diagnosis were calculated on the basis of power company records. The models for estimating historic exposures were verified with on-site measurements. Those with calculated exposures over 2 mG had a 40% greater risk of leukemia, and a 70% higher risk of ALL.

The researchers also found a significant association between the risk of disease and distance from power lines. Those who lived within 50 meters of transmission lines of 69 kV or more had a leukemia risk that was twice as high as those living farther away.

The case-control study was based on data from Taiwan's National Cancer Registry, using information on 870 cases of leukemia, 577 brain tumors and 1,980 female breast cancers. Past residential studies of adults have presented a mixed picture (see *MWN*, N/D96).

No Clear Picture on Childhood Cancer in Norway

A new Norwegian study does not show an association between calculated historical exposure to EMFs and leukemia in children. However, the researchers suggest, "The lack of an association with leukemia in our study may be due to the small numbers

involved." Drs. Tore Tynes and Tor Haldorsen of the Institute of Epidemiological Cancer Research at the Cancer Registry of Norway in Oslo further point out that few of the subjects in their study were exposed to field levels above 1.4 mG.

Tynes and Haldorsen did find increased leukemia risks for some subgroups, including "children who have lived for more than three years in a magnetic field of [0.5 mG] or more" and children exposed to higher magnetic fields in their first four years of life.

Due to the low power of the study, few of the associations are statistically significant. But those which are show links between calculated historical magnetic fields and a couple of specific types of cancer. "The association seen between exposure to magnetic fields and osteosarcoma is particularly interesting in light of the therapeutic use of magnetic fields in bone healing," they observe in the February 1 *American Journal of Epidemiology* (145, pp. 219-226, 1997).

The Norwegian researchers made separate estimates of past levels of electric fields and report that, "Electric fields were not significantly associated with cancer."

The study was based on cancer registry data on children living in census tracts that contained high-voltage power lines. Five hundred cases and 2,004 controls were evaluated.

Tynes and Haldorsen take note of Dr. Nancy Wertheimer and Ed Leeper's recent work on ground currents as a risk factor in childhood cancer (see *MWN*, S/O95). Because of different electrical practices, they explain, "less than two percent of the Norwegian population" is exposed to ground currents.

U.K. Utility Study: No Employee Brain Cancer Risk

"There was no indication of a positive trend for cumulative exposure [to EMFs] and risk of mortality from brain cancer" in

a recent British study of employees of national power companies. In fact, trend analyses show a decreased risk, though this is not statistically significant.

Dr. J.M. Harrington and colleagues at the University of Birmingham examined 112 cases of primary brain cancer diagnosed between 1972 and 1991 among 84,000 British power workers—employees of the Central Electricity Generating Board or its privately owned successors. The study, published in the January issue of *Occupational and Environmental Medicine* (54, pp.7-13, 1997), was funded by the National Grid Co. and other private British utility firms.

Exposure assessment was based a combination of 11 job categories and measurements of 151 workers at different job sites. The researchers also investigated exposures to 24 possible confounders, either carcinogens or neurotoxic agents. The etiology of brain cancer is not well understood, and Harrington's team reports that, "There was no significant association between the risk of brain cancer and exposure to any of the potential confounders.

The team notes that exposure was considered "unclassifiable" for 18 of the 112 cases—a group they described as, "unfortunately, rather large."

The researchers point out that exposure assessment is further complicated by "large variations in exposure within a job group, leading to unavoidable overlap in exposures between the job groups." There are also variations "within and between workers [on] the same job," and, in any case, "there is no agreement on the most appropriate exposure metric for EMFs."

Brain Cancer and Leukemia Risk Higher Among British Electrical Workers

U.K. electrical workers were found to have increased rates of brain cancer and leukemia, according to a recent study by Dr. N.T. Fear and colleagues at the Radcliffe Infirmary in Oxford. They examined national cancer registry data on the 372,000 cases of these diseases diagnosed between 1981 and 1987, and analyzed the 8,000 known to have occurred among electrical workers.

"Significant excesses of around 20% were observed," Fear's team reports in the *British Journal of Cancer* (73, pp.935-939, 1996). Although higher risks of male breast cancer and of melanoma were also observed, the numbers of cases were much smaller and the results were not significant.

There was a 10% lower risk of female breast cancer. While this finding is also not statistically significant, the researchers note that it "offers little support for the suggestion that this malignancy is affected by exposure to [EMFs]."

Fear's team cites the use of "a very large population-based data set" as an advantage of this study, but mentions poor data on occupation, limited information on confounding factors and the lack of specific occupational exposure data as weaknesses. The researchers conclude that, "The extent to which workplace exposures to [EMFs] explain the excesses seen here for leukemia and brain cancer requires further study."

"In analyses in which many associations are examined, some results may be significantly high or low by chance alone," they observe. Accordingly, they urge a cautious interpretation of their findings. A number of other studies have pointed to a link between occupational exposure to EMFs and elevated risks of leukemia

NCI Childhood Cancer Study in New England Journal in July

The results of the National Cancer Institute's (NCI) study of power-frequency magnetic fields and childhood leukemia, led by Dr. Martha Linet, will be published in the July 3 issue of the *New England Journal of Medicine*.

A researcher familiar with the study, who asked not to be identified, predicted that the NCI results will do little to settle the ongoing EMF-cancer controversy.

The case-control, epidemiological study, begun in 1989, compared over 600 children with acute lymphoblastic leukemia with a randomly selected control group (see *MWN*, J/F89). Dr. William Kaune, a consultant based in Richland, WA, headed the exposure assessment effort, which included measurements of residential power-frequency and geomagnetic fields, surveys of home appliance use and determination of wire codes.

Linet's team plans several additional publications: The NCI's Ruth Kleinerman is the lead author of a paper on epidemiological and exposure assessment methodologies, scheduled to appear in the September issue of *Epidemiology*. The NCI's Dr. Robert Tarone has submitted for publication a paper on the relationship between measured magnetic fields and wire codes. Kaune is preparing a paper on exposure aspects of static magnetic fields.

The *New England Journal of Medicine* declined to disclose any details of the Linet paper or to confirm its publication date.

and brain cancer (see *MWN*, N/D94, J/F95 and J/F96).

SCE Employees Are "Healthy Workers"—Except for Leukemia and Prostate Cancer

A Southern California Edison (SCE) study of its employees concludes that "this workforce has lower rates for overall mortality, cardiovascular disease, cancer and nonintentional injury." Published in the May *American Journal of Industrial Medicine* (31, pp.534-544, 1997), the study included 40,335 SCE workers employed between 1960 and 1991, of whom 3,753 had died.

SCE's Dr. Jack Sahl (see also p.17) and Dr. Michael Kelsh of Environmental Health Strategies in Menlo Park, CA, explain that this reflects the "healthy worker effect"—that is, "the improved health status among a stable, financially secure worker population with adequate access to health care."

One exception is noted: "Among the entire Edison cohort, consistently low SMRs [standardized mortality ratios] were observed for all selected causes of death except prostate cancer and leukemia." The researchers state that, "The rate ratios for leukemia, which has been associated with benzene, solvent[s], ionizing radiation and magnetic field exposures, were inconsistent... They were higher among occupations with low exposure levels to these agents...."

Sahl and Kelsh previously analyzed these mortality records in relation to cancer and EMF exposure, and found no consistent association (see *MWN*, M/A93 and J/A93).

« Wireless Notes »

Motorola is getting tough with makers of cellular phone shields. The company's attorneys have threatened to sue **Microshield Industries**, based in Luton, U.K., over statements in its product literature that Motorola calls "patently false," "deceptive" and "grossly misleading." Microshield makes a cover for mobile telephones that is designed to reduce users' exposure to radiation. In a February 28 letter, Motorola attorney Christine Peterson warned Microshield that its marketing brochure constituted false advertising under U.S. law. Peterson objected to the brochure's suggestions that RF energy from cellular phones heats the user's brain and eye tissue, and that scientific research had linked mobile phone use to various illnesses. She also asserted that the shield does not reduce RF exposure by more than 90%, as advertised, but in fact may *increase* exposure. Motorola demanded that Microshield stop distributing "any materials or claims that state or imply" that cellular phones are unsafe. If not, Peterson warned, Motorola would "consider more formal action." In its March 14 response, Microshield promised to stop distributing its product literature in the U.S. and to stop selling the shield to U.S. consumers on its Web site.

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Digital mobile phones are more likely to cause **headaches** than are analog phones, Dr. **Bruce Hocking** reported at the *Annual Scientific Meeting of the Royal Australasian College of Physicians*, held in Auckland, **New Zealand**, in May. Of 40 adults who described "unpleasant symptoms" after using digital or analog phones, he found that 30 had used digital units. Hocking, an occupational health consultant in Melbourne, Australia, who was formerly the chief medical officer of Telstra, the Australian telephone giant, has been tracking down such cases over the last two years (see *MWN*, N/D95). "The symptoms often began minutes after beginning a call but could come on later during the day ...sometimes ceased within an hour after the call but could last till evening...did not occur when using a handset and were different from ordinary headaches. There were several reports suggestive of intracranial effects," Hocking stated. A large study of phone users and headaches is ongoing in Norway and Sweden (see *MWN*, N/D96 and M/A97).

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Dr. **Bill Guy** has resigned from **Wireless Technology Research** (WTR). One of the three members of WTR since its founding (see *MWN*, S/O93 and S/O94), Guy told *Microwave News* in early May that he had resigned, at least in part, because, "I was not in a position to make decisions." He will continue to do some work for WTR on a consulting basis until the end of 1997, collaborating with Dr. **C.K. Chou** of the City of Hope National Medical Center in Duarte, CA, to complete the design of an exposure system for biological experiments (see *MWN*, M/J95). There have also been top-level changes at the **Cellular Telecommunications Industry Association** (CTIA), where **Ron Nessen**, vice president for communications and public affairs, has been replaced by **Margaret Tutwiler**. Nessen had served as press secretary for

President Ford, while Tutwiler was the official spokesperson for the State Department under President Bush. Nessen said in an interview that he had resigned to host a nightly show on Nostalgia Television, a cable channel. Nessen is known among the press for his confrontational style. For example, in 1994 Nessen tried to suppress a UCLA press release on cellular phone dosimetry research by Michael Jensen and Dr. Yahya Rahmat-Samii (see *MWN*, J/F95), prompting this protest to the CTIA in a letter from **William Andrews**, the public information officer at UCLA's School of Engineering: "His phone manner was a one-way locomotive—him yelling, me constantly telling him to calm down....I put him on hold for a 30-second count, came back on and he was in midsentence, still yelling, and unaware I had been off-line. After he twice called me an 'asshole,' I hung up." Andrews also complained that Nessen had threatened to call "many people in the Pentagon," with the intent of "interfering with relationships between faculty and their funding agencies." Nessen's tactics were successful: UCLA withdrew the press release at the request of faculty who had received phone calls from their Department of Defense research program managers. Asked whether the CTIA had been dissatisfied with Nessen's general approach to press relations, CTIA spokesperson **Tim Ayers** said, "Not at all. I think Ron is appropriately celebrated for his aggressive defense of the industry."

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As **WTR** secured coverage for its legal costs and potential liability (see p.9), it was on a winning streak in the courtroom. On May 7, WTR, the **CTIA** and **Ron Nessen** were all dismissed as defendants in *Wright v. Motorola*, which is being heard in Illinois state court. **Debra Wright's** suit charges that use of **Motorola** cellular phones caused her to develop a brain tumor (see *MWN*, M/A95). The defendants dismissed from the case had been accused of conspiring with Motorola to falsely portray cellular phones as safe. WTR's chair, Dr. **George Carlo**, had been removed from the case at the end of January. "We'll appeal everything," said Wright's lawyer, **Robert Holstein**, who is based in Chicago. "We're dedicated to keeping this case going." **James Baller**, WTR's attorney in Washington, seemed unconcerned. "WTR is pleased with the result," he told *Microwave News*, "and believes it should never have been brought into the litigation in the first place." On April 24, Carlo was dismissed as a defendant in the lawsuit filed by **Jerald Busse**, which charges that WTR epidemiology studies amount to unauthorized human testing (see *MWN*, J/F96). Baller successfully argued that the Illinois court had no jurisdiction because Carlo neither resided in nor did business in the state. WTR itself and the CTIA remain defendants in the case.

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A few days before Senator **John McCain** (R-AZ) was to hold a hearing on the **siting of cellular phone and PCS towers**, it was abruptly canceled. **Cathy Bergman**, president of the EMR Alliance in New York City, credits citizen activists and local officials for delaying the May 13 hearing. "McCain's refusal to allow the

public to testify led to a flood of phone calls, faxes, E-mail messages and FedEx packages to his office," she told *Microwave News*. "An embarrassed McCain was forced to rethink the witness list, which reflected only industry views." A spokesperson for the senator denied that public outcry was the reason, saying that the hearing was being put off due to "scheduling conflicts." At press time, a new date had not yet been set.

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Sometimes a lone activist can cause headaches for a multibillion dollar industry. Last year EPA Administrator **Carol Browner** backed the FCC's new RF/MW exposure standard as providing "adequate protection of public health" (see also *MWN*, M/A96 and J/A96). The limits were stricter than industry would have liked, but it reportedly went along—with the understanding that the EPA would not criticize the new rules. The trade paper *RCR* reported that, "As part of the deal with the FCC, the wireless industry supposedly was assured that EPA would remain in the background on RF safety issues." Signed, sealed and delivered—until October, when **David Fichtenberg** of Olympia, WA, wrote the EPA to ask if the FCC standard gave protection against nonthermal effects. **Norbert Hankin** of the EPA's Office of Radiation and Indoor Air responded that there was not enough data

on nonthermal effects to set specific limits. But, citing EPA policy, he added, "Both the NCRP and ANSI/IEEE standards [the FCC standard is based on both] are thermally based, and do not apply to chronic, nonthermal exposure situations. The statement referring to 'adequate protection' pertains to thermally related effects." Hankin's letter produced strong thermal effects within the wireless industry—company representatives got boiling mad. After a meeting with the EPA, the **Electromagnetic Energy Association** (EEA) was still unhappy; EEA chair John Welch of Motorola wrote to the agency to complain about continuing "confusion about EPA's official position." Welch demanded another public statement from the EPA in support of the FCC. On January 17, he got it: Assistant Administrator **Mary Nichols** wrote to the FCC "to reiterate EPA's support" for the FCC exposure rules and repeated Browner's wording. But rather than disavow Hankin's letter on nonthermal effects, she said it had been "incorrectly construed." In May, EEA executive director **Dinah McElfresh** told *Microwave News* that Nichols's letter "clarifies EPA's position," and asserted that "the FCC standard protects against all effects, based on the science known today." But Fichtenberg countered, "Many papers accepted for standard-setting by the IEEE show adverse effects below the FCC's hazard threshold. Prudence requires limits based on these observed effects."

Congressman Markey on Wireless Safety: Answers Needed, but Not with Federal Funds

Rep. Edward Markey (D-MA) wants to know whether cellular phones are safe but is unwilling to commit federal funds to the task. "We need to find the best ways to prioritize current research and accelerate getting answers to the public," Markey's legislative assistant, Colin Crowell, told *Microwave News*. "Then we can identify where gaps may exist. But we are not yet prepared to say that we need to spend millions of federal dollars."

In an April 7 letter, Markey asked the Food and Drug Administration (FDA) what the government has been doing to determine whether cellular phones pose a health risk. Markey also asked whether the research being done by Wireless Technology Research (WTR), which is funded by the Cellular Telecommunications Industry Association, would settle the safety question.

"The type of research proposed by WTR should provide part of the answer," stated Diane Thompson, FDA associate commissioner for legislative affairs, in a May 5 response. Thompson added that the FDA has "no information which would lead us to believe that the federal government and American consumers will not be able to rely on the results of the WTR research."

Thompson noted that there is "no federal government-sponsored research specifically directed toward cellular phone safety," though she pointed to related work sponsored by the Environmental Protection Agency, the Department of Defense and other agencies.

Thompson also described FDA efforts to monitor research

sponsored by industry, including a March 13 letter the agency sent to Dr. George Carlo, chair of WTR (see *MWN*, M/A97). In that letter, the FDA recommended that the WTR research give the "highest priority" to lifetime animal exposure studies and stressed the need for replication of studies showing biological effects, such as the Lai-Singh experiments (see *MWN*, N/D94).

In a May 6 statement, Markey declared that, "The government has a responsibility to assess for consumers whether portable wireless phones pose a health risk," and that he would "follow up with the appropriate federal agencies and the cellular industry." Crowell said that a second letter with additional questions would soon be sent to the FDA.

The Markey letter concluded by asking when answers to cellular phone safety questions could be expected. The FDA's Thompson responded that, "It is difficult to predict when conclusive statements about health risks can be made."

Markey's renewed interest came in the wake of a detailed article in the April 6 *Washington Post* on the slow pace of industry-funded research (see p.14). The *Post* article followed stories in the trade publication *RCR* and in *Microwave News*.

In February 1993, Markey held a congressional briefing on cellular phone safety after the Reynard brain cancer suit put the issue on the front pages of newspapers around the world (see *MWN*, J/F93). He also asked for a report from the General Accounting Office, which was released in 1994 (see *MWN*, N/D94).

WHO: No Overall Support for RF/MW Radiation Health Risks

A group of 44 researchers assembled by the World Health Organization (WHO) EMF Project has found “scant” evidence linking RF/MW radiation and cancer. On the other hand, the WHO consensus report notes that, “Only a few studies have been published, and these are sufficiently indicative of an effect on carcinogenesis to merit further investigation” (see box below).

“It seems likely that any possible effect on health is subtle,” according to the report. While the authors advise that more research is needed, they generally downplay studies indicating ill effects. For example, the report notes that “because it is not possible to prove the negative in hazard-evaluation studies, no definitive affirmation of safety can be made.”

The report states that the Lai-Singh and Sarkar experiments—which showed that *in vivo* RF/MW exposure can lead to damaged DNA—“need to be replicated before the results can be used in any health-risk assessment, especially given the weight of evidence that RF fields are not genotoxic.”

It discounts human studies as showing inconclusive links between RF/MW radiation and health effects: “Overall the epidemiological studies suffer from inadequate assessment of exposure and confounding, and poor methodology.”

In particular, the report criticizes Dr. Stanislaw Szmigielski’s study that indicates an increased cancer risk among RF/MW-exposed Polish military personnel. It states that his results are difficult to understand “because neither the size of the population nor the exposure levels are clearly stated.” Szmigielski attended the WHO seminar.

The report calls for more *in vitro* studies addressing dosimetry, DNA damage and repair and biophysical mechanisms. Priorities for *in vivo* research include effects on cancer promotion, melatonin, the blood-brain barrier and the eyes. Heading the recommendations for epidemiological research are studies on mobile phones, pregnancy and occupational cancer.

The document, which was edited by Dr. Michael Repacholi,

RF/MW Cancer Link Upgraded After Mouse Lymphoma Study

The WHO meeting in Munich was held many months after Repacholi’s RF/MW-lymphoma study had been completed (see p.1). However, Repacholi’s findings were not made available to the participants.

The summary of the Munich meeting, as originally submitted for publication, assesses the cancer risk this way: “Taken overall, the evidence fails to support an effect of RF exposure on mutagenesis or cancer initiation.”

On May 6, a week after Repacholi’s finding of a doubling of lymphoma incidence among RF/MW-exposed mice had been published, a revised manuscript was sent to *Bioelectromagnetics*—and this time it cited the new cancer results. The Munich conclusion now reads: “Although weak evidence exists, it fails to support an effect of RF exposure on mutagenesis or cancer initiation.”

was drafted for discussion at the seminar, held in Munich, Germany, last November 20-22. The meeting was organized as part of the WHO’s \$3.3 million project on non-ionizing radiation, which Repacholi directs (see *MWN*, J/A96 and J/F97). The report was revised after the meeting and, in April 1997, submitted to *Bioelectromagnetics*.

Three working groups in Munich were charged with reviewing the scientific literature—one on *in vitro* studies, led by Dr. Thomas Tenforde of the Battelle Pacific Northwest Labs in Richland, WA; one on *in vivo* studies, chaired by Dr. William Pickard of Washington University in St. Louis; and one on epidemiological and human studies, led by Dr. Anthony Swerdlow of the University of London, U.K.

The Munich seminar, titled *Biological Effects of Nonthermal Pulsed and Amplitude Modulated RF Electromagnetic Fields and Related Health Hazards*, was sponsored jointly by the WHO, the Austrian Ministry of Health and Consumer Protection, the International Commission on Non-Ionizing Radiation Protection and the German Federal Ministry of Environment, Nature Protection and Nuclear Safety.

Was There a Nuclear Device at the U.S. Embassy in Moscow?

One of the enduring microwave mysteries is why the Russians beamed signals into the U.S. embassy in Moscow for decades beginning in the 1950s and why the American government treated the matter with so much secrecy.

In his newly published memoirs, Paul Brodeur speculates that the U.S. government’s sensitivity might have been due to the presence of a nuclear device inside the embassy. If so, Brodeur argues, the government would have done everything possible to deflect attention away from radiation exposures—both ionizing and non-ionizing—at the embassy.

“I think it is possible there was a nuclear device there, but I don’t have journalistic proof,” Brodeur told *Microwave News*.

When asked about Brodeur’s hypothesis, Dr. Sam Koslov, a longtime technical intelligence specialist, now retired, shot back, “It sounds like utter bullshit to me.” He added that, “There were no nuclear connotations in those days. It’s the first time I’ve heard it mentioned.”

In *Secrets: A Writer in the Cold War* (Boston: Faber & Faber), Brodeur reports that a 29-year-old Marine who had been stationed at the Moscow embassy in the 1960s and who later developed lymphoma told him that he had seen “technicians wearing silver-colored radiation-hazard suits with full hoods, face masks and wire-mesh goggles on the eighth floor of the embassy, just below Ambassador Llewellyn Thompson’s office.” The marine did not know what was on the eighth floor; he was never allowed to go there. Thompson died of lymphoma. Walter Stoesel, an ambassador in the 1970s, died of leukemia in 1986.

Brodeur also wonders why access to cable traffic on the microwave signal between the American Embassies in Moscow and Paris required a “Q” clearance, which permits access to nuclear secrets.

“It’s also possible that the Central Intelligence Agency or the National Security Agency had electronic countermeasures in the

embassy," Brodeur said, referring to sophisticated communications and jamming equipment.

Koslov maintains that the secrecy stemmed from "the government not wanting to admit that they had devices that could detect electromagnetic signals. The fact that we would admit that we could listen to their electromagnetic signals horrified the State Department."

As to why the Russians beamed microwaves at the embassy, Koslov said that they were either interfering with our ability to listen to them or activating their own concealed microphones. Koslov, formerly a special assistant for science in the Secretary of the Navy's office, went to Moscow in 1977 to help negotiate the turning off of the microwave signal.

At the end of *Secrets*, Brodeur notes that, "I have retired from *The New Yorker* and the public health wars I waged in its pages." He states that he has returned to writing fiction.

CTIA, WTR Announce Legal and Research Funding Agreement

On April 28, Wireless Technology Research (WTR) and the Cellular Telecommunications Industry Association (CTIA) finally signed an agreement covering WTR's legal fees, as well as possible future damage awards. It also specifies a timetable for the CTIA's payments for WTR's health research.

The pact should clear the way for progress in the CTIA-WTR research program, which has been stalled for over a year.

"It's been quite a difficult process," WTR chair Dr. George Carlo told *Microwave News* in early May. "I'm glad this is behind us." The CTIA's Tim Ayers agreed, saying, "We're looking forward to the research going ahead." Settlement of the long-running dispute had been predicted many times but was slow in coming (see *MWN*, N/D96 and M/A97); the accord followed a *Washington Post* article on cracks in the CTIA-WTR relationship and the lack of progress in research (see p.14).

Carlo offered this explanation for the delay: "When you have a written agreement, it forces people to look at every issue inside out." He noted that, "We never had an agreement before. The first \$17 or 18 million was based on handshakes." Ayers stressed that the CTIA had to be cautious, saying, "You can't allow the deep pockets of industry to get set up as an attractive target."

Neither side would release a copy of the agreement. Carlo explained that to do so "would compromise our position in litigation—it's a privileged document." He said that the agreement combines cash reimbursement of legal fees with insurance against other costs, and will protect researchers from any liability that results from being sponsored by WTR.

Ayers and Carlo both confirmed that some CTIA members had suggested severing the group's relationship with WTR and finding another way to sponsor research. "This was coming from new people, who hadn't heard the arguments for an independent structure and wanted industry to have more control," said Carlo. Ayers added that, "When members raise concerns, we have to respond—but our commitment to WTR was constant."

Carlo indicated that the CTIA has now agreed to pay over \$3.1 million in costs incurred through the end of 1996 that were out-

Proposed Dutch RF/MW Limits

The Health Council of the Netherlands' Radiofrequency Radiation Committee has recommended the adoption of RF/MW radiation safety guidelines based on a specific absorption rate of 0.4 W/Kg for workers and 0.08 W/Kg for the general public. These are essentially the same limits used by ANSI/IEEE, NCRP, NRPB and ICNIRP.

The thresholds are based on thermal effects. "In the literature, nonthermal effects, such as direct damage to DNA, have been reported. However, the committee considers the results of these studies not reliable enough to be used in setting exposure limits," Dr. J.A. Knottnerus, vice president of the health council, wrote in a letter to the Dutch Minister of Health, Welfare and Sport.

The report notes that there is a lack of evidence indicating that mobile phones pose a health hazard when used in "a normal" way—while stressing that "this conclusion is based on only very limited data."

The report was written by a ten-member committee, which was chaired by Dr. E.W. Roubos of the University of Nijmegen in the Netherlands, and included Germany's Dr. J. Bernhardt, the chair of ICNIRP, and Dr. Z.J. Sienkiewicz of the U.K.'s NRPB.

For a copy of *Radiofrequency Electromagnetic Fields (300 Hz-300 GHz)*, which is in both Dutch and English, contact: Dr. Eric van Rongen, Health Council of the Netherlands, PO Box 1236, NL-2280 CE Rijswijk, The Netherlands, (31+70) 340-5730, Fax: (31+70) 340-7523, E-mail: <e.van.rongen@gr.nl>.

side of WTR's original \$25 million research plan, including \$2.2 million for pacemaker research and approximately \$750,000 for litigation expenses. This brings the total CTIA commitment to more than \$28 million, of which \$9.8 million has yet to be paid. WTR will get the balance in eight quarterly installments. "The last one is due around the middle of 1999," said Carlo, "and I've been asked to stay on past my original five-year commitment, until the funds are exhausted."

Asked whether WTR will then close its doors, Carlo answered, "It's hard to speculate." If the group's studies show no risk to public health, he said, "then it's pretty clear that WTR would wind up business." But if evidence of a risk is found, Carlo said, the plan for the industry's health research would have to be redefined.

In mid-May Susan O'Donnell, WTR's public affairs manager, stated that WTR has now paid off all back debts and has at least \$1.4 million in hand to begin biological studies. But WTR would not name the researchers who will be involved. "We still haven't gotten in touch with the people we had selected, to see if they still want to go ahead," said Carlo, adding, "We've got to regenerate some of our momentum."

Carlo predicted that by the end of 1997, *in vitro* genotoxicity studies will be completed and *in vivo* studies will have begun. Replication of the Lai-Singh experiments, he said, will be finished by March 1998 (see also *MWN*, N/D94, J/F96 and M/J96).

What They Are Saying

“Put simply, mobile phone users are not genetically engineered mice. More importantly, this study is no reason for the public to be in any way concerned about the safety of mobile phones.”

—Peter Russell, director, Australian Mobile Telecommunications Association, quoted by Phil Bertolus in “Mice Cancer from Mobiles,” *The Age* (Australia), May 5, 1997

“No firm in the world develops a drug that causes cancer in test animals and says, as mobile phone makers do, that it will not happen in humans.”

—Dr. Wolfgang Löscher, School of Veterinary Medicine, Hannover, Germany, quoted in *Süddeutsche Zeitung* (Germany), May 22, 1997

“Indeed, I think about the most one can say at this stage is that if there are mice in the community who are genetically predisposed to developing lymphoma they would be well advised not to use mobile phones.... That applies to rats as well, I should say.”

—Senator Richard Alston, minister of communications and the arts, comments in the Australian Parliament, May 7, 1997

So who is responsible for the safety of mobile phones? And will the mobile phone companies and industry representatives like Michael Repacholi cease calling for an increase in the human exposure limits in the light of this new research? Until the industry satisfactorily answers these questions, they will continue to be accused of acting and sounding like the tobacco industry.

—Australian Senator Lyn Allison, in a press statement, May 2, 1997

“The scientists are as good as you will get. The journal is very highly respected. Their paper certainly does raise questions—the results are extremely surprising.”

—Dr. Peter Polson, consultant based in Cupertino, CA, quoted by Jonathan Marshall in “Cell Phones Linked to Cancer in Mice,” *San Francisco Chronicle*, May 9, 1997

“The Australian research is one data point. This particular data point appears to conflict with other research showing no promotion effect as well as with epidemiological studies....”

—Thomas Wheeler, president, Cellular Telecommunications Industry Association, quoted in a press statement, April 30, 1997

“It would seem sensible to take a few precautions until more is known about the potential risk.”

—Steve Horrocks, senior policy officer, Australian Consumers’ Association, quoted in a press statement, May 1997

“We don’t know of any one person anywhere in the world who has died as a result of using a mobile phone.”

—Dr. Brendan Nelson, member of Parliament and former president of the Australian Medical Association, quoted by *Reuter* news service, April 30, 1997

The suits being brought in the United States against the tobacco industry, which is finally being forced to take responsibility for the deadly effects of smoking, should provide a useful wake-up call to cellular phone companies.

—Editorial, *Jerusalem Post* (Israel), May 9, 1997

“The biggest hazard is the increased rate of automobile accidents from using (cell phones) while driving.”

—Dr. John Moulder, Medical College of Wisconsin, Milwaukee, quoted by the *Associated Press*, May 9, 1997

risks to humans,” Dr. Mary Elizabeth Jacobs of the U.S. Food and Drug Administration (FDA) in Rockville, MD, said in an interview. Jacobs is the director of the Division of Life Sciences at the FDA’s Center for Devices and Radiological Health.

In the U.K., Dr. John Stather, assistant director of the National Radiological Protection Board (NRPB) based in Oxfordshire, told the *New Scientist* (May 10): “This needs to be investigated thoroughly.” But, he added, “I think people should carry on using mobile phones.”

Dr. Antony Basten of the Centenary Institute of Cancer Medicine and Cell Biology in Sydney, Australia, one of Repacholi’s collaborators, also does not believe the results should prompt changes in phone habits. “For the time being, at least, I see no scientific reason to stop using my own mobile phone,” he asserted in an April 30 statement (see also box on p.11).

Basten, like Repacholi, thinks the study should be repeated. Telstra does, too. Basten told *Microwave News* that the next step would be to examine multiple exposure levels and mice prone to different types of cancer.

Dr. Hugh Bradlow, director of Telstra Research Labs, said that further studies are needed “to independently extend the study...to understand if the result has significance for human health.” He suggested that the Australian government make this part of its A\$4.5 million (US\$3.5 million) program on radiofrequency and microwave (RF/MW) radiation (see *MWN*, N/D96).

Word of the Australian results spread quickly around the world. Dr. John Goldsmith of Ben Gurion University in Beersheba, Israel, told the *Jerusalem Post* (May 2) that the results present “startling new evidence that must be carefully evaluated.”

In the U.S., Dr. Henry Lai said that, “The main point is that RF radiation promotes cancer.” However, he noted that it is “very unlikely” that cell phone use can cause lymphomas and, like Basten, recommended that mice prone to other forms of cancer be used in follow-up efforts. Lai and Dr. N.P. Singh, both of the University of Washington, Seattle, have found single-strand and double-strand DNA breaks in the brain tissue of rats exposed to low-level microwaves (see *MWN*, N/D94 and M/J96).

“I think the findings are very significant,” Dr. Gregory Lotz of the U.S. National Institute for Occupational Safety and Health (NIOSH) in Cincinnati said in an interview. “They used a sizable number of animals and it appears to be a clear effect.”

“While there are some difficulties in extrapolating from animal experiments to human health, the effect reported in this paper appears to be quite substantial,” commented Dr. Stan Barnett of Australia’s Commonwealth Scientific Industrial Research Organization (CSIRO). In 1995, Barnett prepared a report on mobile phone health risks, which recommended a national RF research program (see *MWN*, S/O95).

Dr. George Carlo, the head of Wireless Technology Research (WTR), told *Microwave News* that, “This transgenic mouse study plus the two Lai-Singh studies are clearly suggesting that there’s some biological activity going on. I don’t agree with the idea that it’s impossible.” WTR is sponsored by the Cellular Telecommunications Industry Association (CTIA).

The CTIA and Motorola, as well as trade groups in Australia, interpreted the results cautiously. “These findings cannot be directly related to human health or to the safety of mobile commu-

nications,” said Dr. Mays Swicord, Motorola’s director of biological research.

The Australian study is the second to show biological activity caused by a digital phone signal. Last year, Dr. Ross Adey of the VA Hospital in Loma Linda, CA, announced that a TDMA digital signal with a specific absorption rate (SAR) of 0.58-0.75 W/Kg appeared to be protective against cancer among exposed rats (see *MWN*, M/J96 and J/A96). When Adey repeated the experiment using a signal patterned after an analog phone—which is not pulsed—he found no effect (see *MWN*, M/A97).

“We now appear to have two nonthermal effects, both linked to pulsed fields, and once again we must investigate the possibility that it is the low-frequency modulation that is the essential element in the observed effect,” Adey said in an interview.

Unlike analog cellular phones, the newer digital models, including those featuring TDMA and GSM technology, use pulsed signals. TDMA is used in the U.S., while GSM is the predominant system in Australia and Europe.

More than ten years ago, Dr. Bill Guy, then of the University of Washington, Seattle, released results from a long-term study in which rats exposed to 2450 MHz pulsed microwaves with an SAR of 0.15-0.4 W/Kg had statistically significantly more malignant tumors than controls (see *MWN*, J/A84, Mr85 and J/F93).

In 1995, Poland’s Dr. Stanislaw Szmigielski reported significantly higher rates of lymphoma and leukemia among Polish military personnel exposed to RF/MW radiation from radar and communications devices, many of which use pulsed signals (see *MWN*, M/J95). Szmigielski is at the Center for Radiobiology and Radiation Safety and at the Military Institute of Hygiene and Epidemiology, both in Warsaw.

A Wide Range of Exposures

In the Australian study, the mice were exposed to a wide range of radiation levels depending on where they were in their cages. They were housed in groups of five and could move freely around their particular cage. The experiment was run “blind,” meaning the research team did not know which mice were exposed and which were controls.

The exposures were in the far field. In contrast, most users of cellular phones are exposed in the near field.

SARs at any given time ranged from 0.008 W/Kg to 4.2 W/Kg depending on where the mice were in the cages. Other factors affecting the SARs were the weight of the mice, which changed during the course of the study, and the fact that the mice slept together in packs.

Under current rules, the U.S. Federal Communications Commission (FCC) deems exposures from cellular phones below 1.6 W/Kg to be safe.

“We did not have the resources to hold mice during exposure and irradiate them with a special antenna in the near field. However, we are recommending that this be done in follow-up studies to reduce the problem of a wide range of SARs,” Repacholi wrote *Microwave News*.

“Since the variation is so wide, it is not possible to determine what SAR or SAR range was responsible for causing the increased incidence of lymphoma,” Repacholi notes in the paper.

Guy, now a consultant based in Seattle, was critical of the do-

Advice for the Concerned

It will take years for the RF/MW cancer risk issue to be resolved. In the meantime, Australia’s Dr. Antony Basten and the U.K.’s Dr. John Stather do not see any need to stop using mobile phones. For those who are concerned, here is what some others are advising:

- The Australian Consumers’ Association, based in Sydney, recommends talking on standard phones instead of mobile phones whenever possible, limiting the duration and number of calls and not using digital phones inside buildings, where they have to transmit at higher power levels. The group also suggests considering the use of a headset and extending the antenna completely to reduce radiation exposure.
- Dr. Bruce Hocking, a consultant and former chief medical officer at Telstra, based in Melbourne, advises that children’s exposures to radiation from mobile phones should be limited since the study “showed a marked rise in risk of cancer with duration.” An important step in achieving this, Hocking told *Microwave News*, would be to prevent manufacturers from marketing phones to young people. In 1995, Hocking reported that children living near TV towers had higher rates of leukemia than did children living farther from the antennas (see *MWN*, N/D95 and N/D96).
- The Australian Democrats advocate the transfer of authority for mobile phone policy decisions from the Department of Communications and the Arts to the Department of Health, requirements that manufacturers and doctors record health complaints related to mobile-phone use, restrictions on marketing mobile phones to young people and a ban on cellular towers on school property. Democratic Senator Lyn Allison had asked for a review of safety standards because the “study recorded the damage at power levels similar to those ‘deemed’ safe....” Allison stated that Senator Richard Alston, minister of communications and the arts, has rejected her request.
- In Israel, where the study has been front-page news, the *Jerusalem Post* reported that one manufacturer, Cellcom, has suggested the use of a separate headset (May 6). Cellcom will help establish a research fund to study potential health effects, according to the *Post* (May 9).
- Dr. Peter Neitzke, a physics professor at the Institute for Social Ecological Research in Hannover, Germany, recommends keeping mobile phones away from one’s body when not in use, since they generate radiation even in standby mode, according to Germany’s *New Press* (May 9).

simetry. “I can’t tell whether they overestimated or underestimated the SARs, because there is not enough information in the paper,” he said in an interview.

The use of mice that were genetically engineered to develop lymphoma in the first year of life has also prompted criticism. Motorola’s Swicord, for example, has questioned “the validity of using this genetically engineered mouse strain for carcinogenicity testing.”

In the paper, the Australian team states that humans do not have the same genetic predisposition as the transgenic mice, “but some individuals inherit mutations in other genes...that predis-

pose them to develop cancer, and these individuals may comprise a subpopulation at special risk from agents that would pose an otherwise insignificant risk of cancer.”

Three Rejections Before Publication

The paper was submitted to *Radiation Research* on July 8, 1996, and accepted for publication on December 30. It had been previously rejected by the *Lancet*, *Nature* and *Science*, Repacholi told *Microwave News*. Newspapers in Australia and in Germany have reported that *Science* and *Nature* had expressed concern that the results would create a “panic” and wanted to wait for a replication study.

A spokesperson at *Science* would neither confirm nor deny these reports, noting the journal’s confidentiality policy regarding the peer-review process. Repacholi said that the rejections were based on “nonscientific grounds.”

The results of the Australian study were tightly held until the date of publication. *Radiation Research* would not make advance copies of the paper available to the press. Indeed, the journal’s own Web site did not include a description of the paper, as it did for all the others appearing in the May issue.

Martha Edington, the managing editor of *Radiation Research*,

said that, “The authors have asked us not to release any information about the paper prior to the date of mailing of the issue except for the title and the authors” (see also p.13).

The delay in the release of the results has spurred some harsh criticism. “I think it is very irresponsible and unwise to keep the data secret for two years, knowing their implication,” Lai said in an interview. “The secrecy only reinforces the suspicion of the public that the industry is trying to cover up.”

Dr. Niels Kuster of ETH in Zurich, Switzerland, told the Swiss newspaper *SonntagsBlick* (May 18): “It is incomprehensible to me that industry did not replicate this study 18 months ago, when the preliminary results became known. Now we won’t know for at least two years whether, in fact, mobile phone radiation accelerates the development of cancer.”

On April 30, 1997, Telstra held a news conference in Sydney announcing the study results. Repacholi addressed the attendees via a television satellite link from his office in Geneva. Telstra did not respond to a request for a transcript or a video of the press conference.

M. Repacholi et al., “Lymphomas in μ -*Pim1* Transgenic Mice Exposed to Pulsed 900 MHz Electromagnetic Fields,” *Radiation Research*, 147, pp.631-640, May 1997.

FROM THE FIELD

Motorola on Its Internal Lai-Singh Memo

March 25, 1997

To the Editor:

I would like to convey Motorola’s strong objections to your publication of highly selective excerpts from an internal Motorola memorandum about research at the University of Washington on the possible effects of RF/MW exposure on DNA [MWN, J/F97]. The published version of these documents painted an incomplete and possibly misleading account of our actions and intentions. When read in the proper context, these documents underscore the seriousness with which we addressed the issues raised by this research and questions that may arise about the safety of wireless communications technologies.

As documented by *Microwave News*, Motorola for years has been a world leader in studying the potential interactive effects of RF energy. And we have a strong basis for confidence in the safety of our products. When publicity surrounding the Reynard lawsuit in Florida—later dismissed for lack of evidence—first challenged the safety of cellular telephones in early 1993, we decided that if there were unknown health risks from exposure to RF energy, they could show up in the medical histories of our employees. We commissioned a large-scale epidemiological study of Motorola employees, who have spent decades working with and around RF energy. In a review of the health histories of more than 93,000 Motorola employees, Dr. Robert Morgan found no overall increase in cancer mortality and significantly fewer brain cancer deaths than would be expected based on national averages. Over the last few years, completed laboratory (*in vitro* and *in vivo*) research has produced additional scientific support for the absence of adverse health effects from the radio signals generated by wireless communications.

Now to the DNA experiment of Drs. Lai and Singh at the University of Washington. As documented by *Microwave News* at the time, Motorola devoted considerable time and attention to this research as

soon as the findings became known and months before they were published. Results inconsistent with past research or otherwise in need of validation, verification and interpretation often require further investigation. And as you reported more than two years ago, Motorola promptly commissioned further research of this kind. This decision was based, in part, on the observations of experts who reviewed the methods and conclusions of the University of Washington study.

In the latter part of 1994, we were in contact with *Microwave News* as well as various other entities that had a need or interest in evaluating the University of Washington research and potential scientific follow-up. Motorola’s actions at all times were guided by a dedication to sound science and corporate responsibility. We worked to effectively and factually address questions that might be seen by some, accurately or not, as bearing on the safety of our products. As noted above, the key element of that response was to commission independent research at Washington University in St. Louis, MO, to understand and replicate the Lai-Singh research. Beyond that, Motorola engaged only in the kind of responsible preparations needed to address questions raised in the scientific community and elsewhere about the design, findings and significance of the research conducted by Drs. Lai and Singh.

Albert R. Brashear
Corporate Vice President and Director, Corporate Communications
Motorola
1303 E. Algonquin Road, Schaumburg, IL 60196

We tried to make an objective journalistic decision about what parts of the lengthy Motorola memos would be of general interest. We believe we succeeded, but we invite readers to judge for themselves. The full memos may be obtained by sending a self-addressed 9x12 envelope stamped with \$1.01 postage to Microwave News, along with \$5.00 for handling.

Repacholi Responds: WHO Does Not Seek To Run EC Program

May 9, 1997

To the Editor:

As almost all the criticism that *Microwave News* has leveled at me over the past few years was repeated in your March/April 1997 issue, allow me to set the record straight. WHO does not want, nor is it asking, the European Commission (EC) to delegate its wireless research program, as your headline suggests. WHO has neither the resources nor the desire to run such a program. WHO merely identifies research it needs to make better health risk assessments.

The U.S. Air Force (USAF) can respond to criticism about the Toler study. I am accused of appointing three USAF members to working groups (WGs) at the November RF meeting in Munich. Members of WGs were *not* appointed. Independent scientists who felt they could contribute joined WGs. Considering that the USAF has the largest government-sponsored RF bioeffects research program in the world, it is not surprising that its members wanted to participate. The meeting organizers did not specifically invite them. They were free to attend at their own cost, as were other scientists.

Representatives of the EPA, FDA, NIEHS and NIOSH were invited to the Munich meeting. Since WHO normally funds only those scientists from developing countries, those from the U.S. were asked to pay their own way. At the next international advisory committee meeting, to be held in Geneva, June 2-3, three U.S. government agencies are scheduled to be represented. Further, the FDA has stated to U.S. Rep. Edward Markey (D-MA) that it will await the outcome of the WHO EMF Project before considering further action on mobile phones.

Criticisms of Ken Foster and William Pickard are unjustified. While they may believe that low-level RF fields have no health impact, they were asked how health effects could be found and established. Common sense suggests that one seeks scientists of all persuasions to reach a consensus.

Dr. Pickard agreed to chair a WG in Munich because he was going to report on the views of others. His appointment was in line with WHO policy that WGs have scientists with a wide range of views. WHO has used this technique for many years. Note that the conclusions and recommendations of the Munich meeting are in line with those of other reviews, particularly with the recent EC expert group report on mobile phones.

The title of the Munich report was changed to keep it concise. Note that "low-level" was defined in the text to include both "athermal" and "nonthermal."

Your criticism that only two U.S. participants at the Munich meeting do biological research suggests that no other country has anything to contribute. Xenophobia reigns supreme at *Microwave News*. Readers from other countries will be happy to learn that you consider their contributions to be less than those of Americans. Fortunately, WHO does not have this view. WHO welcomes input from *all* scientists from *any* country.

WHO considers the military to be an agency of a member state and entitled to be heard. Considering that WGs are composed of 20-25 scientists, from many countries, one or two military representatives would have to be very persuasive to convince the other members of a WG. WHO has not received any funds from the military.

WHO, IARC, FDA and EPA have long used scientific principles to assess health risks. My role in the WHO EMF Project is to facilitate its implementation, *not* to influence the science. I will *not* be a member of any WHO WG evaluating health risks.

You note that I tried to raise the limits of the Australia/New Zealand RF standard. What is not mentioned is that there is an anomaly in the Australian standard. In 1985, before I joined the standards committee, a more stringent MW limit was offered to placate the union representative. Later, when I chaired this committee, the Australian and New Zea-

land standards associations asked us to adopt, where possible, international standards to comply with the GATT agreement. Although a majority of the committee agreed, industry and a few others voted against the proposal. I later resigned from the committee. My stance to uphold valid scientific principles in the face of industry opposition could hardly be considered as demonstrating a pro-industry bias.

I am proud that ICNIRP has become one of the most influential groups setting standards on non-ionizing radiation. The U.S. NAS came to the same conclusions on EMFs as IRPA/ICNIRP did some seven years ago, but its review cost about \$1 million while IRPA/ICNIRP's cost about \$50,000. ICNIRP is very cost-effective and provides sound advice. WHO requested that I resign from ICNIRP to work on the EMF Project because ICNIRP is a full partner on the project.

It is true that, a few years ago, I suggested "off the record" that mobile phones interrupt my meals in restaurants (and they still do). Now, following publication of my animal study, I believe that there are real effects from low-level RF fields, which need further investigation.

The fact that the sponsors of my animal study asked for the results three months prior to publication did not delay it. In the past, studies have been released prematurely, only for us to find later that the conclusions did not hold up, or that they failed peer review because of some basic design flaw. The research team, not the sponsors, decided that the results would only be released on the day they appeared in *Radiation Research*.

My criticism of the draft NCRP report chaired by Dr. Ross Adey has been widely misconstrued. While it is true that I said it was a "nothing report" (in retrospect, a poor use of words) at an Australian Senate hearing, I meant that it had *no* status within NCRP since it had not been extensively peer-reviewed, as is required of all NCRP publications. It was irresponsible of *Microwave News* to disclose the draft conclusions, even when requested not to do so by the NCRP president. The draft conclusions of the Adey committee, as published in *Microwave News*, are at odds with *all* recent reviews of the ELF literature, and most recently, that of the U.S. NAS.

It is true that, as chief scientist of Royal Adelaide Hospital, I was asked by some Australian industries to assist on training videos for workers and the general public. I wanted to inform people about the science, since, unfortunately, the view provided by the press is extremely distorted. My appearance as an expert witness was to advise the court on the science and my written statements included *all* scientific studies, not only those showing negative results. As a WHO employee, I am not allowed to be an expert witness.

I chaired a conference in Brussels sponsored by the French and Belgian electrical utilities. My participation was to moderate discussions. I had no part in drafting the program. My paper at the meeting did not espouse the "no effect" view.

Microwave News quotes me as saying that the EMF Project will have "buckets of money." This is Louis Slesin's own quote. There are now ten countries contributing funds or supporting activities of the project. Many more are currently considering support. The project is financially sound and will continue for at least five years, until all tasks are completed.

Michael Repacholi, PhD
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We stand by our editorial, including our reporting of Dr. Repacholi's comments on funding for his WHO EMF Project, which were made in an interview at the NIEHS EMF Science Review Symposium held in Durham, NC, March 24-27, 1997.

Clippings from All Over

When all is said and done, what was lacking in the [National Academy of Sciences-National Research Council's EMF] committee's assessment was common sense. After all, if multiple studies show that children who live in homes near power lines that give off strong magnetic fields are developing leukemia and brain cancer more often than other children, and if multiple studies show that workers exposed to strong power-frequency magnetic fields on the job are developing leukemia and brain cancer more often than other workers, wouldn't common sense tell one that exposure to magnetic fields ought to be considered a more likely suspect than some unknown factor having to do with the age or construction of a residence, the previously considered factor of traffic density, or a highly unlikely exposure to herbicides?

—Paul Brodeur, *Secrets: A Writer in the Cold War* (Boston: Faber and Faber, 1997), p.214 (see also p.8)

[R]esearch on EMF risks "hasn't been very productive...science isn't really up to the task of answering the question."

—Dr. Keith Florig, Carnegie-Mellon University, Pittsburgh, quoted in "ScienceScope: DOE Gets Out of EMF Research," *Science*, p.1867, March 28, 1997

A Peer at Peer Review

Martin Blank

Peer review is the fashion today.
"They're our equals," at least, we can pray.
But make no mistake,
peers can be on the make,
and good science they sometimes betray.

We tend to believe what our peers say,
be their words cheery bright or deep gray.
Though we all go along
their ideas can be wrong.
With self-interest the "truth" goes astray.

Peers claim they review with fair play,
and impartially facts they do weigh.
But it often appears
that it's only the peers
who get dough, and then get to make hay.

When peers sit to judge yea or nay,
they vote for themselves, come what may.
They're old-fashioned elite,
not always discreet,
and we are the ones who must pay.

They're not *US*, they are more like U.K.,
where for years age-old "peers" have had sway.
Despite the pretense,
we know the true sense.
When "peers" speak, we must do it their way.

Dr. Blank, of Columbia University's College of Physicians and Surgeons in New York City, is the president-elect of the Bioelectromagnetics Society.

STILL WAITING FOR THE CALL
Do Cellular Phones Cause Brain Tumors?
Researchers' Inability To Provide an Answer So Far
Is Only Raising More Questions

CELLULAR INDUSTRY RESEARCHERS HAVE SPENT
\$17 MILLION WITHOUT RESULTS

CELLULAR PHONE RESEARCH GROUP'S
INDEPENDENCE QUESTIONED

—Headlines from a news story by Mike Mills, *Washington Post*, pp.H1, H7 and H8, April 6, 1997 (see also p.7 and p.9)

I commend the members of the Cellular Telecommunications Industry Association for their efforts to promote safety through the use of cellular technology. You can take great pride in your dedication to this endeavor and in your hard work on behalf of our communities. You are helping to create a brighter future for all of us.

—President Bill Clinton in a letter recognizing the CTIA's Wireless Safety Week, May 19, 1997

[W]hen big businesses like AT&T Wireless Services tell us those ugly towers they want to erect on our school grounds and through our communities are our friends, I'm skeptical. When they say there's no evidence of any health risk associated with the radio waves emitted by their communications towers, I say that's not good enough. And when government...says it's going to permit such a tower without insisting on assurances that the children in its care won't suffer the consequences 25 years from now, I get angry.

—Dave Lange, "They Can Live Without \$100,000," commentary, *Chagrin Valley Times* (OH), p.12, May 15, 1997

Either deliberately or accidentally, the media was manipulated last week to largely ignore some very disturbing news about Australian research conducted over four years into cellular phones and their potential to cause tumors. The results were to be announced in Adelaide through a videoconference, but journalists who know about this stuff were not invited—and nor were some of the researchers who did the work.

—Stewart Fist, "Cancer Scare Story You Didn't Hear," commentary, *The Australian* (Australia), May 6, 1997 (see p.1)

Defendants' reply brief appears to argue that, although there is no FDA safety standard, there are standards set by the FCC and [ANSI] regarding the output allowed for cellular phones. This argument is irrelevant, as the FCC is empowered to regulate frequencies and power of telecommunications items. "Congress has not empowered the FCC to regulate cellular telephones with regard to health effects and public safety" [citation to *Verb v. Motorola* omitted].

—Judge Paddy McNamara, Cook County Circuit Court, Chicago, Memorandum and Order in *Wright v. Motorola*, May 7, 1997

This year, the Cannes Festival held its fiftieth anniversary. It was a fitting moment to take stock: to stand back and marvel at this luminous fortnight, as stars and stargazers came together to honor the greatest medium of mass communication that has ever existed. It was time, in short, to celebrate the mobile phone. True, there were ugly rumors flying around that some people were laying down their Motorolas and going to watch *films*...but there wasn't much solitude in the air at Cannes 1997, not with all the electronic messages crackling through the atmosphere. If you stood on the Croisette at noon and threw an egg into the sky, it would come down fried.

—Anthony Lane, "Postcard from Cannes," *The New Yorker*, p.78, May 26, 1997

UPDATES

BOOKS AND REPORTS

EMF and RF/MW Reviews...Dr. James Lin of the University of Illinois, Chicago, has assembled seven new papers for the second volume in the series *Advances in Electromagnetic Fields in Living Systems*. For low-frequency EMFs, Dr. Russel Reiter presents the literature on melatonin, while Drs. Leeka Kheifets and Jennifer Kelsey review the epidemiological studies on cancer. For the high frequencies, Lin discusses the health effects of wireless radiation, Drs. George Harrison and Elizabeth Balcer-Kubiczek look at the carcinogenic potential of RF/MW radiation and Richard Tell offers insights on how to interpret and apply the 1992 ANSI/IEEE exposure standard. The other two papers address computational bioelectromagnetics and medical applications. The first volume was published in 1994 (see *MWN*, J/F95). This new volume is available for \$89.50 from: Plenum Publishing Corp., 233 Spring St., New York, NY 10013, (800) 221-9369, Fax: (212) 807-1047. Prices are 20% higher outside the U.S. and Canada.

WTR on WTR...The February issue of *Human and Ecological Risk Assessment*, published by CRC Press, is devoted to papers describing the work of Wireless Technology Research (WTR), the U.S. cellular telephone industry's research group. The papers are drawn from presentations by the seven staffers and consultants that WTR sent to the *Society for Risk Analysis Annual Meeting* in Waikiki, HI, in December 1995. They address topics such as dosimetry, post-marketing surveillance, tumor promotion studies and interference with cardiac pacemakers. Many of the papers have been updated to reflect developments since the 1995 conference. The special issue was guest-edited by Kelly Sund and Dr. George Carlo, both of WTR, with an introduction by Dr. Michael Gough of the Cato Institute in Washington. Copies of the journal or reprints of individual articles are available from: WTR, 1711 N Street, NW, Suite 400, Washington, DC 20036, (202) 833-2800, Fax: (202) 833-2801, E-mail: <Mary@HESGroup.com>.

CELLULAR PHONE EMI

New Data on Defibrillators...One type of implantable cardiac defibrillator (ICD) did not experience electromagnetic interference (EMI) from cellular phones, according to a paper presented on May 8 at the *18th Annual Scientific Sessions of the North American Society of Pacing and Electrophysiology (NASPE)* in New Orleans. Dr. Roger Damle and colleagues at the University of Colorado, Denver, held a TDMA-type digital cellular phone over the chest or abdomen of 48 people with Ventritex ICDs. Previous research has shown that cellular phones can cause EMI with cardiac pacemakers (see *MWN*, J/A94, M/J95 and N/D96); Damle suggested that the sophisticated circuitry of ICDs may make them more resistant to cellular phones. "There were no cases of ICD reprogramming, pacing inhibition or sensing of extraneous signals," Damle stated. "This suggests that one of these phones can be used and it will not cause the device to shock patients inappropriately or turn off." But Dr. Hans Moore of George Washington University in Washington cautioned, "I wouldn't use that to draw conclusions about other models. With pacemakers, Dr. Roger Carrillo found a wide range of responses between different devices" (see *MWN*, M/J96). Moore noted that his own lab had found Ventritex ICDs less susceptible to cellular phone interference than some other types. Two other papers presented at the NASPE sessions reported that ICDs did not appear vulnerable to other forms of EMI. Strong magnetic fields have been one source of concern—for instance, those generated by anti-theft monitors. Dr. Marshall Stanton reported on a recent study at the Mayo Clinic in Rochester, MN, in which a degaussing coil was held four to six inches away from three brands of ICDs in a total of 12 people. Interference occurred in only two devices, and was never triggered at less than 2.5 gauss. In a study of ICDs and cellular phone base stations, a team led by Dr. Charles Gottlieb at the Allegheny University Hospitals in Philadelphia observed a Ventritex ICD at distances from 20 to 1000 feet away from the tower. No interference was observed. But users of ICDs have more to worry about than

"MICROWAVE NEWS" FLASHBACK

Years 15 Ago

- In an antitrust case brought by Hydrolevel Corp., the U.S. Supreme Court rules that the American Society of Mechanical Engineers is liable for the actions of its committee members, prompting a reorganization of voluntary standard-setting groups.
- Two English researchers report in *Nature* that a 500 Hz pulsed magnetic field stimulates the release of noradrenaline from PC12 cells.
- In a unanimous decision, a New York appeals court upholds a workers' compensation award to the widow of Samuel Yannon, who worked near microwave transmitters on top of the Empire State Building.

Years 10 Ago

- A report from the Hawaii Department of Health finds "significantly higher" cancer rates near broadcast towers in Honolulu than in nearby areas without towers.

- The Cancer Research Center of Hawaii reports that, between 1979 and 1985, there were more than four times the expected number of leukemia cases among children living within five miles of the U.S. Navy's communications complex at Lualualei.
- A Denver FM radio station agrees to reduce broadcast power from 100 kW to 1 kW at a campsite where its tower is located.

Years 5 Ago

- In the first case of its kind, Susan and David Reynard sue NEC America Inc. and GTE Mobilnet, claiming the use of a cellular phone promoted the development of Susan's brain tumor.
- The U.S. House of Representatives names the National Institute of Environmental Health Sciences as the lead federal agency for EMF health effects research, replacing the Department of Energy.
- Researchers at the University of Zagreb in Croatia find epidemiological and laboratory evidence pointing to similar genetic effects from exposure to microwave radiation.

Stay Ahead with Microwave News

Time after time,
Microwave News breaks the story:

Microwave News, July/August 1995

“Draft NCRP Report Seeks Strong Action To Curb EMFs”

“Leak Links Power Lines to Cancer”

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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cellular phones: At last year’s NASPE sessions, Dr. Antonio Madrid of the Ramón y Cajal Hospital in Madrid, Spain, reported on four cases in which ICDs fired due to EMI from slot machines.

MEETINGS

Breast Cancer Conference...Dr. Bary Wilson of the Battelle Pacific Northwest Labs, who is now based in the United Arab Emirates, will be among the featured speakers at the *1st World Conference on Breast Cancer* in Kingston, Ontario, Canada, July 13-17. The conference is being coordinated by the New York-based Women’s Environment & Development Organization (WEDO) and the Kingston Breast Cancer Conference Committee with the theme “Joining Together to Prevent Cancer.” July 16 is devoted to environmental factors. Wilson and Dr. Meike Mevissen of the School of Veterinary Medicine in Hannover, Germany, will participate in an afternoon workshop. Mevissen has long collaborated with Dr. Wolfgang Löscher on studies of breast cancer among EMF-exposed animals. Later that day, Cindy Sage of Sage Associates, an environmental consulting firm in Santa Barbara, CA, and Dr. Kjell Hansson Mild of the National Institute for Working Life in Umeå, Sweden, will lead a workshop on EMF public policies. In addition to EMFs, the environment day is slated for addresses on ionizing radiation and pesticides. For more information, contact: WEDO, 355 Lexington Ave., New York, NY 10017, (212) 973-0325, Fax: (212) 973-0335, E-mail: < wedo@igc.apc.org >; or look up < www.wedo.org > on the World Wide Web.

HPS Summer School...This year’s Health Physics Society (HPS) summer school is devoted to *Non-Ionizing Radiation: An Overview of the Physics and Biology*. Dr. Martin Meltz of the University of Texas Health Science Center in San Antonio is one of the organizers of the five-day course, which will be held in San Antonio, June 23-27. Among the scheduled speakers are other members of the university’s faculty, as well as a number of staffers at the Armstrong Lab at nearby Brooks Air Force Base. Battelle’s Larry Anderson, attorney Robert Manor and Lucent Technologies’ Ronald Petersen are also scheduled to speak. For registration information, contact: HPS, (703) 790-1745, Fax: (703) 790-2672; E-mail: < hpsburkmgmt@aol.com >. For a copy of the program, contact: Meltz, (210) 567-5560, Fax: (210) 567-3446. E-mail: < meltz@uthscsa.edu >. The HPS annual meeting follows the summer session.

MILLIMETER WAVES

No Damage Found to Rabbit Eyes...After repeated exposure to millimeter-wave radiation at 60 GHz, rabbits’ eyes showed no signs of damage, according to researchers at Johns Hopkins University’s Applied Physics Laboratory in Laurel, MD. The work was funded by Hewlett-Packard Co. (HP), which is developing a new class of wireless computer networking devices that would operate over short distances at 59-64 GHz (see *MWN*, M/A 96). Henry Kues, who led the study, had previously found damage to primate eyes at frequencies between 0.9 and 2.45 GHz. “It is extremely important to evaluate the biological absorption and potential health hazards at the specific frequencies of interest rather than attempting to extrapolate data gathered at other frequencies,” Kues wrote in his report to HP in January. Below 24 GHz,

he noted, past research has shown a clear relationship between frequency and the depth of penetration into biological tissue. But above 24 GHz, "the absorption of energy and the depth of penetration appear to depend on a complex relationship between the conductivity and permittivity of the specific tissues being irradiated." In Kues's most recent experiment, each rabbit had one eye exposed to continuous 60 GHz waves at a power level of 10 mW/cm², the same power at which Kues had observed damage at lower frequencies. "We were very thorough in looking for any effect, whether transitory or longer-term," Kues said, but none was found. In his report, Kues advocated repeating the experiment with primates instead of rabbits. In early May, Kues told *Microwave News* that HP will fund a study with a small number of rhesus monkeys. "We're gearing up to do the exposures now," he said, "and expect to conclude the work in about three months." In his studies between 0.9 and 2.45 GHz, Kues had found that pulsed signals caused much more damage than continuous-wave radiation, and that drugs used in the treatment of glaucoma had a synergistic effect that could result in damage at power levels down to 1 mW/cm². HP is not interested in funding research on pulsed millimeter waves or on combined effects with ocular drugs, said Kues. "But they have gone to other companies to help us secure funding on those two issues," he added. The device HP plans to market uses continuous waves only. "Now that we have the protocols," Kues noted, "it would be fairly easy to do similar research on other devices."

NAS-NRC

Committee and Staff Changes...The National Academy of Sciences-National Research Council committee reviewing research conducted under the RAPID program has been reshuffled. Dr. John Ahearne, director of Sigma Xi in Research Triangle Park, NC, succeeds Dr. Charles Bean of Rensselaer Polytechnic Institute in Troy, NY, as chairman. Also joining the committee are Dr. Raymond Erickson, a biologist at Harvard University in Cambridge, MA, Dr. Peter Marler of the Animal Communication Lab at the University of California, Davis, and Dr. Thomas Tenforde of the Battelle Pacific Northwest Labs in Richland, WA. Dr. Jerry Williams of the Johns Hopkins University Oncology Center in Baltimore has left the committee. Dr. Steven Simon, a specialist in ionizing radiation, has joined the staff of the NAS-NRC's Board on Radiation Effects Research after five years in the Marshall Islands. He replaces Dr. Larry Toburen. The board's Dr. Evan Douple takes over as director, replacing Dr. John Zimbrick, who is now at Purdue University in West Lafayette, IN.

PEOPLE

Dr. **Russell Owen** has officially taken over as the chief of the Radiation Biology Branch at the FDA's Center for Devices and Radiological Health in Rockville, MD. Owen has been serving as acting chief since October 1995, after Dr. **Mays Swicord** resigned to join Motorola....Dr. **Jack Sahl** is planning to leave Southern California Edison, where he is the manager of health research, at the end of the summer. Sahl said that he will continue to work on health and safety issues, but "not primarily on EMFs."...Dr. **Peter Semm** has left German Telekom and is now doing research at Frankfurt University....**John Graham** of the Harvard

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School of Public Health in Boston has been elected to the NCRP. Drs. **John Boice Jr.** of the International Epidemiology Institute in Rockville and **William Hendee** of the Medical College of Wisconsin in Milwaukee were reelected to the council....**George Oram Jr.** has resigned as president of OrthoLogic Corp. in Phoenix. In May, a search for a new president was continuing....**Michael Volpe** is no longer working as spokesperson for WTR. **Susan O'Donnell**, WTR's public affairs manager, now handles press relations. In late May, Volpe told *Microwave News* that he has not been paid for work done in 1997 (see also p.9). "My relationship with WTR is in limbo," he said.

POLICE RADAR

Dismissal of Medical Monitoring Suit Upheld...On March 24 an Illinois appeals court affirmed the dismissal of *Blesy v. Kustom Signals Inc.*, a class-action suit against several makers of traffic radar devices. The suit was filed three years ago by Harold Blesy and several other police officers with cancer, but unlike in other police radar litigation, the plaintiffs did not ask for damages for their disease or try to prove that it had definitely been caused by the radar units, which they used on the job (see *MWN*, M/A95). Instead, they asked for the creation of a medical monitoring fund "in order to detect the onset of illness" in the future, arguing only that the radar units had exposed them to an increased health risk. But the Appellate Court of Illinois in Chicago found that "a significantly increased risk is not a compensable injury in Illinois," and upheld a lower court's dismissal of the case. The three-judge panel ruled that any lawsuit could only be based on disease or injury that the officers had already suffered. Mark Oium of O'Connor, Cohn, Dillon & Barr in San Francisco, one of Kustom's lawyers, told *Microwave News* that *Blesy* was the 23rd lawsuit against Kustom that has been "dismissed without payment of any judgment or settlement." The attorneys for Blesy and the other police officers, Philip Fertik and Norman Rifkind of Biegel, Schy, Lasky, Rifkind, Goldberg & Fertik in Chicago, declined to comment on the decision, and would not say whether they planned to appeal.

RADIATION ACCIDENT

Zapped on a TV Tower...In June 1993, three men were accidentally exposed to high levels of UHF radiation while servicing a TV transmitter in the U.K. The men were in the antenna's near field and were exposed to 785 MHz radiation at a power level of approximately 50 mW/cm² or higher for between 50 seconds and 2.5 minutes. All three experienced "an immediate sensation of intense heating," followed by pain and a reddening of the skin, like a sunburn, in those areas of the head most exposed, according to Dr. Christopher Schilling, an occupational health consultant in London, U.K. An hour after the accident, the three men began to have severe headaches. For the two most exposed, the headaches were still a problem three years later. Writing in the April 1997 issue of *Occupational and Environmental Medicine* (54, pp.281-284), Schilling reports that it took a year for these two men to feel better, "particularly from the feelings of lassitude and general malaise." Even the least-exposed worker complained of facial discomfort 18 months after the accident. For reports of other RF/MW radiation accidents, see *MWN*, N83, D84, J/A86, J/F88, J/A88, N/D90, N/D92 and M/J93.

not by hiding what little we have. Had the results of the Telstra study been made public when the experiment was finished, attention would have been focused on the need for further research—and we would know more today.

Repacholi insists that the secrecy was necessary to ensure a careful, deliberate consideration of his findings (see p.13). This won't wash. Presenting important findings at scientific conferences is itself an important part of peer review.

In our last issue we wrote, "If he has found evidence of a cancer risk, Repacholi's secrecy would be scandalous." We have little to add. But the problem is bigger than the conduct of any one researcher: Almost all health studies on cellular phones are sponsored by the cellular industry and safety standards are based on the resulting information—or, more often, the lack of it.

This situation is a breeding ground for ethical lapses. There is no reason why Telstra should see health information months—or even years—before anyone else. It must have helped Telstra figure out how to spin the news. But that hardly serves public health.

If the cancer risk found in the Telstra study was observed for a chemical, U.S. law would require that it be "immediately" reported to the Environmental Protection Agency. Not two years later, not two months later, but "immediately."

Telstra is not alone in stifling the free flow of information. Deutsche Telekom, France Telecom and other European companies act as though the results of company-sponsored research were trade secrets. Journalists' inquiries are routinely ignored.

And keeping data under wraps is only one way to achieve delay. In the U.S., the cellular phone industry has managed to avoid even beginning the research. After four years and \$18 million, Wireless Technology Research (WTR) has yet to start a single biological study (see p.6). While disappointing, this is no surprise. WTR was established by the industry to serve its own needs: to control the process and avoid having the Food and Drug Administration (FDA) in charge of research (see *MWN*, J/A93).

Motorola's research program shows how much more could have been done. It has moved faster than WTR and sponsored some important work. Yet Motorola is hardly a disinterested defender of public health. The company has sought to manipulate both the research and the public's perceptions. At times, Motorola has muzzled its own scientists (see *MWN*, M/A97; also J/A96).

Who Will Revise the Health Standards?

We have been stonewalled so often that it is natural to ask: Why is industry afraid of research? The answer goes beyond any single product: Existing RF/MW safety standards are unreliable. And the more research is done, the clearer that will become.

Current exposure limits on non-ionizing radiation all have one thing in common: They are based only on possible *thermal* effects—the heating of tissue, as in a microwave oven. The engineers, physicists and others on the committees that wrote these standards—ANSI/IEEE, IRPA/ICNIRP, NCRP—have argued that at nonthermal levels, RF/MW radiation simply does not have enough energy to have a significant biological impact.

One who held this view was Repacholi himself, who until recently was the chair of ICNIRP. Now he has changed his position, and says that his Telstra study demonstrates "a true non-

thermal effect." When a card-carrying member of the "thermalist" club defects, others are likely to follow.

The Telstra study is far from the only evidence of nonthermal RF/MW bioeffects. It is, in fact, the *third* animal study to show an influence on cancer, and it joins important work by Adey, Becker, Cleary, Guy, Hocking, Kues, Lai, Milham, Persson, Salford, Singh, Szmigielski, Tofani, Verschaeve and others. The position that nonthermal bioeffects do not exist has been untenable for some time—but as science historian Thomas Kuhn pointed out, old paradigms do not die fast or willingly.

As the evidence for nonthermal effects increases, pressure for revising exposure standards will grow. And just as we cannot trust industry to take care of wireless safety research, we cannot allow industry-controlled committees to set safety standards. If human health is our objective, public health agencies should be in charge. Both research and exposure limits must come under their direction.

Unfortunately, public health agencies are also invested in the *status quo*. In Germany, for example, the first reaction of the Federal Radiation Protection Office to the Repacholi study was to declare, "There is no scientifically supported reason to change the existing limits." And in the U.S., the FDA has declined to criticize WTR's lack of progress (see p.7).

Since government agencies have largely ceded the field of wireless safety to private corporations, they are now reluctant to admit that there are any problems. Governments may not want to take charge of wireless safety research and standards—but we should demand that they do so anyway.

The distortion of health research has recently gotten some much-needed attention. A commentary in the April 17 *New England Journal of Medicine* warns of cases in which "special-interest groups block or delay the publication of unwanted findings." It adds that, "The huge financial implications of many research studies invite vigorous attack."

The *Journal* article gives several examples, such as the lead industry's intimidation of researchers "through coordinated attacks at scientific meetings." But the financial stakes in those conflicts look like spare change next to the money involved in the wireless safety debate.

If the Telstra study is replicated, it will be clearer than ever that existing RF/MW safety limits must be thrown out the window. What will replace them? That will be the subject of a prolonged battle. And for the telecom industry, it will not be an academic argument. It will be a holy war.

Old paradigms die hard—especially when there are billions of dollars at risk.

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