MICRO WAVE NEWS

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INSIDE...

Mobile Phones, Cancer Not Linked In Two Short-Term Studies

Two epidemiological studies of U.S. mobile phone users have found no evidence of any increased risk of brain cancer, according to researchers at the National Cancer Institute (NCI) and the American Health Foundation (AHF). Both teams cautioned, however, that it may be too early to detect such risks, if they do indeed exist.

"Our results do not substantiate the concern that some brain tumors diagnosed in the United States during the mid-1990s were caused by the use of hand-held cellular telephones," Drs. Peter Inskip, Martha Linet and eight colleagues from the NCI in Rockville, MD, write in the January 11 *New England Journal of Medicine*.

The release of the NCI findings coincided with the publication of the long-awaited final results from another mobile phone study, led by Joshua Muscat of the AHF in Valhalla, NY, in the December 20 *Journal of the American Medical Association (JAMA)*. "The data showed no correlation between the use of cell phones and the development of brain cancer," Muscat said.

Both papers received widespread press coverage throughout the world.

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Federal Agencies' Report to Congress: EMFs May Present a Leukemia Risk

There is weak evidence that extremely-low-frequency electromagnetic fields (ELF EMFs) may present a leukemia hazard, according to the federal government's interagency committee (IAC) on EMFs.

The findings are contained in the IAC's long-overdue final report to the U.S. Congress on the six-year, $44 million EMF RAPID research program. They mirror the conclusions of the National Institute of Environmental Health Sciences (NIEHS) in its own 1999 report to Congress (see *MWN*, J/A99).

The IAC report has not yet been sent to Congress. Instead, it is languishing within the Office of Science and Technology Policy (OSTP) at the White House. A copy of the report, dated September 2000, was obtained by *Microwave News.*

Asked about the status of the report, Dr. Imre Gyuk, the cochair of the IAC, replied, "It's at OSTP. They will submit it to Congress, by and by." Given

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the change of administration and the fact that President Bush has not yet appointed a new science advisor (who also serves as the director of the OSTP), the report is not expected to be officially released anytime soon. Some federal employees believe the report may never be submitted to Congress, even though it is specifically required under the Energy Policy Act of 1992, which mandated the RAPID program.

The IAC report, which is eight pages long, simply repeats the NIEHS' own conclusions about the health risk: "ELF EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard," and "the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings." (The full text of the IAC's "Findings and Conclusions" is reprinted below.)

The representatives* of seven federal agencies who wrote the report also reiterated the NIEHS' view that, although individual studies are weak, taken together the epidemiological studies demonstrate a fairly consistent pattern of a small, increased cancer risk with increasing residential exposure among children. Two recent pooled analyses of the childhood residential studies have added support for an EMF–cancer risk (see *MWN*, S/O00).

The IAC does not recommend any new regulations to limit exposures, due to the lack of a "convincing" dose-response relationship and uncertainties over the appropriate metric for EMF exposure.

EMF RAPID Interagency Committee's "Findings and Conclusions"

Health Effects

The IAC agrees with the NIEHS conclusions about health risk. Namely, "ELF EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard," and "...the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings." While the support from individual studies is weak, epidemiological studies demonstrate for some methods of measuring exposure a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for adult chronic lymphocytic leukemia (occupational exposures) than for childhood leukemia (residential exposures). Nevertheless, because the scientific evidence is not strong, causality remains uncertain.

Recommendations for Remedial Actions

Extent of exposure: The IAC recognizes that power-frequency EMF exposure cannot be avoided in modern life. Information on the nature of exposure, both environmental and occupational, has been improved and better characterized by recent research including residential and occupational epidemiology studies, measurement surveys and engineering studies.

Personal risk reduction: There is not sufficient information to conclusively determine safety or risk due to power-frequency EMF exposure. Nor is there an understanding of what characteristics of the fields are biologically active at environmental exposure levels. For individuals who may wish to take action to reduce exposure, the most direct way to do this is to increase distance from a source of exposure and reduce the time duration of exposure near a source.

Regulation: Regulation that prescribes protective quantitative exposure limits for the public is not now recommended, because there is no convincing dose-response information on which to base quantitative exposure limits. Causality remains uncertain, and, in particular, no dose or exposure metric is confirmed to be causally linked to adverse environmental health risk.

For regulation of occupational exposures, OSHA refers to American Conference of Governmental Industrial Hygienists (ACGIH) guidelines for regulating exposures. Regulation to prescribe lower protective quantitative limits for the workplace is also not now feasible, for the same reason previously discussed.

Existing guidelines, such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for short-term immediate health effects, should be examined for their appropriateness. The IAC Committee also encourages government agencies to remain abreast of the activities of voluntary standards organizations such as the Standards Coordinating Committee 28 of the Institute of Electrical and Electronic Engineers (IEEE), the National Council of Radiation Protection and Measurements (NCRP) and the ACGIH. Agencies are also encouraged to determine the appropriateness of requiring hazard awareness training for highly exposed workers.

Information distribution: Information about ELF magnetic field exposure and possible health risk should be made available to the public. It would be valuable to continue the RAPID Program web site, now maintained by NIEHS at <www.niehs.nih.gov/emfrapid>. The IAC also encourages relevant government agencies to study further actions that may be deemed necessary such as considering ways to inform highly exposed members of the population whose welfare falls under their jurisdiction.

Electric utilities are encouraged to continue to provide EMF surveys, measurements, and information to their interested customers. The IAC acknowledges the merit of power industry efforts to investigate and implement methods for reducing or not increasing field levels around their facilities, and encourages their continuation. The EMF RAPID Program reviewed and evaluated technologies which can be used to reduce magnetic field exposure.

Research: Various biological effects of power-frequency EMFs have been reported in the scientific literature; however, any causal connection to adverse effects in humans is not yet established. Further research is necessary to provide more complete answers to open questions of power-frequency EMF health risks to the public. Replication of research results remains an important objective. Equally important is the need to identify the characteristics of the field (metrics) and mechanisms responsible for EMF bioeffects reported in the technical literature. Despite the lack of resources dedicated to EMF research with the end of the RAPID Program, the Interagency Committee believes that research efforts should continue, be long-termed and uninterrupted.

Coordination: Appropriate federal agencies should continue interagency coordination and communication. They should continue to monitor federal and private sector EMF research; coordinate research efforts; track international EMF research program findings; participate in activities concerning research, standards and regulation; reassess periodically the scientific evidence; and make any EMF prevention and control policy recommendations that become necessary under their areas of responsibility and jurisdiction.

In fact, the IAC does not specify any action levels for EMF exposures. "I am sorry that we could not agree on a number which would require an awareness training program for highly exposed workers," commented Robert Curtis of OSHA in Salt Lake City, a member of the committee.

Unlike the NIEHS report, which endorsed a policy of prudent avoidance to limit unnecessary exposures, the IAC simply states that those who wish to reduce their exposure should increase their distance from an EMF source and reduce the amount of time they spend near such sources.

The IAC does endorse the need for more research: "The committee believes that research efforts should continue, be long-termed and uninterrupted."

"There has to be more research to lay this issue to rest," said Norbert Hankin, an EPA senior scientist in Washington, who helped draft the report. "But they will probably find a cure for cancer first," he added—half in jest.

The report went through at least six drafts before it was submitted to the OSTP last fall (see *MWN*, S/O00).

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* The members of the IAC, who prepared the report, are: Dr. Imre Gyuk (cochair), Department of Energy; Lawrence Anderson, Federal Energy Regulatory Commission; Dr. Alan Cookson, National Institute of Standards and Technology; Robert Curtis, Occupational Safety and Health Administration (OSHA); Arnold Konheim, Department of Transportation; Dennis Rankin, Rural Utilities Service, Department of Agriculture; and Mary Smith, Environmental Protection Agency (EPA). NIEHS' Dr. Gary Boorman also served as cochair of the IAC but recused himself from preparing this report because the institute submitted its own report to Congress.

Plaintiffs' Experts Named in NSA Workers' EMF Lawsuit

Several well-known figures in the EMF research community are slated to testify on behalf of two former National Security Agency (NSA) workers who developed brain tumors after using a magnetic tape-erasing machine.

Tommy Grimes and Thomas van Meter both used the machine, known as a degausser, for several hours a week at the NSA over a period of several years in the 1980s. They are being represented by the law firm of Peter Angelos in Baltimore in their $10 million lawsuit against the machine's maker, Electro-Matic Products Co. in Chicago (see *MWN*, M/A00).

Among the plaintiffs' witnesses are:

- Dr. Henry Lai, University of Washington, Seattle.
- Dr. Abraham Liboff, professor emeritus of physics, Oakland University, Rochester, MI.
- Dr. Roger McLendon, neuropathology section chief, Duke University Medical Center, Durham, NC.
- Dr. Samuel Milham of Olympia, WA, consultant, formerly epidemiologist, Washington State Department of Health.
- Laurie Oppel, engineering consultant, Albany, NY.
- Dr. Jerry Phillips, consultant, Colorado Springs, CO.

IARC EMF Working Group

The International Agency for Research on Cancer (IARC) has invited scientists from ten countries to serve on its EMF working group. Epidemiologists make up more than one third of the 22-member panel.

The working group will meet in Lyon, France, June 19-26, to evaluate cancer risks associated with exposure to static and extremely-low-frequency EMFs (see *MWN*, N/D00).

In 1998 a 30-member working group set up by the National Institute of Environmental Health Sciences (NIEHS) performed a similar review and voted 19 to 9 in favor of classifying EMFs as "possible human carcinogens," using criteria developed by IARC (see *MWN*, J/A98). Four of those invited to Lyon were also on the NIEHS panel. Only one, Anderson, voted with the majority, while two others, Brown and Kheifets, voted against this designation. Portier served as the coordinator—and a nonvoting member—of the NIEHS working group.

Stolwijk and Tenforde are former members of the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Liboff was asked to replace Dr. Charles Polk of the University of Rhode Island on the IARC panel after Polk died in early November.

The list of invitees, listed below, was assembled by *Microwave News*. IARC's Dr. Robert Baan declined to disclose the membership of the panel.

Dr. Larry Anderson	Battelle PNL, Richland, WA
Dr. William Bailey	Exponent Health Group, New York
Dr. Carl Blackman	EPA, Research Triangle Park, NC
Dr. Arnold Brown	University of Wisconsin, Madison
Dr. Nicholas Day*	University of Cambridge, U.K.
Dr. Vincent DelPizzo*	California Dept. of Health, Oakland
Dr. Pascal Guénel*	INSERM, St. Maurice, France
Dr. Elizabeth Hatch*	Boston University, Boston
Dr. Jukka Juutilainen	University of Kuopio, Finland
Dr. Leeka Kheifets*	EPRI, Palo Alto, CA
Dr. Abe Liboff	Oakland University, Rochester, MI
Dr. David McCormick	IIT Research Institute, Chicago, IL
Dr. Meike Mevissen	University of Bern, Switzerland
Dr. Jörg Michaelis*	University of Mainz, Germany
Dr. Kjell Hansson Mild	NIWL, Umeå, Sweden
Dr. Junji Miyakoshi	Kyoto University, Japan
Dr. Jørgen Olsen*	Danish Cancer Society, Copenhagen
Dr. Christopher Portier	NIEHS, Research Triangle Park, NC
Dr. Richard Saunders	NRPB, Chilton, U.K.
Dr. Jan Stolwijk*	Yale University, New Haven, CT
Dr. Maria Stuchly	University of Victoria, BC, Canada
Dr. Thomas Tenforde	Battelle PNL, Richland, WA

* epidemiologist

• Dr. Daniel Wartenberg, epidemiologist, Institute of Environmental and Occupational Health Sciences, Piscataway, NJ.

Harold Walter of Tydings & Rosenberg in Baltimore, who is representing Electro-Matic, said that the defense will "probably" disclose its experts in April. In an interview, Walter also said that he plans to move to dismiss the case sometime this summer. Currently, it is scheduled to go to trial in the fall in Maryland state court.

A degausser erases information from audio, video and computer tapes by applying a powerful magnetic field. The machine that Grimes and van Meter used at NSA's headquarters in Ft. Meade, MD, generated extremely-low-frequency fields as strong as 2,500 G, according to documents from the intelligence agency. When operating the machine, workers could receive sustained exposures to fields as high as 44 G.

In 1993 the NSA took steps designed to keep employees' exposures to EMFs from degaussing equipment below 10 G—the limit endorsed by the American Conference of Governmental Industrial Hygienists (ACGIH). Following what it described as a policy of "prudent avoidance," the agency modified the degaussers and instructed workers not to sit or stand next to them.

Five years later, a survey conducted by the National Institute of Occupational Safety and Health found that more than 600 NSA workers had operated the Electro-Matic machine. About 150 employees had received exposures ranging from 20 to 70 G from another Electro-Matic degausser at NSA headquarters.

The Angelos firm is also representing Albert Meier and Nancy Ringler, who contend that their brain tumors resulted from using Electro-Matic degaussing equipment while working at the NSA. They filed suit in Maryland state court last July, but the U.S. Federal District Court in Baltimore later accepted a defense motion to move the Meier and Ringler cases there.

The Angelos firm is representing four others who used the degaussing machines at NSA headquarters and developed brain tumors, John Pica Jr., an attorney with the firm, told *Microwave News.* To date, no decision has been made on how to proceed with these cases, Pica said.

In addition to its EMF lawsuits, the Angelos firm has taken on litigation over cell phones and brain cancer (see p.5).

NAS–NRC's 1996 EMF Report "Biased," Professor Charges

The U.S. National Academy of Sciences–National Research Council's (NAS–NRC) 1996 EMF report is "culturally biased," according to a detailed analysis by Professor Magda Havas of Trent University in Peterborough, Canada. Her 80-page paper appeared in the September issue of *Environmental Reviews (8*, pp.173-253, 2000), a peer-reviewed journal published by Canada's National Research Council.

"Whenever a detectable biological response was observed, the authors of [two chapters on bioeffects] would end each paragraph by trying to downplay the effect in some way. This happened so frequently that I began to think 'Methinks, thou doth protest too much!'," Havas wrote.

In each case, the cautionary comments may be valid, Havas allows, "but they were expressed so frequently whenever a biological response was reported that I got a definite impression of bias, especially since the studies that showed no biological effects were not similarly scrutinized."

The NAS–NRC report concluded that there is "no conclusive and consistent evidence" that residential exposures to EMFs present a human health hazard, though it did find that children living near high-current power lines do have an increased risk of leukemia (see *MWN*, N/D96).

"I think that there are health effects due to EMF exposure," Havas told *Microwave News*, "but people cannot deal with noisy data." Havas explained that she is confident that EMFs have beneficial uses, not just negative impacts. "We can use this technology for medical therapies," she said.

In the conclusion of her paper, Havas observes that: "The debates and discussions we are having as a society about EMFs are no different to those that occurred with asbestos, lead, DDT and acid rain. All of these issues had their experts who stated that the results were inconclusive or contradictory or unproven until the mechanisms were identified."

Havas's paper is available on the Web at <www.nrc.ca/cgi-bin/cisti/journals/rp/rp2_tocs_e?er_er3-00_8>. It is free for Canadian citizens; others must pay C$20.00.

California EMF Survey Says 1,700 Classrooms Exceed 5 mG

About 1,700 classrooms in California have average EMF exposures above 5 mG, according to a survey sponsored by the California EMF Program in Oakland.

This estimate is based on a three-year study by Enertech Consultants of Campbell, CA, which conducted a detailed assessment of EMF sources in 89 public schools across the state between 1996 and 1999. The survey found that 20% of all school areas had average magnetic fields above 1 mG, while 1.1% have average fields above 5 mG.

"School areas" included outdoor spaces, hallways, etc. When the analysis was limited to classrooms, 0.63% had average fields of 5 mG or more—which, according to Enertech's estimate, would translate to about 1,700 classrooms across the state.

The most common source of higher field levels was net current due to a given school's wiring practices (see also *MWN*, M/J96). Enertech estimates that 11,000 classrooms in the state have field levels above 2 mG because of net current, while only 140 are above 2 mG because of transmission lines.

To reduce the average field level to less than 2 mG in all school areas throughout the state would cost $79 million, Enertech calculates—an average of $10,000 per school. The largest part of this cost would be for electricians' wages, since the materials cost for reduction of internal fields (the main source) is small. The report notes that highly skilled electricians could do the job at lower cost, since they would be more efficient in determining the sources of net current.

The report's 24-page executive summary is available on the Web at <www.dnai.com/~emf/research.html>.

« Wireless Notes »

Sir **William Stewart** is chairing the committe that will select the projects to be funded under the U.K.'s £7 million ($10 million) research program on mobile phone safety (see *MWN*, N/D00). Stewart previously headed the U.K.'s Independent Expert Group on Mobile Phones (IEGMP), which called for a government-run research effort last May (see *MWN*, M/J00). Several other members of the IEGMP are also on the committee, including Dr. **Michael Repacholi** of the WHO in Geneva and Professor **Colin Blakemore** of the University of Oxford. Among the other members are: Drs. **Ted Grant**, formerly of King's College, London, NRPB's **Alastair McKinlay**, the chair of ICNIRP, **Kjell Hansson Mild** of Sweden's NIWL and **Niels Kuster** of IT'IS in Zurich. One area deemed "particularly important" is an epidemiological study of users of the soon-to-be-introduced 3G phone service. The program, which is being funded on a 50:50 basis by government and industry, will be adminstered by the Department of Trade and Industry and the DOH. The new Stewart committee will hold its first meeting in London on February 9—a workshop for researchers and representatives from government and industry will be held earlier the same day. A request for proposals will be issued soon afterwards. Details are at: <www.dti.gov.uk/cii/regulatory/telecomms>.

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Peter Angelos's law firm has officially entered the cell phone litigation battle. On January 16, **John Pica Jr**. and **Gary Ignatowski**, two members of the Baltimore firm, filed an amended complaint on behalf of Dr. **Christopher Newman**, who claims that he developed a brain tumor after using a cellular phone (see *MWN*, S/O00 and N/D00). In early December, *Microwave News* announced Angelos's intention to enter the legal fray and the story was picked up worldwide (see for instance p.15). Angelos appeared to have some second thoughts, however, and on December 29 released a statement that he had not yet made a final decision about getting involved. But those concerns must have been short-lived: a couple of weeks later, his firm filed the 86-page amended complaint. In an interview, Pica declined to comment on the lawsuit, but confirmed that discovery was under way. No word on when the Angelos firm may file other lawsuits.

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New Zealand has endorsed **ICNIRP**'s limits for public exposures to RF/MW radiation in its new national guidelines for siting mobile telephone and broadcast antennas. In a report released on December 14, the Ministry of Health and the Ministry for the Environment called for the "strict application" of the ICNIRP limits. The U.K. government has made a similar commitment (see p.15). The purpose of the new guidelines is to foster a "consistent approach" by the country's local governments, which have the authority to adopt their own siting policies. The policy endorses voluntary "low- or no-cost" precautionary measures to reduce exposures in view of "the impossibility of proving any agent completely safe." It warns, however, that such measures should not involve "arbitrarily imposing exposure limits lower than the New Zealand standard." Adopted in 1999 by Standards New Zealand, a private body, the standard includes ICNIRP-based limits and calls for precautionary measures on a voluntary basis (see *MWN*, M/J99). While the new government policy is not legally binding, some local tower siting rules have been struck down in court because they were more stringent than the ICNIRP limits (see *MWN*, S/O99). But the 50 $\mu W/cm^2$ limit in New Zealand's largest city, **Auckland**, is not in danger of being overturned, according to **Roger Matthews**, a city planning official (see *MWN*, N/D96). In an interview with *Microwave News*, he explained that the Auckland standard is based on a different set of regulations than the local rules that ran afoul of the courts, and that he was confident that it would withstand a challenge. Matthews added that in his view, the new national guidelines "substantially water down" the New Zealand standard. The 94-page *National Guidelines for Managing the Effects of Radiofrequency Transmitters* is available as a PDF file on the Internet at: <www.mfe.govt.nz/about/publications/rma/Cellsite.pdf>.

German Academy of Pediatrics: Keep Kids Away from Phones

In Germany, pediatricians are advising parents to restrict their children's use of mobile phones and are calling for stricter RF/MW exposure limits.

"Unnecessary, frequent and extended use are to be strongly discouraged," stated the German Academy of Pediatrics on December 8. "Children only need mobile phones to communicate very infrequently, in exceptional situations."

Echoing the recommendations of the U.K.'s Stewart panel (see *MWN*, M/J00), the academy stressed the "considerable" gaps left by health effects research to date and the fact that risks "cannot be ruled out." The statement also cites studies linking phone radiation to tumor promotion and to changes in brain function and sleep patterns.

All mobile phone users should keep conversations "as brief as possible," the pediatricians advised. Additional precautions are appropriate for children, however, in view of the "special health risks" associated with their growing bodies.

The statement also endorses the ALARA (as low as reasonably achievable) principle for managing radiation from mobile phone base stations. As an example of how the principle could be applied, it cites with approval the 0.1 $\mu W/cm^2$ limit proposed by the government of Salzburg, Austria, last year (see *MWN*, J/A00).

The physicians' recommendations run counter to the German government's policy. The Federal Radiation Protection Office stated last year that wireless phone radiation poses no danger to health provided the ICNIRP-based national limits are not exceeded (see *MWN*, S/O00).

Last September, Dr. Heyo Eckel, a senior official of the German Medical Association, called on the radiation office to "take a serious look" at lab results indicating that "radiation at levels below the [German] limits can cause damage."

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In **Australia**, Dr. **Peter French** is consulting with lawyers after a government aide suggested that his work on RF health effects is "pseudo-scientific." French, the chief of immunology at St. Vincent's Hospital in Sydney, had submitted material documenting "important clues that point to a link between mobile phone radiation and cancer" to an Australian Senate inquiry on mobile phone safety (see *MWN*, J/F00 and S/O00). He was later chagrined to see the evidence described as faulty science by Ken Karipidis of the Australian Radiation Protection and Nuclear Safety Agency (**ARPANSA**) in Yallambie. Karipidis analyzed the documents presented to the senate panel for the Radiation Health Council, the ARPANSA committee that is developing a new national standard for public exposure to RF/MW radiation (see *MWN*, S/O99). Those contributing "erroneous information," according to Karipidis, were "mainly lobby groups or 'crusader' scientists such as Peter French." On November 16, French told the senate panel that Karipidis's remarks raised questions about "the motivation and the competence of ARPANSA." Dr. Colin Roy, the head of ARPANSA's non-ionizing radiation branch, did not respond to a request for comment. (Roy was on his way to Geneva to begin working at the WHO; see p.17.) The controversy found its way into the Australian press, as *Good Weekend*, a magazine published by the Melbourne newspaper the *Age*, ran Karipidis's comments in its December 16 issue. French told the magazine that the official's description of him was "highly offensive." In January, French confirmed to *Microwave News* that he is "currently undertaking legal action on this matter." A transcript of French's senate testimony is available as a PDF file at: <www.aph.gov.au/hansard/senate/commttee/s-ecita.htm>.

Sen. Kennedy Seeks NAS–NRC Study of PAVE PAWS Radar

Senator Edward Kennedy (D-MA) has asked the U.S. Air Force (USAF) to pay for a study of possible health effects of the PAVE PAWS radar on Cape Cod to be conducted by the National Academy of Sciences–National Research Council (NAS–NRC).

In a January 11 letter to Whitten Peters, the then Secretary of the Air Force, Kennedy requested that the study "should address, at a minimum, the effects, if any, of the PAVE PAWS radar over the past two decades."

The PAVE PAWS phased array radar, which became operational in 1980, operates at 420-450 MHz with a peak power of 582 kW. Since it was first announced in the 1970s, the radar has been the target of protests from those living nearby.

Community opposition to the radar has recently been fueled by concerns expressed by Dr. Richard Albanese, a USAF physician at Brooks AFB in San Antonio. In a letter to the Massachusetts State Department of Health, Albanese stated that, in "his personal medical opinion," the effects of the type of radiation exposure from phased array radars are "totally unexplored" and studies are needed for this "unique" type of signal. "This lack of testing makes me nervous indeed," he wrote (see *MWN*, S/O00).

Kennedy also asked the USAF to allow Albanese to express his ideas in a public forum on Cape Cod, to let Albanese continue his studies on radar radiation and to declassify Albanese's past work on radar.

Albanese has been sharply criticized by Dr. Robert Adair, an emeritus professor of physics at Yale University in New Haven, CT. In a January 11 letter to Kennedy, Adair stated that Albanese has "no competence whatsoever in this matter," and called Albanese's work "crackpot." The following day, Adair took his charges public by writing a letter to the *Cape Cod Times*.

Adair argues that, "The microwaves generated by the PAVE PAWS facility are *not* different in kind than those emitted by any other radar." Albanese counters that, "Phased array radiation, and specifically the radiation from PAVE PAWS, is qualitatively different from other forms, and therefore requires separate scientific and medical attention."

"The key difference is that there is no gap of silence between the pulses," Albanese told *Microwave News*. "There is no way for the tissue to recover its inertia."

Adair was not swayed. "It is very difficult to understand Albanese because he does not seem to understand basic physics," Adair said in a telephone interview. "There are no numbers—it is all vague talk."

Sweden's TCO Sets SAR Limit For Mobile Phone Certification

TCO Development, an arm of the Swedish white-collar union TCO, has issued a draft of its proposed standard for new mobile phones, with a maximum SAR of 0.8 W/Kg averaged over 10 g of tissue. Manufacturers would have to meet this requirement for their phones to be certified under the new TCO initiative, *TCO'01 Mobile Phones* (see *MWN*, N/D00).

TCO Development used the U.S. standard of 1.6 W/Kg over 1g of tissue "as a starting point," according to a document released for public comment on January 11. In order to use the test protocol to be finalized soon by the European standards group CENELEC, TCO increased the measurement volume to 10 g. Since SARs are lower when measured over 10 g rather than over 1g (see *MWN*, N/D00), TCO then cut the 1.6 W/Kg U.S. limit in half. Many international standards, including ICNIRP's, now mandate an SAR limit of 2 W/Kg over 10 g.

In addition to SAR, TCO is planning to require manufacturers to measure "telephone communication power" (TCP). In simple terms, this is an indicator of a phone's efficiency. TCO Development states that, ideally, a phone would combine a low SAR and a high TCP value.

A phone with a high TCP can operate at a low output power and therefore keeps SARs low, Dr. Yngve Hamnerius of Chalmers University of Technology in Göteborg, who helped develop the TCP measurement protocol, explained to *Microwave News*.

The draft of *TCO'01 Mobile Phones*, which also covers energy efficiency, ergonomics and recyclability, can be requested as a PDF file at <www.tcodevelopment.org>. The deadline for comments is March 1. TCO hopes to have the final version completed by the end of March.

Adair noted that no one had asked him to write the letter, although he had been contacted by the USAF. "The staff at Brooks were afraid that, due to politics, a lot of resources would be diverted to answer Albanese's concerns," he said. Adair's wife, Eleanor, works at Brooks (see p.15).

In 1979 the NAS–NRC issued two reports on PAVE PAWS radiation. One addressed exposure levels and potential bioeffects and the other the intensity of the radiation signals transmitted by the radar.

WTR Micronucleus Results Not Confirmed in Follow-Up Study

A follow-up study has failed to support findings of genetic damage from analog mobile phones that were first reported by Wireless Technology Research (WTR) in 1999.

The WTR study had found highly significant increases in the number of cells with micronuclei after human blood samples were exposed to mobile phone signals, both analog and digital. Those results, from experiments conducted by researchers at Integrated Laboratory Systems (ILS) in Research Triangle Park, NC, have been repeatedly cited as an indication of a genetic risk by Dr. George Carlo, former chair of WTR (see *MWN*, M/A99 and S/O00; also p.11).

The new research, led by Dr. Vijayalaxmi of the University of Texas Health Science Center (UTHSC) in San Antonio, exposed blood from four volunteers to analog phone signals at specific absorption rates (SARs) of up to 5 W/Kg. No effect was observed. "The numbers were very similar between the RF-exposed samples and the sham-exposed controls," Vijayalaxmi told *Microwave News.*

Vijayalaxmi and Dr. Martin Meltz of UTHSC collaborated with Dr. Joseph Roti Roti's lab at Washington University in St. Louis, where the blood samples were exposed. "There's not a whiff of any effect," Roti Roti said in a January interview. "It's pretty clearly negative." Their study appears in the January issue of *Radiation Research (155*, pp.113-121, 2001).

The WTR study found significant increases in micronuclei at 5 W/Kg, with larger increases at 10 W/Kg. In addition to analog signals, the ILS experiments also exposed blood samples to TDMA, CDMA and PCS radiation and showed a significant effect with each.

"I believe both sets of data—the question is why they are discrepant," said Dr. Ray Tice of ILS. One possibility is that the effect is not as consistent at lower exposures. "Without [the other lab] doing 10 W/Kg exposures, which is where we got most of our data, it's hard to draw too many conclusions," he said.

"I would love to have done a 10 W/Kg exposure as well," said Vijayalaxmi. She explained that the exposure system used by Roti Roti's lab could not produce exposures above 5 W/Kg. Roti Roti said that replication efforts at 10 W/Kg are needed. "We need to take the WTR experiments seriously," he said.

Roti Roti added that follow-up studies are needed with a different exposure system than that used by ILS. "There are lots of questions about thermoregulation" with ILS' system, he said.

When the ILS results were first released in 1999, Tice him-

Standards Watch

Czech Government Now Follows ICNIRP

The Czech Republic (and, previously, Czechoslovakia) has long had some of the strictest RF/MW exposure standards in the world. No more. On January 1, 2001, the Czech government began following the recommendations of the European Union and has now essentially adopted the guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for public and occupational exposures. In an open letter to colleagues around the world, Dr. Jan Musil of the National Institute of Public Health in Prague explained that he opposed the change and that he had been removed as the chair of both the National Reference Laboratory and the Advisory Board on Non-Ionizing Radiation. "I was replaced by a person with no research experience in this area, who was willing to accept the ICNIRP limits without biophysical qualification," he told *Microwave News.* Musil, who favors prudent avoidance, said that he is against the adoption of the same limits for short and long-term exposures and against the "hurried harmonization of standards without objective verification of the facts." (For more on Musil's views on the precautionary principle and RF/MW radiation, see *MWN*, M/J00.)

Ear Proposal Ready for a Final Vote

Subcommittee 4 (SC-4) of IEEE SCC-28 has approved new language to incorporate the reclassification of the ear as an extremity in its non-ionizing radiation exposure standard, C95.1-1999. The change was prompted by measurements showing that many cell phones violate the C95.1 and FCC standards (see *MWN*, N/D99). In an earlier vote, the SC-4 had approved the rationale for the change (see *MWN*, S/O 00). The new language now goes to the full committee for a vote. Ron Petersen of Lucent Technologies, the secretary of SCC-28, told *Microwave News* that he hopes to complete the balloting by April or May.

IEEE Cell Phone Protocol Nears Completion

IEEE Subcommittee SCC-34/SC-2 on SAR Measurement Techniques for Wireless Handsets will meet in London, February 5-7, and may finally complete its work. "I am optimistic that we will settle outstanding issues at the London meeting," said the FCC's Dr. Robert Cleveland. FDA's Howard Bassen, the chair of SC-2, concurred. "It looks like we are finally done," he said not long before boarding a plane for London. "We'll need some editing after the London meeting and then we'll send the draft standard to the full SCC-34 for approval." The protocol for measuring radiation exposures from mobile phones, officially known as IEEE P1528, now runs some 125 pages. Work on the standard began in 1997 (see *MWN*, M/A97; see also J/F99). Bassen explained that the standard took a long time to complete because they wanted "to accommodate the diverse viewpoints of the many members of the subcommittee."