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INSIDE...

White House Report Argues EMFs Are Not a Public Health Issue

There is "no convincing evidence in the published literature" to support the possibility that exposures to extremely low frequency (ELF) electromagnetic fields (EMFs) are "demonstrable health hazards," and an expanded research effort is not warranted, according to a report prepared for the Bush Administration. "In the broad scope of research needs in basic science and health...concerns over exposures to ELF EMF should not receive a high priority," the report concludes.

"In the scheme of things, this doesn't need additional funding," said Dr. Alvin Young, chairman of the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC), which commissioned the report. "If people were dropping dead from this, it would be different," Young told *Microwave News*. CIRRPC is part of the White House Office of Science and Technology Policy (OSTP).

But even before its release on November 12, the 372-page report prompted sharp criticism. "This is the last thing we need," said a senior federal official with responsibility for EMFs. The official, who requested anonymity, described the document as the "equal and opposite" of the 1990 Environmental Protection Agency (EPA) draft report which concluded that EMFs are probable or possible human carcinogens (see *MWN*, M/J90).

When, in mid-October, CIRRPC asked its member federal agencies for

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Commentary from San Diego

The Swedes Come to America

By the time Maria Feychting and Dr. Birgitta Floderus stepped up to the podium at the Department of Energy (DOE) meeting in San Diego on November 12th, millions of Americans—as well as millions of others around the world—had already heard about their landmark studies linking weak EMFs to cancer. *CNN* aired a report on October 13th and replayed it many times the next day on its *Headline News* channel. Details of Feychting and Dr. Anders Ahlbom's and Floderus's results were later featured in *Time* magazine (October 26) and in the *Los Angeles Times* on Sunday, November 8th, the day the conference opened. The following day, the *Times* piece appeared all over the U.S.—in the *Seattle Times*, the *Denver Post* and the *Philadelphia Inquirer*, among many other newspapers.

The CNN broadcasts coincided with the Electric Power Research Institute's (EPRI) *EMF Science & Communication Seminar*. So, when utility managers arrived in San Diego, they had already had a month to mull over the implications of the news from Sweden.

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« Power Line Talk »

EMFs top the list of health concerns among readers of *USA Weekend*, Gannett Co.'s Sunday magazine section. In September, the publication solicited questions about possible health hazards, suggesting issues such as pesticides, radon and air pollution, in addition to EMFs. The majority of the responses reflected worries about radiation from power lines and electrical appliances, according to Maryalice Yakutchik, who is writing a cover story on EMFs for the January 3 issue. "They didn't necessarily call it EMF, but they asked about EMF issues: What about my electric blanket? What about the clock radio next to my bed? The concern was very genuine." Yakutchik said her story will respond directly to a dozen or more questions from readers. *USA Weekend* is a supplement in more than 350 Gannett papers, reaching about 15 million readers.

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By next spring, officials at 35 schools in New York State will know the levels of EMFs in their school yards. The Syracuse, NY-based **Niagara Mohawk Power Corp.** will be estimating EMF exposures at those upstate schools that have transmission lines of at least 69 kV on, or next to, their property, according to Jack Toennies, director of environmental licensing and planning at Niagara Mohawk. The project is part of an agreement between the utility and the state PSC. "The reason for initiating the whole thing is that students, teachers and parents are concerned about EMFs, and this will be a good source of information," said PSC's Dan Driscoll, who praised the utility's efforts. Niagara Mohawk will gauge the distances between various spots in the yards and the power lines and use a computer model to calculate EMF exposures. "It's more efficient and consistent this way," Toennies noted, explaining that it is easier for a technician to measure distances than to measure EMFs. If the estimated exposures are high, or if school officials make a request, Niagara Mohawk will confirm the measurements with an on-site survey. The results will be available by March 31, 1993.

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Having decided that the term "prudent avoidance" does not adequately describe its approach to EMFs, the **Connecticut Department of Health Services** (DOHS) has chosen what it says is a more "proactive" policy: **voluntary exposure control** (VEC). "Whereas prudent avoidance is a fearsome concept, [VEC] is an empowering one," explained **Carolyn Jean Dupuy**, a DOHS epidemiologist. The VEC policy recommends giving people information about EMFs and letting them decide how best to control their exposures, Dupuy said. The DOHS move follows an April report by the Connecticut Academy of Science and Engineering (CASE) which concluded that it would be "inappropriate" to recommend prudent avoidance (see *MWN*, M/J92). Indeed, Dr. **Michael Bracken**, a professor at Yale University in New Haven and a member of the CASE committee that wrote the report, scorned such a policy. At a July 30 workshop in Connecticut, he said that, "Prudent avoidance legitimizes the notion that there might be health effects when the evidence does not really exist" (see *MWN*, J/A92). Neither CASE nor the DOHS acknowledges a link between EMFs and health effects. "No definitive cause-and-effect relationship between exposure to EMFs and an increase in health risks has been established," wrote DOHS Commissioner Susan Addiss in an October 16 letter to state Senator Cornelius O'Leary. Meanwhile, Dr. **Jan Stolwijk**, also of Yale University and chairman of the CASE committee, has proposed a $400,000 study on childhood cancer and power lines in Connecticut. The CASE report mentions the possibility of doing an epidemiological study on childhood cancer in Connecticut, but notes that there are "limitations" due to the state's population size.

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Would-be home owners are thinking twice about buying houses with power lines in the backyard, but according to an article in the November/December issue of ***Real Estate Today***, the outlook is not necessarily bleak. Author Sharon Tomecek begins by presenting the issue as an obstacle for sellers and realtors: "Properties located near power lines are a new breed of problem." But by the end of the story, Tomecek quotes the owner of an Illinois real estate company who says that power lines can be seen as an advantage: "Sell the privacy that power lines afford. A 15 to 20-foot easement surrounds the line, so your yard doesn't back up to your neighbor's." The down side is that

Brodeur on Cancer at Fresno School

An article by Paul Brodeur in the December 7 issue of *The New Yorker* turns the spotlight on a grade school in Fresno, CA, where as many as 14 present and former employees have developed cancer. The most troublesome aspect of the story: All who developed the disease had worked in the section of the school that is closest to nearby high voltage power lines. Brodeur chronicles the developing awareness of the EMF issue among teachers at the school over the last two years and paints a picture of growing disillusionment with the responses of public health officials—Dr. Raymond Neutra and his colleagues at the California Department of Health Services, in particular.

Interspersed is the history of the EPA report on the potential link between EMFs and cancer. After describing the most recent studies out of Sweden, Brodeur asks whether U.S. authorities will soon take steps to reduce exposures—by routing power lines away from schools and day-care centers, for example. Answering his own question, he argues that, "Given the record of the government and the industry in dealing with the power-line problem thus far...no one should expect that any of this will occur soon, if at all, unless a concerned and determined citizenry forces action."

buyers are concerned about the health effects of EMFs, the aesthetics of power lines and reduced property values. A study by Florida Power & Light found that transmission lines had no effect on the price of property, but a suburban Chicago realtor determined that homes near power lines sell for 10% less and take two-and-a-half times as long to change hands as homes that aren't near power lines, according to the article. Salespeople are approaching the issue in a variety of ways. One firm suggests that agents supply concerned buyers with information about EMFs, while another recommends taking EMF readings.

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Florida's Department of Environmental Regulation (DER) decided at an October 22 meeting not to lower its power line magnetic fields limits, despite pressure from **Hillsborough County**. "I don't feel there's enough evidence yet to let us set different numbers," DER's Buck Oven told *Microwave News*. Oven acknowledged, however, that the present standard—150-250 mG at the edge of a ROW, depending on the voltage of the line—is not a health-based rule. "It's a politically-based rule," he said, explaining that the governor and the state legislature had told the DER to adopt a standard, but that "the philosophy was to maintain the status quo." The county has been battling the DER—first with a lawsuit and then with a proposal for a 3 mG standard—ever since the DER first announced standards in 1989 (see *MWN*, M/A89, J/F90, M/J91, J/F92 and J/A92). A spokesman for the Hillsborough County attorney's office said that there is a "strong likelihood" that the county will refile its suit. At the same time, **Energetics** Inc. has finished the final draft of its mitigation report, which is now under review by the state's EMF task force, according to Ken Klein, manager of the project (see *MWN*, M/A89, M/J90 and J/A92). The report should be issued around the first of the year, he said.

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Now that the federal government has enacted a National EMF Research Program (NERP) (see p.6 and *MWN*, S/O92), the steering committee for the parallel NERP initiated by state officials must find a new role (see *MWN*, J/A92). The committee will meet in January to discuss its future. In a November 23 conference call, committee members weighed two options: serving as a clearinghouse for the nonfederal matching funds required under the law and providing a link between federal and state officials. The committee also decided to recommend two of its members for the federal NERP advisory committee—**John Coughlin** of the Wisconsin Public Service Commission and **James DuShaw** of the International Brotherhood of Electrical Workers.

A Conversation with Dr. Anders Ahlbom

MicrowaveNews *caught up with Professor Anders Ahlbom at the Department of Energy's annual review of power line research in San Diego in mid-November. Ahlbom is an epidemiologist at the Institute of Environmental Medicine at the Karolinska Institute in Stockholm, Sweden. (For a detailed report on Ahlbom and Maria Feychting's study of residential EMF exposures and cancer, see* MWN, *S/O92.)*

MWN: Where do we stand on the possible link between EMFs and cancer?

Ahlbom: Overall, the childhood leukemia hypothesis has been strengthened. Our study adds weight to the hypothesis.

MWN: Have you always believed that there is a link?

Ahlbom: No. My view has certainly changed over the years. I still remember that when I first read the Wertheimer–Leeper paper, I discarded it. I did not like the design. Later, I was asked to review the Wertheimer–Leeper, Fulton and Tomenius studies, and I still did not take them seriously. Savitz changed my mind. And Peters did a high-quality study.

MWN: What about the Fulton study and the U.K. study by Meyers, Cartwright and Clayden?

Ahlbom: I agree with Nancy Wertheimer's criticisms of the Fulton study, and, unfortunately, the U.K. study has only a small number of exposed subjects.

MWN: Here in San Diego, the main criticism of your study is the small size of your study population.

Ahlbom: It is the weakest part of the study. I regret that Sweden is not bigger.

MWN: You are now going home after hearing all sorts of questions and criticisms about your study. Has anyone said anything that makes you doubt your conclusions?

Ahlbom: No. Overall, we have received support for our methodology and interpretations. We have, of course, received lots of questions and suggestions.

MWN: A few days after your study was released, Dr. Jørgen Olsen of the Danish Cancer Registry announced that he had found an increase in cancer—he reported lymphoma—among children exposed to power line EMFs in Denmark (see p.5). Do you have any plans to compare Olsen's results with yours?

Ahlbom: We have been talking with our Danish colleagues for some time and, as a result, we have used similar study designs. This will allow us to combine the two sets of data and do a small meta-analysis. There are also childhood cancer studies ongoing in Finland and in Norway; when those data are ready, we will add them, too. This last step may take a little time because the Finnish and Norwegian studies are running late.

MWN: What do you make of the fact that you did not observe an increased risk of brain tumors among the EMF-exposed children and adults?

Ahlbom: I can only speculate. I don't know. It's possible that we did not see a risk for brain tumors because our study was too small. It could be that David Savitz—whose study was also

small—saw too many exposed cases and we showed too few. We simply have to wait for more information from other studies.

MWN: And Dr. Birgitta Floderus's finding of chronic lymphocytic leukemia rather than acute myeloid leukemia among EMF-exposed workers?

Ahlbom: Again, I can only speculate. We are talking about small studies, so it is not surprising to see some random variations. Also, you might expect to see different effects in different populations.

MWN: What does your study say about the size of the EMF risk?

Ahlbom: With the limited information we have today and without knowing the appropriate exposure metric, risk analyses are not possible. You can make the following calculation based on the assumption that what we are observing is not an artifact: in Sweden, there are approximately 75 cases of childhood leukemia per year and our study indicates that, of the approximately two cases a year among those who live along a power line corridor, one is attributable to EMFs.

MWN: What about the effects of all the various sources of magnetic fields?

Ahlbom: That's difficult to estimate. If you assume that 10% of Swedish children are exposed to magnetic fields and that EMFs double the risk of leukemia, then you can attribute five to ten cases of leukemia per year to EMFs.

MWN: What can you say about the possible impact of appliances?

Ahlbom: We cannot be certain because we did not do interviews. It was impractical because of the amount of time that had elapsed since some of the cases were reported. We did do 24-hour measurements for a subsample of our study population, and that data must still be analyzed. But we have preliminary indications that the major source of exposure was from power lines.

MWN: Some people are saying that your basic result is that living close to a power line entails a cancer risk.

Ahlbom: I have heard that argument. Certainly distance is a very important parameter for estimating exposures from power lines. It is our version of the Wertheimer–Leeper wire codes, but it's more sophisticated than wire codes. The crudest index of exposure is the distance from the line. The next level of analysis is based on distance and on the type of line. And next is distance, type of line and the load on the line. If you use only distance from the line as the index of exposure, you still see an association with leukemia, but it's not as clear as when you use current-load data.

MWN: Could something other than magnetic fields be responsible for the excess cancers?

Ahlbom: It could be some unknown confounder—I call it the "phantom confounder." It is always possible, but, as long as we don't have a candidate for the confounder, it's not really useful to talk about it. As for currently known or suspected risk factors, they don't seem likely to explain the results.

MWN: Do you think that transients rather than the AC fields could have something to do with the observed effect?

Ahlbom: Transmission lines were the dominant source of exposure in our study. In contrast, the primary exposures in the Wertheimer–Leeper, Savitz and Peters studies were distribution lines. Yet, the results were all similar. That would argue for average field exposure as the key variable.

MWN: What do you think of NUTEK's [the National Board for Industrial and Technical Development] decision to act on the basis of your results?

Ahlbom: I was very surprised. But it was a clever move. It stopped attacks that would have come if NUTEK's Jaak Nõu had said we have to wait for more data. His credibility would have suffered because he told people for five years that we had to wait for the results of the ongoing studies—including our study. Remember that we don't yet know what the regulations or recommendations will be.

MWN: How do you plan to publish your results?

Ahlbom: We will be submitting a paper to a journal in a couple of weeks. This will be only the first in a series of publications. We are writing separate papers on the childhood and the adult study populations. We are also preparing a paper on the details of our methodology.

MWN: Have we now done enough epidemiology?

Ahlbom: I don't think so. Each new epidemiological study provides new, important information to add to the previous ones. There are still only seven studies of childhood cancer and EMFs.

MWN: But some scientists are saying that we must do more to understand the mechanism of interaction.

Ahlbom: There is no question that we need more mechanistic information. It would give us a better metric for assessing exposures and give us a better handle on how large the magnetic field risks really are. But it would be wrong to stop epidemiologic studies.

MWN: How important is it that we don't have a clear picture of the mechanism?

Ahlbom: You must remember that even for cigarettes—while we know there is a lot of chemical exposure—we really don't know what it is about cigarette smoke that causes cancer. The association between EMFs and cancer stands on two legs: an epidemiological leg and a mechanistic leg. Today, the epidemiological leg appears stronger.

MWN: What do you think of the argument that goes: There can't be an association between EMFs and cancer because electric power generation has been growing much faster than childhood cancer rates?

Ahlbom: Those comparisons are based on very crude aggregate data. I don't think that that kind of data can compete with case–control studies or other studies with information on the individual level.

MWN: So where do we go from here?

Ahlbom: People should sit down and see if they have some new ideas. We must not repeat the same studies again. We should try something new.

Danish Studies Offer New Support for EMF–Cancer Link

Two new studies—one residential and one occupational—from the Danish Cancer Registry in Copenhagen add to the growing evidence of a link between magnetic fields and elevated cancer risks.

Dr. Jørgen Olsen and colleagues found that children who lived near high voltage facilities had a significant fivefold increased risk of lymphoma at average exposures of 1 mG or more. This finding is not inconsistent with the Swedish finding of excess childhood leukemia, Olsen told *Microwave News* at the DOE meeting in San Diego in mid-November. On his return to Denmark, he explained that he recently learned that the children in his study had Hodgkin's disease, a subtype of lymphoma. He added that Hodgkin's and leukemia, though different, "both arise from the hematopoietic tissue."

While Olsen's team found a nonsignificant 40% increased risk for leukemia, brain tumors and lymphoma combined at average exposures of 1 mG or more, the risk rose to a statistically significant 5.6 times the expected rate at 4 mG or more. The researchers cautioned that their results were based on small numbers, with correspondingly wide confidence intervals.

Above 4 mG the risks for leukemia and for brain tumors were also elevated—six times the expected rate in each case—but neither was statistically significant.

The Swedish studies have gone a long way toward dispelling some of his lingering doubts about a magnetic field–cancer link, Olsen said. He is now collaborating with Dr. Anders Ahlbom and Maria Feychting, both of the Institute of Environmental Medicine at the Karolinska Institute in Stockholm, on an analysis of the combined Danish and Swedish data (see p.3).

Danish Power Line Blocked

The Danish and Swedish epidemiological studies have prompted a delay in the construction of a 400 kV power line in Denmark until a review of the potential health risks is completed by an expert panel set up by the Minister for the Environment.

"There has been a great deal of discussion about the new cancer studies," Johan Henrik Lous of Elkraft, the Danish power company, told *Microwave News*. The power line would cross the southern part of the island of Zealand, on which Copenhagen is located, and the island of Falster, and establish a link with the German power grid at Rostock. Lous explained that only 33 km of the 108-km line would be AC—the rest would be DC—and that it would cost approximately 20 times more to bury the line than to string it overhead.

The review panel, which is headed by Dr. Carl Wandel, a professor of physics at the University of Århus, is expected to release its report by the end of the year.

Olsen and coworkers surveyed 1,707 children under 15 years of age, diagnosed between 1968 and 1986 with leukemia, brain tumors or lymphoma, and 4,788 controls. Exposures were estimated by distance from the electrical facilities and by current loads—a method similar to that used in the Swedish study.

They estimate that, in Denmark as a whole, high voltage transmission lines expose 4,000 children to 1 mG or more and 600 children to 4 mG or more. Olsen said he plans to submit a paper for publication by the end of the year.

In the occupational study, Danish men who worked at jobs with chronic exposures of more than 3 mG had a significant 64% elevated risk of leukemia. Dr. Pascal Guénel of the Institut National de la Santé et de la Recherche Médicale (INSERM) in Paris, France, and coworkers did not find an increased risk for brain tumors or melanoma, nor did they see a cancer risk for intermittent EMF exposures. Guénel and his Danish colleagues, Drs. Povl Raskmark and Jørgen Bach Andersen from Ålborg University and Elsebeth Lynge from the Danish Cancer Registry, found that the populations at greatest risk were primarily electricians and iron foundry workers.

There was a suggestion of an elevated rate of breast cancer among men but not among women.

The researchers looked at the cancer incidence between 1970 and 1987 among a cohort of 2.8 million working men and women, ages 20-64. They estimated that 18,000 men and 4,000 women had continuous occupational exposures and that 154,000 men and 79,000 women had intermittent exposures of more than 3 mG.

The study has been accepted for publication in the *British Journal of Industrial Medicine*, Guénel told *Microwave News*.

Brain Tumor Recognized as Work-Related Injury in Sweden

A 47-year-old electrician who developed a brain tumor has had his illness recognized as a work-related injury by the Swedish workers' compensation system, marking the first time occupational exposure to EMFs has been recognized as a cause of cancer in Sweden.

The electrician, who worked for 22 years at a steel mill in Borlänge, northwest of Stockholm, was diagnosed in late 1991 with an astrocytoma at the Academic Hospital in Uppsala, according to articles in several Swedish newspapers.

Union representatives filed his claim as a workplace injury after investigators took EMF measurements at the mill, states a report in the November 2 *Arbetsmiljö*, a publication of the Swedish Association of Work Protection in Stockholm. The Borlänge workers' compensation office accepted the claim and the national authorities have said they will not challenge the decision.

The case received prominent notice in the Swedish press. A September 18 story in a local newspaper, *Dala-Demokraten*, "Electrician Job Caused Brain Tumor," called the news "political dynamite" and said the decision "shakes Swedish industry." The tabloid *Aftonbladet* (November 5) stated that "the link between cancer and EMFs has now been established."

All Sides Gearing Up for New Federal Research Program

Planning for the new National EMF Research Program (NERP) is off to a fast start, spurred by congressionally mandated deadlines. By December 24, the Department of Energy (DOE) must outline a five-year, $65 million plan and the Bush Administration must appoint members to two key committees (see box below for complete timetable).

A number of important policy questions must still be answered. The first is how the DOE and the National Institute of Environmental Health Sciences (NIEHS) will work together to sponsor health studies, the key objective of the law. NIEHS is responsible for health research and communications, but the funding is channeled through the DOE, which also retains responsibility for engineering research. The two agencies have formed a task force to oversee the transfer.

"We are committed to a smooth transition," Dr. Gary Boorman, chief of the chemical carcinogenesis branch at NIEHS, told *Microwave News*. Robert Brewer, director of DOE's utility systems division, who is working closely with Boorman, agreed. "We are committed to making this work," he said. Both officials predicted that there will be no immediate dramatic changes in the research program.

The DOE has asked the heads of nine agencies to submit the names of their respective representatives to President Bush for appointment to an interagency committee. This committee will have primary responsibility for setting the federal research and communications agendas. The members of an advisory committee will be more difficult to select, Brewer said, because the law requires that a broad mix of qualifications and interests be represented.

Another question is whether the DOE will sustain its existing research program. According to Brewer, there will be one program. "We have no direction from Congress to do otherwise," he said. But in private briefings, other senior energy officials have said that DOE's research effort may indeed continue.

Whether the DOE will keep its program depends, of course, on funding. Congress has already given the DOE $6 million for its EMF program for the 1993 fiscal year, which began October 1. When Congress appropriates money under the new law in its next session, it will have to decide whether to support both programs—which would entail the provision of an additional $6.5 million, to be matched by nonfederal sources—or simply add another $500,000.

Larry Mansueti, director of technical services for the American Public Power Association (APPA) in Washington, wants additional funding. "Our members want an accelerated research program. That means old money and new money," he said.

Hanging in the balance is what will happen to those investigators who are already funded by the DOE. "As far as I can see,

Timetable for the EMF Research Program: Who? What? When?

Who	Task	Deadline
Secretary of DOE	Establish a comprehensive program	December 24, 1992
The President	Appoint members to the interagency committee*	December 24, 1992
Secretaries of DOE & DHHS	Appoint members to the advisory committee†	December 24, 1992
Secretary of DOE	Agree with NIEHS on research & information programs	April 24, 1993
Interagency committee	Develop a comprehensive program agenda	June 24, 1993
Interagency committee	Recommend research guidelines	June 24, 1993
Interagency committee	Recommend communications objectives	June 24, 1993
Secretary of DOE & Director of NIEHS	Select from solicited proposals	January 24, 1994¶
National Academy of Sciences§	Status reports to interagency & advisory committees	Periodically
Director of NIEHS	Report to interagency committee	June 1, 1995
Interagency & advisory committees	Report to Congress	December 31, 1995
Director of NIEHS	Report to interagency committee	March 31, 1997
Interagency & advisory committees	Final report to Congress	September 30, 1997
Advisory committee	Disband	December 31, 1997

* The interagency committee will consist of nine members appointed by the President, including a representative from each of the following federal agencies: Department of Defense, Department of Energy, Department of Transportation, Environmental Protection Agency, Federal Energy Regulatory Commission, National Institute of Environmental Health Sciences (NIEHS, which is part of DHHS, the Department of Health and Human Services), National Institute of Standards and Technology, Occupational Safety and Health Administration and Rural Electrification Administration.

† The ten-member advisory committee will make recommendations to the interagency committee, to the secretary of the DOE and to the director of NIEHS on the design and implementation of the research program. The advisory committee will include experts on health effects, measurement surveys and mitigation, as well as representatives of state regulatory and health agencies, electric utilities, electric equipment manufacturers, labor unions and the public. The secretaries of the DOE and the DHHS will each select five members.

¶ The selections can be made earlier. The law states, "Within 15 months after the date of the enactment of this act, and as often thereafter as appropriate, the secretary [of the DOE] and the director [of NIEHS] shall, in consultation with the interagency committee, solicit and select proposals to conduct activities under the program." President Bush signed the law on October 24, 1992.

§ The National Academy of Sciences will submit periodic reports evaluating research results and recommending ways to promote communications efforts.

Source: *Congressional Record*, October 5, 1992, pp.H12,138-H12,139.

the current DOE researchers will continue their work," Boorman said. Brewer made a similar commitment. "There will be no break in the continuity of the work. We will provide whatever support is needed," he explained.

Arrangements also have to be made to secure nonfederal matching funds required under the law. A committee has been set up by electric utility groups to aid in soliciting this money, according to Richard Loughery, EMF issue manager for the Edison Electric Institute (EEI) in Washington. "Our credibility is at stake. We lobbied for the program, and we don't want to be seen as slowing things down," he said in an interview with *Microwave News*. Loughery is working with representatives from APPA and the National Rural Electric Cooperative Association.

Earlier this year, the DOE organized a series of workshops as part of its NERP planning process (see *MWN*, M/J92) after Congress designated it the lead federal agency on EMF research—before the switch to NIEHS (see *MWN*, S/O91). Reports from the DOE workshops—*Electric and Magnetic Fields Policy Support Workshop, May 4-5, 1992* (October 1992); *EMF Science and Engineering Research Workshop, June 3-5, 1992* (October 1992); and *National EMF Research and Communication Program: Communication Workshop* (November 1992)—are available from: DOE's Advanced Industrial Concepts Division, CE-232, 1000 Independence Ave., SW, Washington, DC 20585, (202) 586-5377.

President Bush signed the new EMF program into law (Public Law 102-486) on October 24 as part of H.R.776, the Energy Policy Act of 1992 (see *MWN*, J/F92, M/A92, M/J92 and S/O92).

Legal Notebook

NY Utility Wins Appeal in "Cancerphobia" Case

Plaintiffs in one of the nation's most high-profile power line lawsuits—the Marcy-South case—lost their appeal on October 5. The Appellate Division of the New York State Supreme Court in Brooklyn upheld an earlier ruling that denied the landowners compensation for losses in property value due to fear about the health effects of EMFs (see *MWN*, S/O89). The case—*Zappavigna v. New York Power Authority* (NYPA)—has come to be known for the claim of economic losses due to "cancerphobia."

The court also reversed a lower-court ruling ordering payment of "consequential damages" to one of the plaintiffs for visual and noise pollution from the power line (see *MWN*, J/F90), but it increased slightly the award for direct damages resulting from the condemnation for a right-of-way (ROW). The landowners' claims on cancerphobia were heard together, but damage awards are being decided individually, according to plaintiff lawyer Michael Gurda of Gurda, Gurda & Smith in Middletown, NY. Donald Zappavigna's case was the first the appellate division ruled on. Many of the other appeals are pending.

"We're very disappointed," said Robert Isseks, an attorney who worked with the plaintiffs on the appeal. "There's a reasonable basis for fear and the records show there's also sufficient basis for loss in property value." Isseks said he could not comment on whether the landowners would petition the state's highest court for a rehearing.

"There's no basis in this record to award damages based on cancerphobia, and the court agreed," Tom Watson of Crowell and Moring in Washington, who is representing the NYPA, told *Microwave News*. Watson noted that there is "a continual flow of new science" about the health effects of EMFs, but that the evidence presented in the Marcy-South case did not justify the plaintiffs' claims.

After the court first rejected the landowners' allegations in 1989, Gurda pointed out that the decision might have been different if he had been permitted to introduce the Savitz epidemiological study linking EMFs and cancer (see *MWN*, S/O89). "The fact is that ever since the claim was brought, people have been more concerned and there is more factual data available," he said recently.

The $66 million lawsuit was originally filed in January 1987 by 55 landowners who claimed that NYPA's 345 kV Marcy-South transmission line would reduce property values by creating a 206-mile-long "cancer corridor" (see *MWN*, M/A87). In September 1989, the New York Court of Claims rejected the cancerphobia charge but awarded direct and consequential damages to Donald Zappavigna. The NYPA appealed the decision, and plaintiff lawyers responded by filing a cross appeal, again raising the issue of EMF health risks.

The appellate court upheld the decision to award Zappavigna direct damages—and decided to increase the amount from $53,352 to $61,801—but disallowed the $41,215 awarded for consequential damages. The NYPA allocated a 150-foot ROW plus an additional easement of 50 feet on each side of the power line to protect against falling trees. The line, which has been energized, stretches south from Marcy to East Fishkill.

A landowner claim that was not heard with the cancerphobia cases was rejected in May 1991. John Cameron, an attorney in Goshen, NY, said that his clients, Harold and Jeanne Jonas, focused on direct loss of property value rather than on scientific evidence about EMF health risks. "We saw what happened with Gurda's clients. For every witness they had, NYPA had another saying the opposite. If people know about the controversy and are spooked by it, we're entitled to damages." Cameron filed an appeal in April of this year.

Trial Date Set for Zuidema Case

A closely watched EMF lawsuit involving a child with cancer is scheduled for trial in March. The plaintiffs in *Zuidema v. San Diego Gas & Electric* (SDG&E) claim that the utility should be held accountable for failing to warn its customers about the potential health effects of EMFs.

Ted and Michelle Zuidema allege that their daughter Mallory developed nephroblastomatosis and Wilms' tumors—kidney cancer—as a result of exposure to EMFs *in utero*. Their

Lawyers Seek To Show That EPRI Delayed Key EMF Studies

Attorneys representing a child with alleged EMF-related injuries and the Trial Lawyers for Public Justice (TLPJ) are seeking documents which they say will show that EPRI tried to avoid finding any EMF health risks. TLPJ is representing Citizens Concerned About EMFs, a California group.

The plaintiffs' lawyers in *Zuidema v. SDG&E* (see p. 7) have accused EPRI of selectively sponsoring studies that would show no link between EMFs and health risks. "The plaintiffs' charge is that EPRI...refused to fund... researchers whose studies might have shown a positive correlation between [EMF] exposure and biological effects...[and] funded only studies that it thought had a strong probability of not showing a correlation," according to a statement by the Washington-based TLPJ.

EPRI denies the charge. "Nonsense," said spokeswoman Barbara Klein. "EPRI's policy is to find out the truth about EMFs, and we do everything possible to achieve that."

In a legal skirmish, EPRI requested a protective order to shield its documents, disputing the "relevance and proper scope" of the Zuidemas' requests for information. TLPJ then filed a motion to intervene, but its request was denied by Superior Court Judge Judith Haller, who referred EPRI's motion to Judicial Arbitration & Mediation Services Inc. (JAMS) in San Diego.

"We are most interested in seeing a record of the basis for EPRI's decisions to fund or not fund studies," said Aaron Simon, one of the Zuidemas' lawyers. On October 27, Judge Ben Hamrick of JAMS granted EPRI's request, with certain exceptions. He required EPRI to release by November 10 a list of applicants for grants prior to 1990, and ordered that other documents requested by the plaintiffs be reviewed later by the California Superior Court.

"The EPRI–TLPJ dispute is a sideshow to the real issue—what science can tell us about the health effects of EMFs," said Greg Barnes, an SDG&E attorney.

claim was filed in California Superior Court in San Diego in May 1991 (see *MWN*, J/A91).

"By 1986 or so, the state of science and public concern was such that SDG&E knew or should have known about the dangers of EMFs," said Michael Withey of the Seattle law firm of Schroeter, Goldmark & Bender, adding that the utility should have done its own research independent of that done by the Electric Power Research Institute (EPRI). SDG&E Assistant General Counsel Greg Barnes stressed that the utility has abided by its commitment to keep its customers up to date on EMF research, and has urged the California Public Utilities Commission to encourage studies in addition to those sponsored by EPRI (see box). "It's disappointing that the attention we get is for the lawsuit, and not for our EMF center or anything else," Barnes said. SDG&E's EMF center, which arranges residential EMF surveys for customers, was established in April 1991.

During Michelle Zuidema's pregnancy and until Mallory was three, the family lived in a house in which EMFs were estimated to have been 3.5-17 mG. Withey said that doctors for the Zuidemas have ruled out other environmental factors and heredity as possible causes of the cancer. The results of the recently published Swedish study—which found that children exposed to magnetic fields of 3 mG or more in their homes had close to four times the expected rate of leukemia (see *MWN*, S/O92)—will be very important to the suit, said Dr. Richard Piccioni, an independent consultant who is working on contract for the Electromagnetic Radiation Case Evaluation Team (EMRCET). Plaintiff lawyers Withey and Aaron Simon, of the firm of Kazan, McClain, Edises & Simon in Oakland, CA, are both members of the group, which seeks cases with the potential to establish legal precedent (see *MWN*, M/A91). Withey acknowledged, however, that proving that EMFs caused or promoted the child's condition would probably be the toughest part of the case.

Withey said that if he cannot prove causation but does succeed in establishing SDG&E's liability for failing to warn its customers about a potential health threat, "It will establish an important legal precedent....I hope it will open the minds of people in the electric power industry to change their conduct and engage in a serious effort to mitigate and warn customers so there aren't future claimants."

The plaintiffs' expert medical witnesses will include Dr. Sam Milham, retired from the Washington State Department of Health, Dr. David Ozonoff of the Boston University School of Public Health and Dr. Peter Wright, an oncologist in Seattle. A spokesman for SDG&E declined to disclose who the utility's witnesses will be.

White House Report *(continued from p.1)*

reviews, EPA raised some of the most strenuous objections. In a letter to Young, EPA's Dr. William Farland and Margo Oge recommended that the report be accompanied by a cover letter indicating that the conclusions are those of the authors—an eleven-member panel under the direction of Oak Ridge Associated Universities (ORAU)—not those of the client agencies. The Public Health Service similarly suggested that CIRRPC should include a letter outlining the document's limitations.

"The report doesn't say that this is the view of the federal government," said Young, who is director of the office of agricultural biotechnology at the Department of Agriculture. The transmittal letter, sent to federal agencies on November 10, notes that the agencies "had no role in developing or reviewing the document prior to publication. The report therefore represents the viewpoints of the panel and does not necessarily reflect a consensus of the scientific community or of the federal government."

"I am not a bit surprised that some people are upset by this

Federal Agencies on the CIRRPC Report

The following are excerpts from the comments filed by federal agencies in response to CIRRPC's report on the potential health effects of ELF EMFs.

Department of Defense (DOD)

For many DOD individuals responsible for health and safety, the [report's] confirmation of the long-standing conventional view that commonly encountered ELF field levels are not sufficient to cause adverse human health effects is a reassuring conclusion....

Other DOD individuals associated with the electromagnetic biological research arena may [be concerned] that the report minimizes findings of positive effects, especially *in vitro* studies in cell lines, even though there is no clear extrapolation of these findings to a conclusion of causal links at the human level. Such *in vitro* findings do presuppose the existence of physical phenomena which may have important consequences beyond their intrinsic scientific interest. The [report's] basic conclusion for the absence of health effects should not be used for justifying the lack of importance for this line of research.

...Nevertheless, we consider the report to be a comprehensive and careful review of current knowledge, and support the conclusions and recommendations [of the authors].

—William Flor, Captain, U.S. Navy, Defense Nuclear Agency

Department of Energy (DOE)

Information and analyses presented...adequately support the report's conclusion that the published literature fails to provide convincing evidence that exposures to [various sources of ELF EMF] are hazardous....

We believe that the final paragraph of the report [concluding that a major expansion of the national research effort is not warranted] is susceptible to misinterpretation as failing to support any continued research on ELF EMF. Accordingly, CIRRPC should make it clear that it is appropriate to...attempt to resolve public concerns about potential dangers of ELF EMF to human health.

—Dr. Paul Ziemer, Assistant Secretary for Environment, Safety and Health

Environmental Protection Agency (EPA)

Based on our preliminary review, we believe that there is a lack of support for some of the conclusions reached in the Executive Summary. For example, the report reaches a conclusion that "ELF EMF does not appear to constitute a public health problem" and that "this review does not provide justification for a major expansion of the national research effort."...We believe that the basis for this statement is not adequately supported given discussions of research needs and the uncertainty of public health impacts stated in several chapters.

In view of the lack of a peer review and apparent errors and inconsistencies, the letter transmitting this report for public release should emphasize that the contractor report represents only the views of the panel of authors and *not* those of the federal agencies.

—Dr. William Farland, Director, Office of Health and Environmental Assessment, and Margo Oge, Director, Office of Radiation and Indoor Air

National Institute of Standards & Technology (NIST)

...NIST is aware of the years of research which have been conducted in this field....Although the focus of much of this research has been to provide convincing evidence as to whether or not there is a hazard, the most that these investigations have appeared to have been able to do is to rule out some processes and to demonstrate that the effects, if any, are not large. Thus, the report's conclusion is not surprising. For completeness, it should also be noted that there is no convincing evidence that these exposures are not health hazards.

—Robert Hebner, Deputy Director, Electronics and Electrical Engineering Laboratory

National Science Foundation (NSF)

...The executive summary of the section "Epidemiologic Studies of Cancer" does not mention the need for any further studies in this area, yet the chapter in the report devotes a page to "Future Studies."...The executive summary, in this case, seems to miss an important conclusion of the report.

We have not been able to read the report in all its details, given the time available for comment, but assume that we would have found more such problems given more time. We have no reason, however, to disagree with the major conclusions of the report.

—Dr. Philip Harriman, Program Director, Genetics

Public Health Service (PHS)

- The ORAU document is incomplete in important aspects such as the omission of numerous peer-reviewed citations.
- The Executive Summary is inconsistent with some of the detailed conclusions in the body of the report and the report indulges in speculation.
- The report recommends minimal additional research on unanswered health issues even though recent studies further suggest a problem and there is a great public demand for factual answers.
- The PHS recommends that this document be transmitted to the various agencies by CIRRPC for their own use with a cover letter recognizing the limitations of the document.

—Incorporating comments from the Food and Drug Administration, National Cancer Institute and National Institute for Occupational Safety and Health

report," Young said, explaining that a number of those who commented on it are dependent on a federal commitment to research in this field. He predicted, however, that the report, which cost about $500,000, "will be accepted in the government policy arena."

Many of the agency reviews struck a positive tone. The Department of Energy noted some "inconsistencies and errors," but it endorsed the conclusion that there is no convincing evidence that ELF EMFs are hazardous. The Department of Defense was also supportive, but it stressed the importance of further research. (For excerpts of responses from these and other agencies, see box above.)

The executive summary of the report emphasizes the uncertainties inherent in the scientific methods used to assess EMF health risks. The authors describe shortcomings of the epidemiological studies of EMFs and cancer, point to difficulties in identifying the origins of pregnancy complications, and object to the lack of "converging epidemiological and biological support for the occasionally reported adverse health effects...."

The report also gives weight to several general arguments against the possibility of adverse EMF health effects. Prominently discussed is the idea that even strong EMFs "would not

induce current densities [in human tissue] comparable to those naturally occurring in the body." This is a view championed by Dr. Robert Adair of Yale University in New Haven, CT, who reviewed the relevant section of the report—a chapter by Dr. William Bennett Jr., also of Yale.

Several agencies complained that this theory is presented uncritically. The National Institute of Standards and Technology (NIST), for example, pointed out that the only reference in this section is to a paper by Adair. This "denies the reader a more representative picture of the research efforts...that are under way," NIST wrote.

The executive summary also makes the case—laid out in more detail in Bennett's chapter—that cancer statistics run counter to the epidemiological evidence. Since "per capita electricity consumption increased exponentially in this century," this should be reflected in cancer rates for the general population if EMF exposure is a cancer risk, the report states. Barring strong countervailing trends in other risk factors, "we should be witnessing an observable epidemic of childhood cancers. However, there is little, if any, evidence of such an epidemic...." This theory was put forward most recently by particle physicist Dr. David Jackson of the University of California, Berkeley, and it has prompted objections from epidemiologists (see *MWN*, M/J92). Jackson was not part of the ORAU panel, but his assistance is acknowledged in the report. Contrary arguments are not presented (see *MWN*, J/F91, J/A91 and J/A92).

In his chapter on epidemiology, Dr. Dimitrios Trichopoulos, chairman of the department of epidemiology at the Harvard University School of Public Health in Boston, makes a similar point about cancer trends. Indeed, in January 1991, he presented his calculations to EPA's Science Advisory Board (SAB), which was reviewing the agency's draft EMF–cancer report. At that time, Dr. Genevieve Matanoski of the Johns Hopkins University School of Hygiene and Public Health in Baltimore, chair of the SAB panel, took exception, calling Trichopoulos's assumptions "extreme" (see *MWN*, J/F91).

The report's overall recommendation that research efforts need not be expanded prompted the most consistent objections. A report in the November 26 *Nature* sums up critics' views that this conclusion "seems to run counter to [the report's] individual chapters, which urge dozens of new studies." Indeed, the November 10 transmittal letter admits that, "The panel also noted areas of scientific interest that may warrant consideration for further research. These specific areas are described in the topical chapters, but may not be found in the Executive Summary."

A section on EMF effects on pineal gland function, for example, suggests "a critical need for more studies at both the *in vivo* and *in vitro* level related to the...exposure parameters...that may be important in inducing the observed changes." But Dr. Russel Reiter, coauthor of this section, told *Microwave News* that this should not be seen as a contradiction of the overall conclusions. The report merely opposes a "major expansion" of research, said Reiter, of the University of Texas, San Antonio. "You cannot imagine the length of time we deliberated over words and sentences in the executive summary and conclusions," he explained. "It was a consensus document....I like the final product."

The CIRRPC report was first requested by Sheldon Weiner of the Occupational Safety and Health Administration (OSHA) in 1989, but it gained importance in late 1990, when the President's science adviser, Dr. Allan Bromley, asked that formal release of the EPA report be delayed until CIRRPC could review it (see *MWN*, N/D90). CIRRPC provided an assessment of the EPA report in August 1991 (see *MWN*, S/O91). When ORAU was put in charge of the review, some suggested that the move was an attempt to avoid scrutiny; the panel's meetings were closed to the public (see *MWN*, J/A91).

Copies of *Health Effects of Low-Frequency Electric and Magnetic Fields*, June 1992, are available for $25.00 from: U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402, (202) 783-3238 (refer to publication 029-000-00443-9).

FROM THE FIELD

NCRP SC89 Membership

In our May/June issue we announced the formation of the National Council on Radiation Protection and Measurements (NCRP) Scientific Committee 89 (SC89) on "Non-Ionizing Electromagnetic Fields." This committee will serve as an umbrella group that will oversee three subcommittees: SC89-1 (formerly SC67), "Biological Effects of [Static] Magnetic Fields," SC89-2 (formerly SC78), "Practical Guidance on the Evaluation of Human Exposures to Radiofrequency Radiation" and SC89-3 (formerly SC79), "Extremely Low Frequency Electric and Magnetic Fields." For more on NCRP's work on non-ionizing radiation, see MWN, *D83, Ap84, J/F86 and M/J92. Members of the committees are as follows:*

SC89—Tom Tenforde (Chairman), Battelle Pacific Northwest Laboratory, Richland, WA; Ross Adey, VA Hospital, Loma Linda, CA; James Cleaver, University of California, San Francisco; Bill Guy, professor emeritus, University of Washington, Seattle; Everett James Jr., Vanderbilt University Medical Center, Nashville, TN; James Lin, University of Illinois, Chicago; Gilbert Omenn, University of Washington, Seattle; David Sliney, U.S. Army Environmental Hygiene Agency, Aberdeen Proving Grounds, MD; Jan Stolwijk, Yale University School of Medicine, New Haven, CT; Richard Tell, Richard Tell Associates Inc., Las Vegas, NV.

SC89-1—Dennis Mahlum (Chairman), National Research Council, National Academy of Sciences, Washington, DC; John Baum, Brookhaven National Laboratory, Upton, NY; John de Lorge, Navy Aerospace Research Center, Pensacola, FL; Karl Illinger, Tufts University, Medford, MA; Charlotte Silverman, FDA, Rockville, MD; Tom Tenforde, Battelle Pacific Northwest Laboratory, Richland, WA; Thomas Budinger (Adviser), University of California, Berkeley.

SC89-2—Richard Tell (Chairman), Richard Tell Associates Inc., Las Vegas, NV; Howard Bassen, FDA, Rockville, MD; Jules Cohen, Jules Cohen & Associates, Washington, DC; David Conover, National Institute for Occupational Safety & Health, Cincinnati, OH; Carl Durney, University of Utah, Salt Lake City; Ronald Petersen, Bell Labs, Murray Hill, NJ.

SC89-3—Ross Adey (Chairman), VA Hospital, Loma Linda, CA; Carl Blackmen, EPA, Research Triangle Park, NC; David Carpenter, NY State Department of Health, Albany, NY; William Feero, Electric

Research and Management Inc., State College, PA; Richard Lovely, Battelle Pacific Northwest Laboratory, Richland, WA; Richard Luben, University of California, Riverside; Martin Misakian, National Institute of Standards and Technology, Gaithersburg, MD; Mary Ellen O'Connor, University of Tulsa, OK; Richard Phillips, W/L Associates, Spokane, WA; David Savitz, University of North Carolina, Chapel Hill; Charles Ehret (Adviser), Argonne National Laboratory, Argonne, IL

HIGHLIGHTS

Technician Exposed to MW Radiation Files $5 Million Suit

A technician who was injured by microwave radiation from an illegal satellite uplink has filed a $5 million lawsuit against the owners of the transmitter. Keith Angstadt, an employee of Mutual Broadcasting Systems Inc. in Arlington, VA, is suing Multicomm Telecommunications Inc.—a subsidiary of Amway Corp., which is also named as a defendant. A trial is scheduled to begin next March in Arlington County circuit court. Parties in the case are in the process of deposing witnesses.

Angstadt was injured on May 31, 1990, during the course of routine maintenance of Mutual Broadcasting's rooftop transmitting and receiving equipment. When he went to investigate the source of an "unusual sound" he heard coming from one of the antennas, he was accidentally exposed to 6 GHz microwaves from an illegally rigged transmitter owned by Multicomm, according to his complaint. Multicomm had illegally converted a receiving antenna to a transmitter after being denied a permit from the Federal Communications Commission, said Roy Mason of the Baltimore law firm of Mason, Ketterman and Morgan, who is representing Angstadt.

Soon after the accident, Angstadt began to experience hot flashes and burning sensations on his skin and consulted doctors at Johns Hopkins University medical school's Wilmer Institute, a world-famous center for eye research. They deduced that the retinas of his eyes had sustained 5 mW/cm^2 of continuous wave radiation for two 15-minute periods, and they concluded that he had "suffered more microwave exposure than any human being ever studied by scientists," according to Mason. Angstadt is now color-blind and lacks night vision (see *MWN*, S/O91). A second technician, who worked with Angstadt and who was also injured by the radiation, has not filed a lawsuit.

"Multicomm knew or should have known of the particular risks and danger associated with the conversion and assembly of this makeshift microwave transmitting antenna....[and] that the plaintiff was likely to come in contact with leaking microwave radiation," Mason charged.

Multicomm, which is based in East Salt Lake City, UT, did not respond to repeated calls from *Microwave News*. Bert Hultink, litigation counsel for Amway, said that the subsidiary has filed for bankruptcy: "I think it was a direct result of the Angstadt suit." He declined to comment further. Amway is based in Ada, MI. Other defendants in the suit include Royal Communications Corp. of Urbana, IL, which installed the antenna, and Vertex Communications Inc. of Kilgore, TX, which manufactured it.

Dr. Jennifer Lim, Henry Kues and coworkers at the Wilmer Institute describe the results of their examinations of the two workers in a paper they have submitted for publication. A number of other microwave injury cases are currently pending (see p.13 and *MWN*, N/D90 and J/A92).

ANSI OKs RF/MW Standard; Questions Makeup of Committee

The American National Standards Institute (ANSI) has adopted the revised radiofrequency and microwave (RF/MW) radiation safety guidelines that were approved by the Institute of Electrical and Electronics Engineers (IEEE) in September 1991 (see *MWN*, N/D91). But before okaying the new limits, ANSI's Board of Standards Review (BSR) revived questions about the balance of the IEEE panel that developed them.

After meeting on October 1, the BSR requested more information from the IEEE about the makeup of Standards Coordinating Committee 28 (SCC28), which develops non-ionizing radiation health standards for the IEEE. At issue were charges, formally raised in early 1991 by Dr. Mays Swicord of the Food and Drug Administration's Center for Devices and Radiological Health in Rockville, MD, who wrote at the time that, "It is generally recognized that the current membership is not balanced in representing government, industry and the general public." (Similar objections had previously been raised; see *MWN*, S/O89 and J/A90.) "The BSR placed further action on hold pending resolution of these issues," the board's secretary, Beth Somerville, wrote in an October 2 letter to the IEEE.

SCC28's membership as of May 1990 "was determined to be balanced," according to a response prepared by Dr. John Osepchuk of Raytheon Co. in Lexington, MA, who is executive secretary of the committee. "There was concern, however, about the large representation...of the military and lack of a *breadth* of nonmilitary members" (his emphasis). A membership subcommittee chaired by Dr. Jay Brandinger, then of SRI International, "analyzed the problems and made recommendations," resulting in an expansion of the membership, Osepchuk wrote. Brandinger never issued a formal report, however.

The guidelines were formally approved by ANSI on November 18 and will be designated ANSI/IEEE C95.1-1992.

"I still think it's a problem," Swicord said in a telephone interview. "I'm not convinced that increasing the size of the committee is the answer." Swicord explained that the committee risks becoming too large to function well.

Separately, an objection that was raised by Hammett & Edison Inc. (H&E), an engineering consulting firm in San Francisco, about the standard's 100 MHz cutoff point for limiting

induced body currents did not delay the standard. H&E has argued—in letters to the IEEE in 1990 and to ANSI in February of this year—that the cutoff should not fall in the middle of the commercial FM broadcast band (see *MWN*, M/J92). The firm has lobbied for a 40 MHz cutoff, which would cover frequencies used by TV and AM radio but exclude FM radio entirely.

ANSI's BSR did not consider this issue. Dr. Om Gandhi of the University of Utah, Salt Lake City, cochair of SCC28's Subcommittee 4, which drafted the new rules, described it as "an objection after the fact," adding that the issue could be considered in the next revision of the standard. H&E's Dane Ericksen said his firm is considering filing an appeal of the BSR decision.

Commentary from San Diego *(continued from p.1)*

With all this priming, the Swedish studies were *the* topic of conversation in San Diego—from the opening cocktail party on Sunday night to Thursday morning, when the Swedes finally made their presentations. In addition to keeping up with the press coverage, most of those who came to the meeting already had copies of the full reports from Sweden. In fact, there was little else to talk about—except perhaps the Star Trek convention which greeted those checking into the hotel on Sunday afternoon. Because of the persistent scarcity of research funds, no one else had much new science to report.

A frequent topic of conversation was how the U.S. electric utility industry and public health officials will react to the Swedish government's decision to recognize the EMF–cancer risk and set health standards in the 2-4 mG range, a level that would have been unthinkable only a few years ago. And many speculated about how the industry would respond to the growing public anxiety over EMFs.

In interviews with the press, utility leaders generally praised the Swedish efforts, but cast some doubt over their reliability, due to the small size of the study populations. A few uninformed critics tried to make something out of the fact that the Swedes had failed to find an association between current spot measurements and past cancer incidence; those who resurrected this argument from the postmortems of the Savitz and Peters studies had not grasped the elegance of the Swedish study design.

"It is becoming more and more likely that there is something associated with living near high power lines," EPRI's Dr. Stan Sussman told *Time* magazine. And, in an interview in San Diego with the *San Francisco Chronicle* (November 13), Sussman said that the studies marked "important advances in our understanding of the issue." Richard Loughery of the Edison Electric Institute told the Associated Press (November 13) that, "Something is out there that cannot be explained away." But no one was suggesting the tough measures that are being embraced by the Swedes.

Utilities *are* reducing EMF exposures, albeit quietly, without conceding that there is a health risk. "It's being done, but no one is willing to admit it," said Dr. Kelly Gibney of BC Hydro, referring to large Canadian utilities such as Hydro Quebec and Ontario Hydro, as well as his own company. "We would look foolish if we didn't reduce EMFs," he said.

Similarly, Jack Sahl of Southern California Edison (SCE) said that his company has been using low-field designs for new power lines and substations for the last year and a half. "This is an important issue and we will continue to take it seriously," he said. But he maintained that there would be no policy shift as a result of the Swedish studies.

Even before the DOE meeting, Cindy Sage had tried to convince SCE to follow Sweden's lead. On October 29th, Sage, a consultant based in Montecito, CA and a member of the California Public Utilities Commission's (PUC) EMF Consensus Group, asked the PUC to "require reasonable-cost field reduction measures" when exposures at the edges of rights-of-way exceed 2 mG. The highest priority should be to reduce EMF levels in schools and day care centers, she stressed.

In his response, filed with the PUC on November 20th, Sahl noted that the Swedish studies "have not been completed" and "have not been published in the scientific literature, and the normal peer-review process has not been completed." For good measure, he added a professional rebuke: "Ms. Sage is not qualified to offer scientific reviews of these epidemiological studies."

Sahl has failed to learn a key lesson from his Swedish counterparts. By immediately announcing that they would tackle the EMF problem with new health standards and mitigation strategies, Rolf Lindgren of Vattenfall, the state utility, and Jaak Nõu of NUTEK, the government energy agency, avoided a predictable confrontation.

Sahl's comments come across as business as usual—precisely the perception the Swedes sought to avoid. Why should Americans wait for the studies to be peer-reviewed and published if the Swedish government and utilities felt no such need? Why not start drafting plans now to protect children and other high-risk groups? And why should the views of a utility manager like Sahl have any more authority than those of a consultant like Sage?

Sage's proposals for power lines in California are just the beginning. Activists across the country are demanding action on EMF risks—real or perceived—citing the Swedish studies in public hearings, newspaper columns and legal proceedings.

Concerns about cancer have spread to other sources of EMFs. In San Francisco, people are asking questions about the

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safety of the region's electric transit system, BART. And some in the computer industry are worried about video display terminals: "Just as black lung slowly but surely felled scores of coal miners, [EMFs] radiating from our [computer] systems may be killing us day by day," writes a columnist in the December issue of *PC Computing*.

And, of course, there are the EMFs from myriad appliances, such as hair dryers, dishwashers and electric blankets. The *Wall Street Journal* highlighted this problem in a front-page, second-section article on November 13th, under the headline "Study Suggests Electric Razor Link to Cancer." The story was based on a paper by Dr. Richard Lovely and coworkers from the Battelle Pacific Northwest Lab in Richland, WA, which was presented in San Diego shortly before the Swedes gave their talks. Using data collected in the mid-1980s for a study sponsored by the New York Power Line Project, Lovely found that men who used electric razors had twice the expected rate of leukemia.

The fact that the *Journal* devoted 20 column-inches to the preliminary Battelle findings—but only mentioned the Swedish studies in passing—shows once again that the press follows unpredictable rules in the way it covers EMFs. In this case, the *Journal* was no doubt looking for a news peg, but, in the process, it missed the more important story. In another display of peculiar news judgment, the *Journal* turned to Victor "I-bought-the-company" Kiam, the head of Remington Shavers, to rebut the Battelle study.

Writing in the *Seattle Post-Intelligencer* on November 20th, Dr. A.A. Afifi, the dean of the School of Public Health at the University of California, Los Angeles and a member of the advisory committee for EPRI's EMF program, summed up his position this way: "Most public health officials agree there is insufficient evidence to conclude that normal exposure to EMFs is hazardous or that there is a cause-and-effect relationship between cancer and exposure to EMFs."

Clearly, as long as public health and utility officials in the U.S. cling to the status quo, the EMF controversy will continue to rage unabated on this side of the Atlantic.

DOE and EPRI's *Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery and Use of Electricity* took place in San Diego, November 8-12, 1992.

UPDATES

COMPATIBILITY & INTERFERENCE

Utility Suspects EMI from GWEN... Virginia Power has changed the frequency of the communications system used on two of its power lines after they picked up a radio signal from an outside source, according to the utility's Robert Morton. The signal was similar to that from the USAF's Ground Wave Emergency Network (GWEN), Morton said, but he stressed that he was unable to identify it. "There are a lot of things out there—it could have come from the Coast Guard or the Navy." Although the interloping signal, which appeared in April, did not disrupt electrical service, Virginia Power decided to make the adjustment as a precaution against future EMI, Morton told *Microwave News*. GWEN program officer Lt. Col. Stephen Martin said that he has never received complaints from power companies about EMI. But he did say that it is possible that the interference came from GWEN, which operates at 150-175 kHz. Virginia Power's communications system—which helps the utility check, prevent and correct problems in power transmission—uses some of the same frequencies (90-200 kHz). The GWEN communications system, which is designed to withstand the EMP from a nuclear attack, is tested for six seconds hourly, according to the USAF. There are 54 GWEN transmitters in operation, including one in Virginia; 42 more are planned but are on hold, pending a National Academy of Sciences study on the health effects of VLF radiation from GWEN that is expected to be released soon (see *MWN*, M/J90 and N/D90).

INTERNATIONAL

Israeli RF/MW Cancer Case... An Israeli man has filed a claim alleging that his prolonged and intensive work with RF/MW radiation transmitters caused him to develop eye cancer. Itzhak Glicksman, 42, was diagnosed with melanoma in his right eye in 1990, 14 years after he began working at Elisra Electronics Systems Ltd. in Israel. The exact nature of the transmitters and how long Glicksman worked with them could not be revealed due to concerns over national security, Glicksman's attorney, Dr. Richard Laster of the Jerusalem firm of Laster & Gouldman, told *Microwave News*. But he did say that the transmitters operated in the range of 0.2 to 18 GHz, with output powers between 200 W and 2 MW. For at least six years, Glicksman worked up to 14 hours a day with the equipment—he was often positioned only 20 cm away—and he was exposed to radiation levels of 20-40 mW/cm^2. "There is no reason...that shortwave radiation, which is suspected of being a carcinogen, cannot be included in the list...of materials that can cause melanoma in the eye," Laster said. He filed the claim with Israel's Social Security Department in January 1991. It was rejected and is now under appeal, he said. Laster also noted that another Elisra employee, who worked near antennas and high-intensity transmitters, had recently been diagnosed with cataracts in both eyes. Cases of eye cancer have also been found in police officers exposed to traffic radar (see *MWN*, M/A91).

POLICE RADAR

GE Named as Defendant... Attorneys for David Berndt, a police officer in Grand Rapids, MI, have added General Electric Co. as a defendant in Berndt's lawsuit, which alleges that use of hand-held radar guns caused his testicular cancer. Jack Sweeney, cocounsel for Berndt, explained that GE makes the Gunn-effect diode used by MPH Industries of Owensboro, KY in its radar devices. The diode is the source of the radar signal, Sweeney said. "All along, GE has had more knowledge of the hazards of

microwave radiation" than the small companies that market police radar equipment, he added. As far back as the early 1980s, GE faced lawsuits over alleged radar injuries (see *MWN*, Ap81 and D82). Two other defendants, Kustom Signals Inc. and Decatur Electronics Inc. have been dropped from the case, leaving just GE and MPH (see *MWN*, M/A92)....The trial date in another case Sweeney is handling—that of Officer Eric Bendure, formerly with the Petaluma, CA police department (see *MWN*, J/A92)—has been pushed back to January 4 from November 10, due to scheduling problems and the illness of a witness.

VDTs

Finnish Pregnancy Study... What would be considered prudent for pregnant women who work at video display terminals (VDTs)? That was the question Finland's Dr. Marja-Liisa Lindbohm faced at the *Work With Display Units '92* conference in Berlin, Germany, in early September, when she presented the final results of her study of miscarriages among women exposed to VDT EMFs. "When you use a VDT, it would be better to have the lowest possible magnetic field," Lindbohm replied, cautioning that the results of her and Dr. Maila Hietanen's study need to be confirmed. Lindbohm and Hietanen, both of the Institute of Occupational Health in Helsinki, found a threefold increase in miscarriages among women exposed to VDT magnetic fields of 3 mG or more (see *MWN*, M/A92 and M/J92). Dr. Kjell Hansson Mild of Sweden's National Institute of Occupational Health estimated, on the basis of surveys, that 25% of Swedish VDTs expose operators to more than 3 mG—and 50% expose them to more than 2 mG. There are no comparable estimates for the U.S. because of the lack of any systematic measurements in this country. Lindbohm and Hietanen's paper was published in the November 1 *American Journal of Epidemiology*.

CONFERENCES

1993 Conference Calendar

January 31-February 5: **1993 Winter Meeting of the IEEE Power Engineering Society** (PES), Columbus, OH. Contact: PES Special Services, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855, (908) 562-3881.

February 2: **Industry Update Seminar: Non-Ionizing Electromagnetic Radiation at Radiofrequencies**, Beltsville, MD. Contact: Rachel Riley, Biospherics Inc., 12051 Indian Creek Ct., Beltsville, MD 20705, (301) 419-7878.

March 2-4: **8th Annual Winter Convention of the Cellular Telecommunications Industry Association** (CTIA), Convention Center, Dallas, TX. Contact: Norman Black, CTIA, 1133 21st St., NW, 3rd Floor, Washington, DC 20036, (202) 785-0081.

March 9-11: **10th International Symposium & Technical Exhibition on Electromagnetic Compatibility** (EMC), Federal Institute of Technology, Zurich, Switzerland. Contact: EMC Zurich '93, ETH Zentrum-IKT, CH-8092 Zurich, Switzerland, (41+1) 256-2790.

March 18-19: **19th Annual Northeast Bioengineering Conference**, New Jersey Institute of Technology (NJIT), Newark, NJ. Contact: Dr. Stanley Reisman, Electrical and Computer Engineering Dept., NJIT, University Heights, Newark, NJ 07102.

March 20-25: **1993 Joint Meeting of the Radiation Research Society** (RRS) and the **North American Hyperthermia Society**, Dallas, TX. Contact: Laura Fleming Jones, RRS, 1891 Preston White Dr., Reston, VA 22091, (703) 648-3780.

March 22-23: **1993 EMF Conference**, Crystal Gateway Marriott Hotel, Arlington, VA. Contact: Jayne Mixon, *T&D* Magazine, Intertec Publishing Corp., PO Box 12901, Overland Park, KS 66282, (913) 967-1865.

March 28-April 2: **11th Symposium of the Bioelectrochemical Society**, University of Basel, Basel, Switzerland. Contact: Dr. Dieter Walz, Biozentrum, University of Basel, Klingelbergstrasse 70, CH-4056 Basel, Switzerland, (41+61) 267-2224.

March 30-April 2: **8th International Conference on Antennas and Propagation**, Heriot-Watt University, Edinburgh, U.K. Contact: IEE Conference Services, Savoy Pl., London WC2R OBL, U.K., (44+71) 240-1871.

April 2-3: **30th Annual Rocky Mountain Bioengineering Symposium**, Holiday Inn Market Square, San Antonio, TX. Contact: Dr. John Enderle, Dept. of Electrical Engineering, North Dakota State University, Fargo, ND 58105, (701) 237-7689.

April 7-8: **29th Annual Meeting of the National Council on Radiation Protection and Measurements** (NCRP), Crystal City Marriott, Arlington, VA. Contact: NCRP, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814, (301) 657-2652.

April 13-16: **1993 International Magnetics Conference**, Stockholm, Sweden. Contact: INTERMAG '93, c/o Congrex (USA) Inc., 7315 Wisconsin Ave., Suite 606W, Bethesda, MD 20814, (301) 469-3355.

April 18-22: **71st Annual Convention of the National Association of Broadcasters** (NAB), Convention Center, Las Vegas, NV. Contact: NAB Convention Registration, 1771 N St., NW, Washington, DC 20036, (800) 342-2460.

April 20-22: **1993 IEEE National Radar Conference**, Boston, MA. Contact: Fritz Steudel/DD-22, Raytheon Co., 430 Boston Post Rd., Wayland, MA 01778, (508) 440-6408.

April 28-30: **2nd Annual EMC/ESD International**, Sheraton Tech Center, Denver, CO. Contact: Gary Breed, *EMC Test & Design*, 6300 S. Syracuse Way, Suite 650, Englewood, CO 80111, (800) 525-9154.

May 4-6: **7th International Ionospheric Effects Symposium**, Old Town Ramada Inn, Alexandria, VA. Contact: Dr. John Goodman, SRI International, 1611 N. Kent St., Arlington, VA 22209.

May 8-12: **28th Annual Meeting & Exposition of the Association for the Advancement of Medical Instrumentation** (AAMI), Sheraton Boston Hotel & Towers, Boston, MA. Contact: Education Dept., AAMI, 3330 Washington Blvd., Suite 400, Arlington, VA 22201, (703) 525-4890, ext. 210.

May 16-20: **1993 National Conference on Radiation Control**, Westin St. Francis, San Francisco, CA. Contact: Conference of Radiation Control Program Directors Inc., 205 Capital Ave., Frankfort, KY 40601, (502) 227-4543.

May 17-21: **12th Annual Conference on Electricity Distribution**, International Conference Centre, Birmingham, U.K. Contact: IEE, see March 30 above.

May 18-20: **IEEE Instrumentation and Measurement Technology Con-**

ference, Hyatt Regency Hotel, Irvine, CA. Contact: Robert Myers, 3685 Motor Ave., Suite 240, Los Angeles, CA 90034, (310) 287-1463.

May 24-25: **Edison Electric Institute (EEI), American Public Power Association and National Rural Electric Cooperative Association EMF Conference,** Omni Shoreham Hotel, Washington, DC. Contact: Gayle Novak, EEI, 701 Pennsylvania Ave., Washington, DC 20004, (202) 508-5654.

June 3-6: **10th Congress of the European Society for Magnetic Resonance in Medicine and Biology,** Rome, Italy. Contact: Scientific Secretariat & Organizing Office, Dept. of Radiology, University "La Sapienza," Policlinico Umberto I, I-00161 Rome, Italy, (39+6) 445-5602.

June 7-18: **6th Summer Institute in Environmental Health Studies,** Johns Hopkins University (JHU) School of Hygiene and Public Health, Baltimore, MD. Contact: Dr. J. Corn, JHU School of Hygiene and Public Health, 615 N. Wolfe St., Room 6001, Baltimore, MD 21205, (410) 955-2609.

June 13-17: **15th Annual Meeting of the Bioelectromagnetics Society** (BEMS), Biltmore Hotel, Los Angeles, CA. Contact: BEMS, 120 W. Church St., Frederick, MD 21701, (301) 663-4252.

June 14-18: **IEEE MTT-S International Microwave Symposium,** Atlanta, GA. Contact: MTT-Symposium 1993, 1218 Balfour Dr., Arnold, MD 21012.

June 16-18: **Annual Meeting of the Society for Epidemiologic Research,** Keystone, CO. Contact: Dr. Lorann Stallones, Dept. of Environmental Health, Colorado State University, Ft. Collins, CO 80523.

June 18: **Automatic RF Techniques Group Conference,** Atlanta, GA. Contact: Jonathan Schepps, David Samoff Research Center, MS 3-074, 201 Washington Rd., Princeton, NJ 08540, (609) 734-2185.

June 27-July 2: **1993 IEEE AP-S International Symposium and URSI Radio Science Meeting,** University of Michigan, Ann Arbor, MI. Contact: John Volakis, 1301 Beal Ave., Ann Arbor, MI 48109, (313) 764-0500.

July 11-15: **Annual Meeting of the Health Physics Society** (HPS), Atlanta, GA. Contact: HPS, 8000 Westpark Dr., Suite 130, McLean, VA 22102, (703) 790-1745.

July 12-14: **Quality Enhancements Using Microwaves,** Sheraton Center Hotel, Montréal, Canada. Contact: Robert Schiffmann, 149 West 88th St., New York, NY 10024, (212) 362-7021.

July 18-22: **1993 Summer Meeting of the IEEE Power Engineering Society,** Vancouver, Canada. Contact: Yakout Mansour, BC Hydro & Power Authority, 6911 Southpoint Dr., Podium A01, Burnaby, BC V3N 4X8, Canada.

July 26-29: **1993 SBMO International Microwave Conference,** São Paulo, Brazil. Contact: Paulina Cardoso, IMT–Escola de Engenharia Mauá, Estrada das Lágrimas 2035, 09580, S. Caetano do Sul, SP, Brazil, (55+11) 743-8988.

August 8-13: **5th International Conference on Human-Computer Interaction** (HCI) and **9th Symposium on Human Interface (Japan),** Hilton at Walt Disney World Village, Orlando, FL. Contact: Myra Leap, School of Industrial Engineering, Purdue University, 1287 Grissom Hall, West Lafayette, IN 47907, (317) 494-5426.

August 9-13: **1993 IEEE International Symposium on Electromagnetic Compatibility,** Grand Kempinski Hotel, Dallas, TX. Contact: Dr. Frederick Tesche, c/o International Compliance Corp., 1911 E. Jeter Rd., Argyle, TX 76226, (817) 491-3696.

August 30-September 1: **24th General Assembly of the International Union of Radio Science,** Kyoto, Japan. Contact: Dr. Y. Furuhama, ATR Optical and Radio Communications Research Laboratories, Seika-cho, Soraku-gun, Kyoto, 619-02 Japan, (81+77) 495-1511.

September 6-9: **23rd European Microwave Conference,** Madrid, Spain. Contact: Reed Exhibition Co., 90 Calverley Rd., Tunbridge Wells, Kent TN1 2UN, U.K., (44+892) 544027.

September 12-17: **1993 European Congress of Radiology** (ECR), Vienna, Austria. Contact: ECR, Neutorgasse 9/2a, A-1010 Vienna, Austria, (43+1) 533-4064.

September 26-October 1: **24th International Congress on Occupational Health,** Nice, France. Contact: Yveline LaGarde, "Les Miroirs," 18 avenue d'Alsace, Cedex 27, F-92096 Paris La Defense, France, (33+14) 762-3370.

October 11-14: **2nd International Scientific Meeting on Microwaves in Medicine,** Rome, Italy. Contact: Prof. Guglielmo D'Inzeo, Dept. of Electronic Engineering, University "La Sapienza," Via Eudossiana 18, I-00184 Rome, Italy, Fax: (39+6) 474-2647.

October 11-14: **13th Annual Meeting of the Bioelectrical Repair and Growth Society** (BRAGS), Dana Point Resort, Dana Point, CA. Contact: BRAGS, PO Box 64W, Dresher, PA 19025, (215) 659-5180.

December 15-18: **4th International Symposium on Recent Advances in Microwave Technology,** New Delhi/Agra, India. Contact: Dr. Banmali Rawat, Dept. of Electrical Engineering, University of Nevada, Reno, NV 89557, (702) 784-1457.

Dates and/or Locations To Be Announced

2nd week in November: **Annual Department of Energy Contractors Review.** Contact: W.L. Associates, 120 W. Church St., Frederick, MD 21701, (301) 663-1915.

December (or January 1994): **2nd Scientific Congress of the European Bioelectromagnetics Association,** Ljubljana, Slovenia. Contact: Dr. Alessandro Chiabrera, Dept. of Engineering, University of Genoa, Via Opera Pia 11A, 16145 Genoa, Italy, (39+10) 353-2757.

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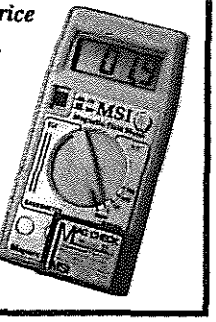

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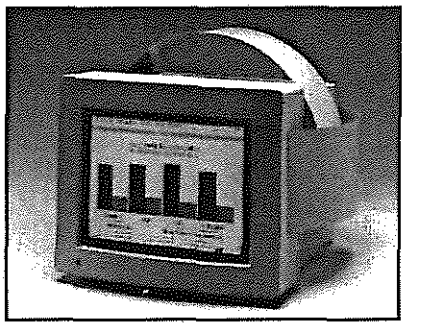

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