



A News Report on the Health Effects of Electromagnetic Energy.

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Article 1

Putting a spin on science:

The NCI Linet Study

On Friday July 4, 1997, both The Australian and The Sydney Morning Herald featured articles about the just released U.S. National Cancer Institute study, conducted by Dr. Martha Linet and co-workers, in which it was claimed that there was no evidence that powerline electromagnetic fields increase childhood leukemia risks. This study was published July 3rd in the New England Journal of Medicine. Most of the media and power industry supporters are claiming this study exonerates powerline EMFs as a health hazard. As reported by CNN on July 2, 1997; "Children exposed to electromagnetic fields by living near electrical power lines are not more susceptible to developing leukemia, a study released Wednesday shows."

Don MacPhee from Latrobe University's school of microbiology states in The Australian that the results of the NCI Study backed his claims that power lines did not emit enough energy to cause childhood cancer or any other form of cancer. Mac Phee said that it was mostly the media and scientists of "Dubious Quality" that had perpetuated the myth that there was any link between power lines and cancer. "Its just absolute non-sense", Dr. McPhee said.

This line is also being actively pushed by the media in the US, the U.K. and Europe and is being promoted as proof that future funding for research should cease.

These claims can not be scientifically justified, as the following will illustrate.

The view that powerline EMFs do not emit enough energy to effect cellular processes is at odds with recent research conducted by respected bio-effects researcher Dr. Om Gandhi. In March 1997 at a science symposium on cellular studies convened by the U.S. National Institute of Environmental Health Sciences (NIEHS) in Durham, North Carolina, and reported in the U.S. based publication Microwave News, "Dr. Gandhi reported that the fields induced in the human body by power lines and appliances indeed, essentially all strong EMF sources - are much stronger than the fields generated naturally inside the body. Or, in the jargon of the trade: the exogenous EMFs dwarf the endogenous fields. Gandhi, who is at the

University of Utah in Salt Lake City, used a computer model to calculate the electric and magnetic fields in the 41 - 70 Hz frequency band from internal and external sources.

The human heart is the strongest and most consistent source of EMFs, but even its fields in other organs are hundreds of times smaller than those induced by standing under a high-voltage power line or by using a hair dryer. "My assumption was that what is already in the body is pretty substantial, but that turns out to be incorrect," Gandhi said in an interview. He noted that he was "surprised" by his results. "It is time for people to reject false assumptions," he said." (*Microwave News*, May/June 1997)

It is unfortunate that reporters and so-called experts who are now calling the NCI study as positive proof that a risk does not exist from long term exposure to powerline electromagnetic fields did not take the time to critically examine what the study had actually found, and also to examine the criteria which led to the NCI researcher's conclusions.

The NCI researchers actually acknowledge in no less than four places, a statistically significant increase in acute lymphoblastic leukaemia (ALL) in children exposed to powerline magnetic fields in excess of 3 milliGauss . This is a **confirmation** of many previous studies which have shown a similar level of association between childhood leukaemia and magnetic fields from electricity. The article in *The Australian* mentions that the researchers dismissed, as a "statistical fluke", a 24% increase in leukemia risk for children exposed to what is termed "especially high magnetic fields".

The NCI researchers were able to dismiss this fact by arbitrarily setting a 2 mG level as a cut-off limit. The fact is, that if they had used the 3 mG level as a cut off point in their calculations, the conclusions would have been exactly the opposite - **that there is a significant risk.**

On July 4th EMFacts e-mailed Professor Ross Adey, one of the most respected bio-electromagnetic researchers in the U.S., Dr. Adey is the author of numerous books and research papers on the bio-effects of EMFs. He recently conducted a \$3 million research program for Motorola. His reply on the NCI study is as follows:

"A number of us worked on the NCI paper through last weekend. Sam Milham, the Washington State epidemiologist and a pioneer in this field, points out that if they had included the 3mg level in their cutoff, the conclusions would have been exactly the opposite - that there IS a significant risk, and selection of 2mG is quite arbitrary. David Savitz used 3mG in some of his work. Obviously there is no steep threshold beyond which risks rise exponentially.

At the recent Bologna International Symposium, Scuz from U. Mainz had a paper combining kids from Berlin and Southern Saxony in high exposure homes to give leukemia odds ratio of 6.8 for young kids (under 4yrs). So the dismissive attitude of NCI is totally unrealistic."

As stated in a July 2 press release on the Linet study, by British researcher Alasdair Philips from Powerwatch Network; " The Linet study, billed by the NCI as "The most comprehensive study ever done on this much-debated topic", falls far short of its billing as the study does not approach the thoroughness of the earlier Swedish studies, and, **incredibly** for a modern study it only measured **magnetic** fields and did **not** include **electric** fields which are being increasingly implicated in cancer development and many other adverse health conditions. Both magnetic and electric fields are being measured in the landmark UK Childhood Cancer Study due out early next year, as UK researchers understand the potential

importance of electric fields. In a 1996 study on adults which took **both** fields into account, the risk rose from 1.6 (magnetic fields only, and similar to the 1.79 in this study) to 11.2 (both magnetic and electric fields considered) - it is likely to be a similar increase for children."

It should also be noted that the magnetic field is not the equivalent of EMF. It is only one of the now "five or six" known EMF metrics. Of these, the electric field may well be the most important, though the role of transients, harmonics, ground currents, radon daughters and the radiofrequencies that "ride" on power lines are also suspect. Any study which only considers one of these metrics cannot give any assurance of "safety".

If we extrapolate to the evidence (Electromagnetics Forum, Vol.1, No.2, p.5-6) that levels of 12 mG affect the ability of melatonin to suppress cancer cells and that there is some evidence of a dose-response relationship between 2 and 12 mG, then at levels at or below 2mG, a no effect result could well be expected.

With this in mind, the only thing the NCI indicates is that children with magnetic field exposures at 2 mG and under are not at increased risk of developing leukemia from their EMF exposure. Rather than exonerating EMFs, the NCI study gives further support for the 1995 draft guidelines from the U.S. National Council of Radiation Protection and Measurements. (NCRP) These guidelines generally endorse a 2mG exposure limit.

As stated in the NCRP's conclusions:

"In arriving at the proposed guidelines, the committee has considered available laboratory studies on bioeffects and epidemiological reports of health hazards from electric and magnetic field exposure. In key areas of bioelectro-magnetic research, findings are sufficiently consistent and form a sufficiently coherent picture to suggest plausible connections between ELF EMF exposures and disruption of normal biological processes, in ways meriting detailed examination of potential implications in human health." (For more information on the NCRP Guidelines see Electromagnetic Forum, Vol.1, No.2, Autumn 1997)

The NCI study can be put into the same classification as the NAS/NRC review study. (Electro-magnetics Forum, Vol.1, No.2, p.1-4) Both studies come up with conclusions based on serious omissions of hard scientific data which do not fit in with those conclusions. Both these studies are now being used by those wishing to end further EMF research.

When you look at the tobacco health issue history, you will find that similar efforts to stop or curtail research spending was one of the tactics used- along with belittling research findings that indicated a health hazard existed. For some years those attempts to stymie research on the tobacco problem were successful. Lets hope that tactic will not be successful here.

The National Cancer Institute may well consider that research money should be better spent in other areas than EMF research. To be fair to the NCI, when you consider the millions previously spent on EMF research and that figures indicate that the number who live above 2mG in the U.K., Sweden and Italy is only estimated to be about 0.5% of the population, there is a need to re-prioritise future research. The many large and expensive epidemiological studies that looked at magnetic fields only have really "had their day". They show that there is an effect, maybe on a susceptible sub-group in the population, and the effect is NOT very large for magnetic fields alone. It is now time to think very carefully how we spend the

millions, to carefully look at the other metrics of EMF exposure as mentioned earlier, also to adopt a policy of prudent avoidance, along the lines recommended by the draft NCRP report.

World Conference on Breast Cancer's press release on the NCI Linet Study:

At The First World Conference On Breast Cancer, held at Queens University, Kingston, Ontario, Canada, from 13 to 17 July 1997, many concerns were raised on the calls for ending future EMF health effects research, based on the NCI Linet study.

The following is a joint press release from that conference:

Dateline: 1st World Conference on Breast Cancer, Kingston, Ontario, Canada , July 15, 1997.

"The recent report in the New England Journal of Medicine by Linet and colleagues has been widely reported as showing no link between exposure to electromagnetic fields (EMF) and one type of leukemia in children. On the basis of this new study, some scientists and some news media organisations, including the major networks, have repeated the questionable claim that the link between EMF exposure and cancer risk is no longer an issue, and further research is unnecessary.

Such statements, based on a single study, are troubling. More disturbing still, is the fact that the data presented in the Linet study do not support the assertion that no link exists. Even a cursory review of the main data set shows a 53% increase in leukemia incidence at magnetic field exposure levels above 2 mG; a 72% increase (which is statistically significant) above 3 mG; and a more than 600% increase at exposures of between 4 and 5 mG. Above 5 mG, no link is shown, but there are too few cases in this range to yield any significant result.

Dr. Bary Wilson, who has co-authored a recent book on EMF and breast cancer, and several other speakers at the World Conference on Breast Cancer, including Dr. Kjell Hansson Mild of National Institute of Working Life in Sweden, have stated that a study which is apparently positive and limited only to leukemia should not be used to discount a possible link between EMF and cancer in its entirety.

Any statement claiming the demise of the EMF and cancer issue should be based on an analysis of all the available data and not one study, particularly one in which the reported data are apparently not reflected in the conclusions. In fact, available data on the subject, provided by many scientists over more than a decade, do not support the hypothesis that there is no link between EMF exposure and increased risk for several types of cancer.

Cindy Sage of Sage Associates and Chair of the EMF program at the conference points out that, "even a small increased risk of breast cancer due to EMF exposure has enormous public health implications given the high incidence of this disease in developed countries."

Based on the Linet, et al. study, it is clearly not justified to call for the end of research into the possible link between EMF and cancer. Given the growing body of evidence for a possible link between EMF and breast cancer, in particular, cessation of research funding at this time would be reckless and scientifically indefensible."

Kjell Hansson Mild, Ph.D., Natl Inst for Working Life, Sweden

Cindy Sage, Sage Associates, USA

Bary W. Wilson, Ph.D., Pacific Northwest National Laboratory, USA

Comments to the NCI study by Allen H. Frey:

Allen Frey is the author of "On the nature of electromagnetic field interactions with biological systems ", RG Landes Co., Austen TX, USA, 1994.

"Are the conclusions of the Linet et al epidemiological study and associated editorial by Campion justified? I think not.

The fault, as is often the case in science, is in assumptions made before the study began, assumptions upon which the study is based. If the assumptions can not be shown to be true, then the conclusions are not valid.

In their statistical study, it was assumed that the active agent in power line biological effects is the 60Hz sinusoidal wave. But there is substantial data and biological theory that indicate the primary active agent would be the transients that are found on power lines in varying forms to varying degrees in various places (Frey, 1994). A broad statistical study such as Linet et al's would tend to obscure such effects since data from areas where there are effective transients would be submerged in the mass of data from areas where there are not such transients.

Epidemiological studies, and statistical studies in general, are quite useful for hypothesis generation. But they are not appropriate for drawing conclusions. Causality can not be shown. There are just too many unknown and uncontrolled factors operating in a large statistical study, as compared to wet biological experiments. This is particularly the case with magnetic fields as an agent, for it is not yet clear what parameters of the agent are of importance biologically.

Is it appropriate to draw what may be life and death conclusions on the basis of one statistical study that is based on an assumption about what is the active agent, an assumption that can not be shown to be true? I doubt that many people would be willing to stake their life on one such study."

Comments to NCI by A. R. Liboff:

A. R. Liboff is Professor of Physics, Oakland University, Rochester, MI, USA.

"Like Allan Frey, I too have doubts concerning the implications of the Linet study. Frey points to the possibility of transients as the metric underlying the earlier correlations.

Another possibility is that the geomagnetic field may be a complementary factor, either because of cyclotron resonance or some other type of resonance interaction. In connection with this it appears that Denver was not one of the areas examined, which is puzzling

considering the fact that data from the Denver vicinity was the impetus for such epidemiological studies.

The media has characterized this study as the largest yet. For some time, I have had the feeling that funding for such studies would continue until the funders got the answer they wanted. Never mind the original objections to the Wertheimer and Savitz results that epidemiological studies were "innately non-scientific" and did not prove anything. Now that the results are more in line with what is desired, we are subjected to newspaper and TV reports saying that this report is the final word.

Nowhere does the media awaken the public to the fact that since Wertheimer's original 1979 results, there has arisen a wealth of (laboratory) evidence showing that ELF magnetic fields can have profound effects on living things. What in 1979 seemed inconceivable no longer appears improbable.

Perhaps now that we have had, in the words of the media, the "final word", the rest of us can get on with the science underlying these ELF interactions and, through the science, determine the consequences for human hazard."

Article 2

Swedish study finds increased risk of leukemia

Considering the media interest in mis-reporting the NCI Study, what was surprisingly NOT reported in the Australian media was the release of a large Swedish EMF human exposure study less than three weeks before the NCI study. The Swedish study included approximately 400,000 subjects who had lived within 300 meters of transmission lines in Sweden for at least one year between 1960 and 1985. The researchers found that persons who were exposed to magnetic fields both at home and at work are nearly 4 times likely to develop leukemia than those who were not exposed to magnetic fields.

To quote from the *Epidemiology* Press Release of 16 June 1997:

"Dr Maria Feychting and colleagues at the Karolinska Institute and the National Institute for Working Life in Sweden report in the July issue of *Epidemiology* that persons who were exposed to magnetic fields both at home and at work are nearly 4 times likely to develop leukemia as those were not exposed to magnetic fields.

Dr. Feychting and colleagues conducted a case-control study from among approximately 400,000 subjects who had lived within 300 meters of transmission lines in Sweden for at least one year between 1960 and 1985. The investigators designated as cases 325 residents diagnosed with leukemia and 223 residents diagnosed with a tumor of the central nervous system. For each case identified, they selected at random at least two control subjects of the same sex and five-year age group who had lived in the same parish as the case.

They assessed exposure to magnetic fields generated by transmission and distribution power lines close to each subject's house, excluding buried power cables from the calculations. They obtained information on each subject's occupation from five-year censuses. They assessed occupational magnetic field exposures for each subject through extrapolation of exposure estimates for each occupation and without knowledge of whether the subject was a case or control. The investigators took into account in their analysis other occupational exposures,

such as benzines, oil products, solvents, and welding fumes, that have been associated with leukemia in earlier studies. They compare the residential and occupational histories of the cases with the histories of controls.

Subjects in the highest category of occupational exposure to magnetic fields (0.20 microT, or 2 mG) had nearly double the risk of developing acute myeloid leukemia, a 40% increase in risk of developing chronic myeloid leukemia, and a 70% increase in risk for chronic lymphocytic leukemia when compared with unexposed subjects. Those with high levels of exposure to magnetic fields at home had double risk of developing acute myeloid leukemia and chronic myeloid leukemia as those who were unexposed.

Among subjects who had high exposures to magnetic fields at home and at work, the risk of developing acute myeloid leukemia and chronic myeloid leukemia increased more than 6 fold and doubled for chronic lymphocytic leukemia when compared with subjects who had not been exposed to magnetic fields. Results for central nervous system tumors were consistent with no increase in risk."

(Feychting M., et al , Occupational and residential magnetic field exposure and leukemia and central nervous system tumors. Epidemiology 1997; 8; 384-389)

Article 3

World Conference identifies EMFs as factor in breast cancer

From the San Juan Star, Puerto Rico August 6, 1997

By Lorraine Blasor

Role of pollutants in breast cancer probed by experts.

Communities must heed environmental pollutants such as electromagnetic radiation more closely and demand vigorous government action to curb these potential health hazards, according to Puerto Rico's delegates to the recent World Conference on Breast Cancer held in Canada.

Women need to learn more about breast cancer, its prevention and alternative treatments, said Dr. Iris Zabala Martinez and researcher Tania Garcia Ramos, the island's representatives at the conference. The activity, which ran from July 13-17, drew 650 delegates from around the world.

A key point made at the conference, according to the local delegates, was the close connection between environmental factors and breast cancer, an illness that kills more than one million women worldwide each year. In Puerto Rico, the incidence of this type of cancer has more than doubled since 1900, from one in 47 women to one in 18 women in 1991.

"The scientific debate has grown stronger," said Garcia Ramos, the daughter of environmental activist Neftali Garcia, at a news conference on Tuesday. But she added, these hazards "still are not being taken seriously."

Environmental pollutants may contribute up to 80 percent of breast cancer cases, participants were told by experts who challenged communities world-wide to take action despite lack of conclusive scientific evidence.

Experts at the conference noted that fewer than 7 percent of cancer cases are linked to heredity, meaning other factors are at play. Increasingly, the blame is being put on environmental pollutants such as household cleansers, pesticides in food **and electromagnetic field radiation emitted by computers, cellular phones and microwaves.**

"The emphasis on the environmental aspects was the innovative aspect of the conference", said Garcia Ramos, who with Zabala is a member of Taller Salud. This women's health organisation has been increasing breast cancer awareness in communities island-wide in the past year.

"While doing away with environmental hazards is impossible, Garcia Ramos and her Taller Salud colleague Nirvana Gonzalez Rosa emphasized the importance of minimizing individual exposure. Thus, people should avoid standing in front of microwave ovens, reduce using cellular phones and hair dryers, and take regular breaks from sitting in front of a computer. Computer screen shields also afford some protection", advised Gonzalez Rosa.

A major scourge of industrialised countries, breast cancer is now starting to climb in non-developed countries in tandem with their rising modernization. Right now, however, the highest incidence of breast cancer is found in North America where the rate is 84.4 cases for each 100,000 inhabitants or one in every eight women.

The conference also highlighted current breast cancer research and treatment, focusing attention on controversial preventative measures. These included the practice of recommending that women with a breast-associated gene have a mastectomy, regular mammo-grams for women over 50 years of age and the use of Tamoxifen, an anti-estrogen, as a preventive strategy. Zabala said researchers warned of potential risks associated with giving Tamoxifen, a drug used in treating cancer patients, to healthy women in clinical trials designed to test its cancer-prevention virtues. "These women are at risk of developing endometrial cancer and ocular problems", she said. It is unclear if trials are currently under way in Puerto Rico.

Article 4



International & Australian EMF Guidelines and Cancer:

Are We Protected?

One of the more contentious issues in the scientific community today are the biological effects of electromagnetic fields (EMFs) and whether or not they are adversely affecting our

health. This issue has caused more concern and controversy than any other human health issue, including smoking . Many scientific studies do indeed indicate statistically significant adverse health effects, while other studies do not report such a correlation.

With this controversy going on, it is perhaps understandable why many national and international regulatory organisations have found it difficult to set accurate guidelines for maximum human exposure levels to powerline electromagnetic fields. The epidemiological research has in general indicated that there is a low-level risk which may be less than some other recognised risk factors, such as air pollution in cities. However recent research indicates that most of the previous epidemiological studies which only considered powerline frequency magnetic fields, may have been looking at the wrong parameter of the electromagnetic field. Studies such as the Ontario Hydro Worker Study and the Henshaw Study on electric fields and Radon (Electro-magnetics Forum, Vol.1, No.2, Autumn 1997) indicate that the magnetic AND electric field can have a greater biological effect than the magnetic field in isolation.

The real stumbling block for the regulatory agencies setting maximum exposure standards for both residential and occupational exposures to 50 or 60 Hertz powerline frequency electric and magnetic fields has been a lack of a recognised biological mechanism showing how such low-level fields could possibly effect biological processes. In fact, the original 1990 guidelines states: " The major reason for the interim nature of these guidelines was the inability to arrive at a scientifically based judgment concerning any causal relationship between 50/60 Hz magnetic field exposures and the excess occurrence of cancer."This was reconfirmed in the current guidelines.

The same was true with tobacco smoking, but in that case the epidemiological evidence overwhelmingly indicated a significant risk. With tobacco smoking, lack of a proven biological mechanism did not stop regulatory action on behalf of the authorities to warn the public of the potential dangers from smoking.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP), who have set the current maximum exposure guidelines, in 1993 concluded that "The data related to cancer do not provide a basis for health risk assessment of human exposure to power frequency fields."

Australian regulatory authorities such as the Australian Radiation Laboratory (ARL) and the National Health & Medical Research Council (NH&MRC) have taken the ICNIRP Guidelines as the standard for Australia. They are as follows:

- Occupational - Magnetic field intensity (whole working day) is 5,000 milliGauss.
- General Public (Residential) - Magnetic Field Intensity for a 24 hour day is 1,000 milliGauss.

When you consider that the epidemiological studies generally found a low-level cancer risk in the order of 2 to 4 milliGauss it is understandable why these guidelines have received so much criticism.

The ICNIRP's rational for setting these levels can be defined as; 1) The epidemiological evidence to date (1993) does not clearly show that an association between powerline EMFs and cancer is real. there may be another factor as yet to be identified. 2) There are no clear physical or biological models to explain such an effect, if it does exist. 3) They had no idea of the risk factor (effect per unit exposure), nor even a clear understanding of what exposure measure we should be considering.

In fact the current guidelines specifically do not provide any protection from chronic exposure to powerline frequency EMFs. This, in effect, was admitted in 1991 by Dr Keith Lokan, from the Australian Radiation Laboratory, in a conference paper published in Radiation Protection in Australia (1991). Vol 9, No.4 . Discussing the current power line frequency exposure guidelines. To quote:

"One thing which we have done, **though it has little direct bearing on the issue of chronic low level exposure**, is to adopt the WHO/IRPA (predecessor to ICNIRP Guidelines with identical limits) recommendations on field limits. These limits represent plausible field values, below which **immediate** adverse health effects are unlikely, and as such serve a useful purpose. **They are not intended to provide protection against possible cancer induction by continued exposure at the lower field levels implicated in the studies...**"

In 1993 the ICNIRP reconfirmed the interim guidelines which were published in 1990. As stated above, a major reason of maintaining the high exposure levels "was the inability to arrive at a scientifically based judgment concerning any causal relationship between 50/60 Hz magnetic field exposures and the excess occurrence of cancer."

This can no longer be justified, as there is now one extensively researched and several times replicated biological interaction (The melatonin hypothesis) with powerline magnetic fields, which as stated at the June 1997 World Congress for Electricity and Magnetism in Biology and Medicine, represents "one of the more well documented/tested interactions in the field of bioelectromag-netics." (see page 10). This effect occurs at a level around 12 mG, which is far below the Guideline limits. So we now have, 1) A credible biological causal relationship between 50/60 Hz magnetic field exposures and promotion of cancer, and 2) A clear understanding of what level of exposure causes the effect.

In the previous two issues of Electromagnetics Forum we have been following the continuing research on the connection between breast cancer, melatonin which is produced by the pineal gland, and exposure to low level powerline frequency magnetic fields. Since the last issue (Vol.1, no.2, Autumn 1997) still more research confirms that the "melatonin hypothesis" as stated above, is "one of the more well documented/tested interactions in the field of bioelectro-magnetics."

The melatonin hypothesis is supported by nine research papers from four laboratories with results showing that low level powerline frequency magnetic fields, at levels easily encountered in the environment (12 milligauss) can block melatonin and/or Tamoxifen's (a cancer therapy drug) ability to suppress breast cancer cells in vitro. In addition, we have three recent human exposure studies showing a reduction in melatonin among workers exposed to low level EMF's.

If we were dealing this much evidence against a chemical carcinogen, the scientific and medical community would be calling for immediate government action. However with human exposure to electromagnetic fields there is a major bureaucratic problem, when existing guidelines are being questioned. In the lead article in this issue, Putting a Spin on Science: The NCI Linet Study, it is clearly demonstrated the extent vested interest groups will go to to disprove a connection between EMFs and cancer. In the article Poweline Litigation Concerns, page 9, it is shown that the power industry is preparing to actively fight litigation claims against the industry. In light of this, the reality is that in all likelihood we will not soon see any official change to the existing Guidelines, despite the evidence.

Article 5

Finnish study on residential magnetic fields and cancer (1996)

In October/November of 1996 the British and European media widely reported that a new Finnish study exonerated powerlines from adult cancers. Unfortunately the media and others took this study at face value and did not bother to critically examine the findings.

Researchers, Dr. Pia Verkasalo and coworkers from the University of Helsinki, Finland, claimed that their large scale epidemiological study found that "The results of the present study suggest that typical residential magnetic fields generated by high-voltage power lines are not related to cancer in adults." Their findings were published in the October 26, 1996 issue of British Medical Journal.

As reported in New York based Microwave News, (Nov/Dec 1996) Verkasalo and co-workers found "no major increases" in risk among the cohort for 21 varieties of cancer. "The previously suggested associations between magnetic fields and tumors of the nervous system, lymphoma, leukemia and breast cancer in women were not confirmed," they wrote.

The study included 8,415 cancer cases from a group of 383,000 adults living within 500 metres of all 110-400 kV high voltage power-lines in Finland. No actual field measurements were taken. Exposures were calculated from power company records.

Verkasalo however later reported at the U.S. Department of Energy's EMF review in November, that there was a statistically significant risk ratio of 4.8 for chronic lymphatic leukemia among those adults exposed 12 or more years before diagnosis. "It's not clear what this means," Verkasalo said.

Verkasalo did find a statistically significant increase in female colon cancer but said that this "may well be due to chance." There was also a slight increase in some other cancers but they were not statistically significant.

A careful evaluation of this study makes apparent some major weaknesses which makes the researcher's conclusions fundamentally flawed.

1) The researchers wrongly assumed that the only exposure to magnetic fields was from high voltage powerlines over 110,000 volts. This is wrong. It is widely accepted that peoples' main exposures are from other sources, such as home wiring and appliances, underground distribution lines, substations and occupational exposure.

2) The researchers calculated magnetic fields into five bands. According to British researcher Alasdair Philips, the first four bands are at similar levels to ones in Finnish homes, which are from sources other than powerlines. This means that in four out of five of their analysis bands, their calculated exposure for individuals from high voltage powerlines is not an accurate assessment of the fields the people were actually exposed to. Only the highest band would have any chance of seeing a significant risk.

3) Virtually no homes in Finland are located within 100 metres of high voltage power lines. This is significant because at 100 metres, the fields from the powerlines would have been reduced greatly.

4) The study did not consider the electric field component, which is being shown to have a real impact on cancer risk. (see Section 3.0)

As a result of the above, the Finnish study's calculated exposure levels would have had little relevance to actual magnetic field exposures and no relevance to electric field exposures, which most likely would come from other sources than powerlines anyway.

The only thing the Finnish study does show is that the many large and expensive epidemiological studies that looked at magnetic fields only have really "had their day". They show that there is an effect, maybe on a susceptible sub-group in the population, and the effect is NOT very large for magnetic fields alone.

(Information supplied courtesy of Alasdair Philips at Powerwatch, 2 Tower Road, Sutton, Ely, Cambs, CB6 2QA, UK)

Article 6

Powerline Litigation Concerns

The prospect of massive law suits against the power industry has been a major ongoing concern to the industry, a prospect not lost on the legal fraternity. As reported in the January 1994 edition of the American Bar Association Journal's cover story "Why Electromagnetic Field Litigation Could be the Next Asbestos" is the following:

"Presently, more studies exist that appear to link EMF exposure to an increased risk of cancer than existed linking asbestos exposures to an increased rate of cancer at a similar embryonic stage of asbestos litigation."

In anticipation of possible future Australian power industry exposure to litigation, as reported back in 1991 by Les Dalton, former CSIRO research scientist and Author of Radiation Exposures: (Habitat Australia, Dec. 91):

"Despite their unwillingness to acknowledge the health risks, there are reports that the Australian electricity utilities are being urged by their associations to contribute significant sums to an industry legal fighting-fund to defend against anticipated worker's compensation and public litigation from workers affected by EMR exposure."

In the Nov/Dec 1996 issue of Microwave News, it is reported that eight of the U.K.'s major electricity companies, including the National Grid Co., are considering setting up an 8 million Pound fund to fight EMF litigation. In a confidential memo leaked to the Financial Times (Oct 11 1996), Willis Corroon, a leading U.K. insurance brokerage stated:

"A priority of the electricity industry must be to prevent a legal precedent being established. This will require the strenuous defence of any claims, and the associated defence costs are likely to be high. The uncertainty surrounding this topic has created unease in the insurance market and has resulted in coverage being restricted" "Some insurers will not participate in the liability program of an electricity utility if it includes protection against liability for electromagnetic fields."

Until now, the prevailing legal opinion on litigation cases involving adverse health claims from exposure to electromagnetic fields (EMFs) such as cancer and other diseases identified in the scientific literature, is that the electrical engineering and power industries can only be

held liable if science provides conclusive proof that weak electromagnetic fields impair health. This has been the main line of defence the power industry has used in litigation cases. It has been a very successful argument, with most cases being dismissed for lack of this type of evidence. However the question on whether or not EMFs are a proven hazard may not be the most important issue when it comes to possible future litigation pay-outs for insurance companies.

On February 20, 1997 the Swiss insurance firm of Swiss Re announced a new publication "Electrosmog - a phantom risk" which raises serious concerns as to the exposure of the insurance industry to future liability for claims from "electrosmog". This can be defined as environmental pollution in the form of electromagnetic fields from a wide range of sources, such as powerlines, electrical sub stations, work places, electrical equipment, etc. To quote from Swiss Re's press release:

"Swiss Re's new publication "Electrosmog - a phantom risk" comes to the opposite conclusion and shows that, **on the basis of present knowledge alone**, it must be expected that plaintiffs will win suits dealing with this issue. The crucial question in this respect is not what results EMF research will yield in the foreseeable future, but how society will evaluate such conjecture.

For the insurance industry, this situation gives rise to an extremely dangerous risk of change composed of two parts. First, the classical development risk, that is, **the possibility that new research findings will demonstrate electromagnetic fields to be more dangerous than has hitherto been assumed**. Second, the sociopolitical risk of change, in other words, the possibility that changing social values could result in scientific findings being evaluated differently than they have been thus far.

The direction of this change is outlined by the gradual transition of liability law from its original form of fault liability, through strict or absolute liability, to the liability - in part already practised - of mere presumption or suspicion. The EMF problem is more dangerous and more threatening for the insurance industry than has generally been supposed - due not to the incalculably small health risks, but to the incalculably great risk of sociopolitical change.

From the insurance point of view, the EMF issue is a typical example of what has become known as a phantom risk: that is, a prospective hazard, the magnitude of which cannot be gauged and which perhaps does not even exist, but which is nonetheless real - if only in that it causes anxiety and provokes legal actions.

With "Electrosmog - a phantom risk" Swiss Re intends to contribute to a forward-looking discussion of pragmatic and feasible solutions. The publication is available in German, English and French. Orders for additional copies can be placed with; Swiss Re, Public Relations, P.O. Box, CH-8022 Zurich; Fax: 0011-41 1 285 2023"

The power industry should be concerned about the legal implications of the above, for their main defence in court rooms has been the lack of 'conclusive proof'. If what Swiss Re says is true and a perceived threat is sufficient to win litigation cases, the economic consequences are enormous. The pervasive presence of EMF/EMR in our society (according to the American Bar Association), has the potential make this litigation battle dwarf the asbestos issue. Obviously this would be a great win for the legal fraternity, but a disaster for the insurance and power industry, with implications for the national economy in general.

The defence of a lack of 'conclusive proof' has largely rested upon the fact that there has been no known mechanism whereby external powerline frequency EMFs could influence internal biological processes. This concept is mentioned in an article in the July 4, 1997 *The Australian*, by Don MacPhee from the Latrobe University's School of Microbiology, in discussing the NCI Linet Study. Dr. MacPhee stated that the results of the NCI Study backed his claims that power lines did not emit enough energy to cause childhood cancer or any other form of cancer.

(see Putting a spin on science: the NCI Linet Study, page 1)

The idea that powerline EMFs do not have enough energy to affect biological processes is now very much in question. In the article, Putting a spin on science: the NCI Linet Study, it is pointed out that recent research by Dr. Om Gandhi indicates that essentially all strong external sources of EMFs are much stronger in the body than the fields naturally occurring in the body.

At the recent Second World Congress for Electricity and Magnetism in Biology and Medicine, held in Bologna Italy (June 1997), four further laboratory research papers were presented, which now make a total of nine in vitro studies, from four laboratories, finding that low level powerline frequency magnetic fields in the order of 12 milli-gauss can suppress the body's main defence against breast cancer (melatonin) and/or Tamoxifen, the commonly used drug used in breast cancer treatment. In addition there are at least three human exposure studies that show that low level exposures can significantly reduce melatonin levels. This effect is termed the "melatonin hypothesis". At the Second World Congress meeting, reflecting the evidence to date, it is stated in the conference program bulletin:

"A number of experimental studies have been conducted to test the [melatonin] hypothesis. Although the literature is still evolving and consensus is being built, it is fair to say, **a) there exists credible scientific support for the hypothesis and, importantly, b) this support encompasses in vitro, in vivo, and epidemiological research. The melatonin hypothesis, thus, currently represents one of the more well documented/tested interactions in the field of bioelectro-magnetics.**"

With the amount of credible scientific evidence now accumulating, the power industry should be concerned about the legal implications of any attempts to down-play the evidence for EMF health hazards. In both the asbestos and tobacco industries, similar attempts to suppress hazard information eventually resulted in multi million dollar litigation and massive pay-outs, specifically because their attempts to suppress information indicated the industries knew of the risk but still knowingly exposed workers and the public to their products. If the power industry continues down the path of denial of a health risk, and makes no attempt to improve the situation, then they may well be heading down "tobacco road".

Lets hope that this does not happen in Australia. We have the benefit of seeing overseas trends, both in legal and scientific evidence and hopefully can take corrective action. If it can be shown, further down the track, that the Australian power industry took positive corrective action to reduce EMF exposures **similar to the 1995 NCRP Draft EMF report's recommendations** (*Electromagnetics Forum*, Vol. 1, No.2, Autumn 1997, page 3-4), it would seem reasonable that their exposure to possible litigation may be greatly reduced.

Article 7

NCI in the spotlight again

By PAUL SLOCA (The Associated Press, July 23, 1997)

SIOUX FALLS, S. D. (AP) - Two nuclear industry watchdog groups on Wednesday, July 23, asked two Cabinet secretaries to make public a long-delayed government study on radiation exposure from nuclear tests in the 1950s. The Military Production Network and Physicians for Social Responsibility wrote U.S. Energy Secretary Federico Pena and Health and Human Services Secretary Donna Shalala, asking that the National Cancer Institute study be released.

They say the cancer institute - part of the Department of Health and Human Services - has for years withheld information about radiation exposure millions of Americans received from the tests, even though evidence suggests the releases may be linked to thyroid cancer.

"This is appalling that the National Cancer Institute did not make this available as soon as possible. It's been too long sitting on this," said Arjun Makhijani, president of the Institute for Energy and Environmental Research. "The thyroid doses to children who were around in the 1950s and drinking milk almost throughout the United States are much, much greater than previously thought," said Makhijani, who has seen some of the data. About 1,200 cases of thyroid cancer are diagnosed each year in the United States.

The ongoing study, begun in 1983, looks at the dispersal of radioactive iodine-131 from nuclear weapons tests in Nevada between 1951 and 1958. The material was carried by prevailing winds and deposited, sometimes by rainfall, in much of the continental United States and parts of Canada.

Much of the criticism of NCI inaction on releasing information has been aimed at Bruce Wachholz, who heads the institute's Radiation Effects Branch. Wachholz said that he hopes to have the report released by the end of September. He also confirmed that officials at the Energy Department have received some study results. "We certainly will release the report as soon as we can," Wachholz said.

One person not happy about the delay is Sen. Tom Daschle, D-S.D., who was instrumental two months ago in pressuring NCI to discuss the study's status. "I think somebody has some explaining to do," the Senate minority leader said Wednesday by phone from Washington. "I am extremely concerned about the slow progress of the study."

The watchdog organizations' letter also asks President Clinton to form a group to "investigate the cover-up of this data and to make recommendations for policy changes." Susan Gordon, director of the Military Production Network and a co-author of the letter, said the NCI apparently is unwilling to deal with the legacy of nuclear tests.

"I think that this points out that the agency is still run by old warriors (and) the Cold War mentality is still deeply entrenched in these agencies," Gordon said on Wednesday.

Article 8

Recent research: *The Adelaide mice study*

In late April 1997, the results of an extremely important Australian research study into the biological effects of radiation from digital cellular phones were released. The study's findings have aroused great interest around the world - but were hardly reported in Australia's own news media. Here's a rundown on what the study found and why it's important, plus some insight into the way it's been quietly swept under the media carpet

·By Stewart Fist

Many years back, before my conscience began to bother me, I spent a few years as a public relations consultant with the world's second largest PR company. In the process, I learned how easy it is to manipulate the media - we did it on a daily basis.

One whole sub-section of public relations is devoted to what they now call Crisis or Risk Management. And, in America if your company faces substantial health or environmental problems, you can hire specialist crisis-management corporations with a 'scientific-research' front, which often promote themselves as "Risk Analysts". These people will take over the scientific tasks of independently proving your product/service to be safe, and they usually save a lot of time and avoid confusion by writing the research conclusions first.

To a very large degree, research into the safety of cellular phones in most of the world has been conducted in this way for many years. In fact, it has earned the reputation of being 'tobacco science'. There are some truly independent researchers working in the field, on both sides of the debate - but also a lot of charlatans and fundamentalists. There are also activists and their scientific supporters, who oppose cell phones (in particular towers), in a sort-of aesthetics-health-environment-religious way.

However the ones with the money are PR and mercenary-science companies, and they are now highly skilled in various ways of defusing issues - mainly the judicial and selective release of information to selected parts of the media.

Late in April, either deliberately or accidentally, this was done with some very disturbing news about Australian research conducted over four years, into cellular phones and their potential to cause or promote tumours.

Telstra executives were running around in a semi-panic all week, and they hastily organised, with the help of the Royal Adelaide Hospital, a video-conference bringing in Dr Michael Repacholi from Geneva to officially announce the report and explain why it was insignificant.

Journalists who have been keenly awaiting the release, and writing about cell-phone and health issues for a few years, were not invited to the video conference. None of the most prominent Australian research scientists working in this area were present, nor were the scientist who conducted the research, or even oncologists from the hospital itself.

Then on the Monday morning (28th April), on the anniversary of the Port Arthur Massacre, details of the report were leaked to the Hobart Mercury, two days before the official release.

This ploy effectively killed the interest of the national newspapers in the story, so it received scant treatment.

The full details of this most important piece of research are:

Four years ago, Telstra agreed to fund a research program to investigate claimed links between cellular phones and cancer. The funding was organised by physicist Dr Michael Repacholi, who has been working through the Australian Radiation Research Laboratories and Royal Adelaide Hospital, and had long been a vocal spokesman for the position that 'cell phones have no real or potential adverse health effects'.

Repacholi involved Professor Tony Basten, Executive Director of the Centenary Institute of Cancer Medicine and Cell Biology at the University of Sydney; Dr Alan Harris, a cancer biologist from the Walter and Eliza Hall Institute of Melbourne; and statistician Val Gebski of the NHMRC. Repacholi then left early in the program, to take up a job with the World Health Organisation in Geneva.

Since the funding had some from Telstra, the scientists insisted that the research protocols should be established and supervised through the independent National Health & Medical Research Council (NHMRC), to ensure that Telstra had no influence over the results. It took nearly six months to formulate acceptable protocols with Telstra and to obtain 200 specially-sensitive transgenic mice. These mice were bred to be highly sensitive to external impacts on the T-cells of their immune system.

The mice were divided into two groups of 100 each, housed in absolutely identical conditions, and subject to the same amount and type of handling. The match extended even to having a sham antenna hanging over the control group.

The only difference was that one group had an active antenna, and the other group had none. Half the mice were subject to GSM-type pulsed microwaves, at a power-density roughly equal to a cell-phone transmitting for two half-hour periods each day.

The experiment was conducted as a blind trial. Dr Harris, who conducted the autopsies, was never made aware of to which group each mouse belonged, in order to ensure that his prejudices couldn't influence results. Yet over the 18 months, the exposed mice had 2.4-times the tumour rate of the unexposed mice. This was later adjusted down to a more confident 2-times claim to remove some unrelated kidney problems experienced by some mice, and correct for other possible influences.

Tumours began to show up at about nine months, and the rate increased steadily for another nine months, until the last mice were killed for autopsy. This seems to suggest that the effects are cumulative and dose-related over time.

This was one of the most carefully controlled and extensive studies of its kind done anywhere in the world, and it has turned up probably the most significant and obvious links between adverse health effects and cellular phones yet.

The team finished their evaluation work in the middle of 1995, and yet the published report of their research in the international journal *Radiation Research* was only released two years later. This was always going to be a political hot-potato.

According to Dr Harris, these findings are very important, and statistician Val Gebski says they are 'highly significant' (well above the 1% significant level). So this research takes a giant step towards answering long-standing questions about the biomedical effects of radio waves.

A new clue to the mechanisms has also been found. The research showed a very significant increase in a form of B-cell lymphoma. The importance of the B-cell (rather than the normal T-cell) here is that B-cell effects are implicated in roughly 85 per cent of all cancers. As one prominent biomedical researcher explained:

B-cells are very important in immune responses. They produce antibodies against bacteria, foreign substances, etc, and also (provide) surveillance against the appearance of cancer cells in the body. One would be more prone to infection if these cells are affected, as in the case of B-cell lymphomas.

In a carefully worded statement to the press, Professor Basten suggested that the correlation between animal studies and humans is complex, and that "more focused research needs to be done to resolve that issue".

This is a common fire-extinguishing approach, with the idea of hosing-down media sensationalism. The 'Men aren't Rodents' claim is both obviously correct, while at the same time discounting 150 years of medical and pharmaceutical research. Our recent Nobel Prize winner, Professor Peter Doherty, was awarded it for his work in the immune system using mice.

As one of the other Adelaide scientists pointed out, they were not researching mice, they were looking for DNA changes in sells. At the level of disruption of normal cell-growth processes (which are fundamental to cancers), animal and human sells act pretty much alike.

Another popular claim is that the study used specially bred trans-genic mice, genetically modified to be susceptible to tumours. This confuses 'susceptibility' with 'sensitivity' - the system noise, with the signal.

Mice have a life span of only two years, so it's hard to test the effects of 50 or 80 years of cell-phone exposure on rodents unless the incubation period is shorted. Brain cancers, for instance, take about 10 years to reveal themselves in humans.

The mice are simply detectors - and the more sensitive the detector, the better. These were 'low-susceptible' mice, injected with a gene which made them sensitive to assaults on their DNA - and most cancers arise from changes at this cell level.

It is also a common mistake to criticise this research for what it doesn't prove, rather than what it does. It set out to establish whether non-ionising radiation CAN have a direct effect on cells at the DNA level - and CAN either cause cancer, or promote it. That's all.

But that's more than enough, because this possibility has been vigorously denied by the radio industry for close on a century.

It is not the absolute numbers of tumours that are at issue here; it is a highly-significant doubling of tumour rates in the exposed group. I don't remember any research of a similar sort in the past few years that has shown increases of this order.

The increased rate of tumour growth began at about nine months, and continued to the end of the research. This graph was continuing to rise, which suggests that the effects of exposure are cumulative over time.

We aren't dealing with a crisis like an air-crash; our concern must be with the use of cell-phones over a lifetime. Teenagers now have their own cell-phones, so they could be exposed for 80 years or more.

And we aren't dealing with any certainty of disease; obviously some people (like some mice) are specially susceptible, while others never need worry. But it would be nice to know how to distinguish these two groups.

Critics are also commenting on the size of the mice, because of its relationship to the wavelength. But this assumes the old theory - now soundly discredited - that the only adverse effect of non-ionising radiation exposure is localised heating (or full body heating in the mice). Heating requires absorption, and in tissue this occurs most at resonant frequencies.

But although the brain and body are reasonably good electrical conductors, they are by no means simple electrical devices. Scientists are now detecting layered-resonance effects (basically capacitance in body tissue) and stochastic resonance (the eye and the brain seem to be able to operate under threshold power levels using system noise amplification), so none of these old full-body resonant claims make sense are more.

Mice are roughly about the size of a full wave at cell-phone frequencies - and the human head (transversely) is a couple of times the wavelength of PCS. Mice also wander around, sometimes facing the source, sometimes side on. Brains are of variable size (the foolishness of this controversy makes this obvious!), and eyes are of another size, as are ears. Who can say which animal-part would be closer to the resonant frequency for any sell phone emission?

And does it matter anyway? The whole point of this experiment was to establish beyond doubt that non-thermal molecular-cell effects occurred through exposure to radio waves. The level of exposure to radio waves. The level of exposure used here would not raise body temperature by a fraction of a percent of 1 degree Celsius (less than 10 seconds in the sun) - yet the cancer rate doubled.

Yet this is the basis for all radio exposure standards. The danger point was assumed to be exposures that raised tissue temperatures by 1 degree C - now we know that it is unrelated to temperature.

How trustworthy?

What makes this study especially significant is that the honesty and validity of both the procedures and the scientists are beyond dispute. If your inclination in such matters is towards corporate conspiracy theories, it must be pointed out that the findings were in no way advantageous to Telstra. There can be no question that they influenced the research in any way once the protocols were in place.

However Telstra did have a confidentiality clause inserted in the contract which prevented the scientists from revealing their findings for a number of years. I find this most disturbing, since both the scientists and Telstra are publicly funded.

Also, under the terms of their contract, Telstra had a three month preview of the report before publication in which to train and activate its fire-fighters - and it turned them out in force, In fact, hosing down the results probably cost Telstra more than establishing them.

Vodafone stole some of the thunder from Telstra by pre-announcing the findings of the Adelaide research some months earlier. They published a booklet quoting the Adelaide Research as finding 'there is no substantial research which indicated the level of emissions from mobile phone base stations could lead to adverse health effects' - without mentioning handsets.

This mouse exposure was pulsed transmission as from a GSM (digital) handset (ie, matched power densities), not the steady transmission of a cell-phone tower and most of us (but few of the public) have heard about the Inverse Square Law.

The American CTIA (Cellular Telephone Industry Association) followed this line of public confusion in an 'advisory' to their members on how to counter press questions. They suggested the statement: 'The mice were exposed to radiation that was more than 1000 times higher than average exposure in the service area covered by a typical cell site'.

More to the point would have been an objection based on GSM's pulsed nature. The Americans still remain staunchly in the AMPS analog camp, with very little intrusion of time-division digital phones. But GSM in Australia is on a rapid rise, because AMPS is being forced out - and GSM pulses its power in a stroboscopic fashion, at 217 times a second.

Many scientists believe it is the 217 Hz low frequency component of the signal that is the problem - in fact, one study about to be released in America suggests analog RF may be a tumour inhibitor. So some beneficial knowledge may come out of all this yet.

The conduct of the Adelaide experiment actually also raised questions more about the potential for cell-phone hand-set radiation to effect people nearby (passive exposures) than just the user him/herself. The experiment was conducted in the 'far field', at distances of about 36cm, which is greater from the mice than the cell-phone is normally held from the head. They obviously had trouble strapping cell-phones onto the mice heads, so had to make do with a more general exposure...

Near-field biological effects in EMF effects are thought to be substantially different from far-field, although the biomedical implications are not clear. Also, in close proximity, most of the energy transfers from the handset to the head by induction rather than just radiation, and this can actually raise the energy transfer by a factor of four.

The study therefore under-rates the potential power effects on the handset user from the ELF component, while possibly over-rating those from RF for people nearby.

But this is par for the course. No single study is ever definitive, and every experimental design, other than concentration camps and human autopsies, raises questions of methodology and relevance.

There's been evidence accumulating over many years that the long-term effects of radio frequency exposures may have serious consequences for a small percent of the population, but this has been ignored by the industry and by governments alike.

So nothing done in the last few years has more obviously established that cell-phone safety has not yet been proved - or so clearly, that the standard-setting process is wrong - than the Adelaide research.

Prof. Tony Basten concluded his release with the statement "For the time being, at least, I see no scientific reason to stop using my own mobile phone". But this is largely irrelevant. At his age and in his occupation, the potential dangers from increased phone use are probably minimal.

The question is, would he buy his teenage child one?

The common sense approach at present is surely 'prudent avoidance'.

Of Mice and Men

by Stewart Fist

The Adelaide report follows two other fierce brush-fires in the cell-phone industry. The first was generated last year when Dr Henry Lai and Dr Singh at Washington State University in the USA reported enormous increases in double-strand DNA breaks in rat-brain tissue following microwave exposures of only two hours. The industry has tried to ignore these findings, claiming that the frequencies used were not identical to cell-phones; but this is only one of a series of experiments conducted over many years which show similar findings.

However, few scientists are independently funded like Drs Lai and Singh. Most need to go cap in hand to the Wireless Technology Research (WTR) group in the USA, which is funded by the cell-phone industry through an 'escrow account' (arms-length third-party) run by a very well known opponent of environmental health groups, Dr George Carlo.

Dr Carlo is a very experienced epidemiologist and 'Public Issues Manager' who has worked for companies ranging from those in the nuclear industry with environmental spills and still-birth problems, to dioxins (through the Chlorine Institute), to pesticides, herbicides, Agent Orange, and more recently, Breast Implants. He owns a large number of research and 'think tank' organisations which act for companies or industries having problems, and he currently runs all 'independent' research on behalf of the Cellular Telephone Industry Association (CTIA).

Recently, as reported in a number of US papers and magazines, the WTR has become embroiled in a number of scandals and questions are currently being asked in the US House of Representatives as to where US\$25 million in research funding has been spent, and why there are no results.

The WTR was promoted to the public and to the US Government as being an 'independent' and 'arms-length' body controlling all research funding. But documents leaked to Microwave News and Radio Communications Report (RCR) show that it has been under the direct control of the industry association (CTIA). It has long operated as a PR front and provider of funding to controlled research-often carefully designed to guarantee nil results. In the last four years it has spent US \$17 million "without wetting a test tube", according to Microwave News editor Louis Slessin.

Radio Communications Report (March 3, 1997) claimed that following the tobacco industry's problems, WTR scientists went on strike for nearly a year, refusing to perform their contracted work until they were adequately covered for indemnity against law suits. Last week, CTIA finally paid up US\$938,000 to fund coverage.

As one prominent American scientist explained to me in an e-mail: I am also puzzled by WTR process. I simply don't know what they mean by "indemnifying scientist against law suits". Why would they anticipate any problem? Thousands of scientists in the US are doing research without 'law suit' insurance.

RCR has done a good job in reporting the conditions of RF research and industry involvement in the US. Other countries in the world, such as EU and Australia, are gearing up to do research and we are basically grounded here in the US.

It is a shame, Motorola is now the only source for funding of on-going research. But they hand-picked their investigators without going through usual peer review process and have tight control of their researchers on what they can say and report.

The WTR scientists' sensitivity to this issue follows the filling of 38 cases which are now before the courts over past tobacco-safety studies. Both the tobacco company lawyers and the scientists they funded have been charged as co-conspirators with the Tobacco institute and the cigarette companies, in suppressing evidence and manipulating research results.

Article 9

What they are saying: the Adelaide Study

By Stewart Fist

*The Swiss Institute of Technology's Dr Neils Kuster, probably the world's expert in how cell-phone radiations focus in brain tissue, said in a newspaper interview with SonntagsBlick: **"It is incomprehensible to me that industry did not replicate this study 18 months ago, when the preliminary results became known."**

*Dr John Goldsmith, probably the leading epidemiologist in such environmental exposure problems, was reported in the Jerusalem Post as saying the Adelaide results **"present startling new evidence that must be carefully evaluated"**.

*Dr John Stather, of the UK's National Radiological Protection Board, agrees that **"this needs to be investigated thoroughly"**.

*In his 1995 report to the Government, Dr Stan Barnett, of the CSIRO's Radio Physics Laboratory, noted the absurdity of cell-phone exemption from national exposure standards: **"It is odd that cellular telephones should be exempted when they represent a unique device that operates with its transmitter placed against the user's head."** In reference to the Adelaide study, Dr Barnett says: "The effect reported in this paper appears to be substantial."

* Dr Gregory Lotz, of the US National Institute for Occupational Safety and Health, agrees. **"The findings are very significant,"** he says. **"They used a sizeable number of animals,**

and it appears to be a clear effect."

* The veteran virtuoso of cell phone/brain research, Dr Ross Adey of Loma Linda, California, has been studying these mechanisms for a few decades. He believes strongly it is the pulsed nature which causes the problems. Dr Adey has published hundreds of papers dealing with the ways in which cell growth and functions are disrupted by fluctuating magnetic and electrical fields.

He notes that the Adelaide findings match his own. **"We now appear to have two, non-thermal effects, both linked to pulsed fields, and once again we must investigate the possibility that it is the low-frequency modulation that is the essential element,"** he says.

* Dr Henry Lai, whose years of research at the University of Washington first revealed double-strand DNA breaks in rat brain tissue following brief exposures to pulsed microwaves of a level comparable to cell phones, also sees the Adelaide study as confirmation of his work. Double breaks in DNA strands are widely regarded as precursors of tumour growth or of genetic mutations. **"The main point is that RF radiation promotes cancer,"** Dr Lai says. He also has some harsh words to say about the release of the results: **"It is irresponsible and unwise to keep the data secret for two years, knowing their implications. The secrecy only reinforces the public's suspicion that the industry is trying to cover up."**

Article 10

Industry opposition to Microshield launch

The following article was sent to *Electromagnetics Forum* by Joseph Prasada, director of Microshield Australia. This newsletter has a general policy of not promoting products, and as such does not include advertising. However exception is taken in this case because, even though the Microshield has been shown to significantly reduce the level of phone emissions being absorbed by the head of the phone user, there have been attempts by both Motorola and Australian Mobile Telecommunications Association (AMTA) to discredit Microshield. The following is Microshield's reply to those attempts.

By Joseph Prasada

Early stages of Microshield before it went on the market.

Back in the UK in 1991, there was a mobile phone user who started to suffer from migraine headaches after he switched to one of the UK's first digital mobile phones. He noticed that the more he used his mobile phone, the more frequent and intense the headaches became and, as he used the phone less, the headaches equally diminished.

Figuring there was some relationship between his headaches and the microwave radiation emitted from his mobile phone Microshield inventor Leslie Wilson designed a crude case employing strips of metal to shield his head from the localised radiation. The migraines disappeared and in their place came hoards of colleagues and friends who in turn also found relief what was then a very primitive device. Realising then the commercial implications, the idea for the Microshield was born. After placing an application with the Patent office the British inventor then spent four years examining the scientific evidence about the effects of

microwave radiation and the shielding technology. The Micro-shield contains specialised shielding materials within the leather layers of the case and an exclusive PVC screen containing an ultra-fine mesh, which protect against radiation emissions from the phone's main body, earpiece, keypad and display screen. The case also features an adjustable aerial guard on the side to protect the user from the radiation from the antenna. In 1995, independent testing for the Microshield were commissioned through the British Approvals Board for Telecommunications which is owned by the Government. Using specialised digital equipment, these tests have shown radiation level reduction by over 90% without signal drop out.

In April 1996 it was launched at the UK's Royal Society of Medicine. The innovative Microshield has already proved a success in Europe and is now represented in 10 countries around the world.

The Launch in Australia

Since 1994 there have been some significant research and findings which have linked mobile phone use to various symptoms and illnesses. Unfortunately much of this information was not in the knowledge of the Australian public. The only little information they were receiving was from the telecommunication industry's associated bodies and Government departmental spokespersons.

They certainly were not going to promote issues that could be damaging their multi-billion dollar industry. Because of this, it was decided to hold a seminar on "Health Effects of Radio Frequency Radiation" at the Garvan Institute of Medical Research sponsored by Microshield. There at the seminar the Microshield device would be unveiled. It was in April this year that this seminar took place.

The seminar included presentations of research studies by Dr Bruce Hocking, former Telecom Chief Medical Officer, now independent Medical Consultant; Dr Peter French, Principal Scientific Officer of the Centre of Immunology and Dr Neil Cherry from Lincoln University, New Zealand. Concerns about low level microwave radiation were raised about recent research which indicated the possibility of adverse health effects including tumours, cancer, cell death, and cumulative DNA damage which is associated to various diseases such as Alzheimer's and Parkinson's Disease.

Earlier to the launch, figures released towards the end of last year in London at a world convention on "Mobile Phones and Safety" showed that as much as 80% of microwave radiation, is absorbed into the human head during a phone call. These concerns were also highlighted in a recent Australian Government Discussion paper in March 1997 prepared by the Committee on Electromagnetic Energy Public Health Issues. It stated, "Human exposure of RFR (Radio Frequency Radiation) is greatest from mobile phone handsets because of the method of use, with the transmitting antenna of the mobile phone handset close to the head. There is evidence that localised hot spots or energy deposition in the brain may occur as a consequence of internal reflections".

Since the launch of the Microshield the Australian Consumers Association in May released a notice on the warning of mobile phones in regards to health on limiting exposure to Microwave radiation emitted from mobile phones.

Response from the Australian Public since the launch of the Microshield product

Apart from issuing more than 3,000 units in the last month the response has been very receptive. What is now important, is the unique position we have found ourselves in. That is never before had any one organisation openly logged so many anecdotal enquiries.

Microshield Industries UK has logged well over 1000 phone calls from users complaining of headaches and migraines. Other symptoms include eye and ear problems, a tingling/burning sensation to the skin, a numbness or soreness to the surrounding areas, nausea and dizziness.

One day before the launch here in Australia we were invited to appear on Channels Nine's Midday Show with Kerry-Anne. John Simpson from Microshield UK appeared with Dr Neil Cherry. Concerns were raised again which triggered many people to call in. In Australia Microshield logged over 3000 phone calls in the first two days with hundreds of callers complaining of exactly the same ranges of symptoms with those of the UK's. Some users were actually experiencing immediate overt symptoms when using their mobile phone and also reported were users complaining of feeling disorientated and confused. What is curious about these reported symptoms is that they are replicated when the user holds the phone on the other side of the head. Furthermore they disappear immediately a user stops using their mobile phone for a period of time and reappear once they start using it again.

Opposition to the Micro-shield device

Everyone (and that includes the telecommunications industry) knows that microwave radiation is emitted from mobile phones. I mean, that is how they work.

Before we launched here in Australia, we always knew that there could be some resistance from the Australian Mobile Telecommunications Association (AMTA) but we were always prepared for that. But the extent of that however took us by surprise with false and misleading information they were giving to their dealers and the public alike about our product. At the launch there were some Telecommunication industry representatives present that were vigorously taking notes. Within days there after, we received a notice from Motorola Australia's Law firm asking us to retract information we were issuing on our brochures which they say was either misleading and deceptive in conduct.

They asked that statements of research conducted by various respectable scientists be withdrawn from our booklet and also the Microshield's effectiveness test commissioned with the British Approvals Board of Telecommunications. We sent them a long response to their letter to either put up or shut up. Needless to say all the claims we made can be substantiated one way or another in so far as they are true. Microshield have the source documentation for all the statements that have been made.

We denied that we are engaged in any conduct which is either misleading or deceptive. Should they ever decide to take any formal action it shall be defended vigorously and any subsequent damages and cost shall be sought from Motorola Australia Pty Ltd. In the future however we shall not be taking their bully tactics lightly.

Peter Russell from the AMTA then decided to take this matter to the Australian Competition and Consumers Commission (ACCC) asking that the brochure also be retracted. We were asked to substantiate all of these claims. The Commission were advised by the AMTA that there is no substantiated evidence that such low level exposures can cause adverse health effects. They were also advised that the Australian Standard for radio frequency exposure is said to be one of the most stringent in the world. It is based on more than forty years of scientific research and is said to provide ample margin of protection.

In our reply we first stated that to deal with this whole issue it would take many volumes and that we would have to refer them numerously to other sources of material which could be obtained at National Reference Libraries and also on the Internet. We at Microshield have no medical experts working for us and we have therefore relied on the comments and reports confirmed by others far more eminently qualified to comment than ourselves. The booklet is essentially a collage of those comments and reports. We have in our possession every original source document to confirm authenticity.

What is very interesting is that the ACCC should readily accept AMTA's representative Peter Russell's comment as being accurate and immediately cast doubts about the accuracy of our own information. Have they in fact seen the 6000 or so reports he refers to supposedly confirming mobile phone safety? Are they also aware of the fact that virtually without exception, every independent scientist working in this field agrees that the exposure conditions for mobile phones, ie with the source of radiation held directly against the side of the head, is unique and that no real correlation of effects can be drawn from experiments carried out forty years ago on radio frequency radiation. The experiments I refer to were conducted at different frequencies to those which mobile phones operate under and also different power levels. In addition the majority RF research has been done in the far field and not the near field. There have also been many experiments carried out over the past 40 years which have drawn adverse conclusions relating to RF safety and ironically the cellular industry normally distances itself from such findings, by using the very same rationale they have become accustomed to, i.e. the research was done too long ago and did not replicate the particular conditions which mobile phone users expose themselves to and is therefore invalid. So it seems they only refer to past research when it suits them, i.e. when the result comes done in their favour. When it doesn't it is dismissed as inaccurate and labelled as "junk science".

I also made it very clear in our reply that I was astounded that they should automatically believe Peter Russell simply because he represents the cellular industry in Australia. That industry is not a health authority or indeed any other class of authority. They are simply a group of companies who have clubbed together to protect their own interests. What on earth do you expect them to say?

A question they might pose back to Mr Russell is that if there is not any health problem whatsoever relating to mobile phones, then why have 7 mobile phone manufacturers lodged their own patents for devices to protect the users from radiation emissions? At least one such patent application confirms that the device is intended "to prevent damage to the head of the user". Why also would manufacturers recommend in their handbooks that users may wish to reduce their exposure to RF energy (a less effective way of saying microwave radiation) by spending less time on the phone? The answer to these questions is quite simple. They know that there is a problem.

We made it aware to the ACCC that virtually all of the research which give mobile phones a clean bill of health, has either been sponsored by the cellular industry or carried out by them and not by independent researchers. The current vogue is to sponsor studies, determine their direction and then edit the contents of the published paper. One such scientist supposedly acting independently, but who actually is being sponsored by Motorola confirmed as much. When asked why he had decided to conduct his experiments using a radio signal which was clearly inappropriate, he confirmed that he did not make the decision about the signal. "I did not pick it. Talk to the lawyers who wrote the contract".

As regards mobile phones complying with safety standards, I can confirm that those safety standards are currently under question and the European body CENELEC who advises the European Commission on such issues, has recently announced a proposal to revise the standards upwards which effectively will put every phone on the market outside the new limits. In any event, we made the ACCC aware that these limits are recommendations only and relate specifically to the thermal effects known to be caused by microwave radiation and not the non-thermal effects which is what we are really talking about here. There are no limits currently in place for non-thermal effects. The cellular industry in fact denies that there are any non-thermal effects despite the hoards of independent research which contradicts them. Calls to Microshield have had users complaining of various symptoms from the use of their mobile phone. I did suggest that the ACCC should refer them to Peter Russell of the AMTA so that he can take time out to respond to each one individually ensuring them that their problems are not caused by their mobile phone, because they are "safe and comply with current standards".

I finally respectfully suggested that if the ACCC really want to protect members of the Australian public then they should ask why the cellular industry is still advertising its products without mentioning the problems which users may experience with their health and the results of studies which implicate their product with possible serious long term illness. After all even the Australian Consumer Association this year saw fit to place a caution on the use of these devices.

Postscript

(As reported in the Hobart *The Mercury*, August 8, 1997)

Watchdog backs off on mobiles

"Australia's leading consumer watchdog has declined to investigate controversial claims linking mobile phones to a wave of serious health problems including cancer and Alzheimer's disease. The Australian Competition and Consumer Commission (ACCC) said it would not investigate claims about the dangers of mobile phones "for a number of reasons, including difficulties posed by the controversial nature of the issues involved"."

Article 11

Official Statements On Mobile Phone Use

Quoted from the Australian Government Discussion paper, 26 March 1997. Strategy for an Australian research program into possible health issues associated with exposure to communications equipment. Prepared by the Department of Communications and the Arts, Department of Health and Family Services, Australian Radiation Laboratory, Therapeutic Goods Administration, AUSTEL and the CSIRO.

"Human exposure to RFR is greatest from mobile phone handsets because of the method of use, with the transmitting antenna of the mobile phone handset close to the head. There is evidence that localised hot spots of energy deposition in the brain may occur as a consequence of internal reflections. Therefore, it is most appropriate that some studies focus on the pulsing conditions employed in the Global System for Mobiles (GSM) operation at both 900 and 1800 MHz, the conditions which apply in the Australian mobile phone network. Possible synerg-ism between RFR exposure and other factors should also be considered."

Quoted from U.S. Industry magazine *Radio Communications Report*, 3 March 1997. Quoting Michael Volpe, spokesman for Wireless Technology Research (WTR), formally known as the Scientific Advisory Group (SAG), an industry funded research group set up to conduct RF cancer research on behalf of the Cellular Telecommunications Industry Association (CTIA).

"In fact the SAG and WTR have repeatedly made public statements which confirm the contention that existing data and studies do not rule out the possibility that cellular telephones cause ill health effects such as brain cancer."

Quoting *The Washington Post*, April 6, 1997, in the article Still Waiting for the Call- Do Cellular Phones Cause Brain Tumors? Researchers' Inability To Provide an Answer So Far Is Only Raising More Questions.

"Motorola's head of cellular operations at the time, Edward Staiano, told reporters that "thousands" of studies showed there was no link between cellular phones and ill-health effects. That was something of an overstatement. While studies on the health effects of radio waves were indeed common, the industry could not cite any studies in which cellular telephones specifically had been tested for their impact on human tissue or organs."

Quoting Dr. Bruce Hocking, former Chief Medical Officer for Telecom, during the *7:30 Report* of May 7, 1997. Discussing the Royal Adelaide Hospital mice study which found over a two fold increase in cancer in the mice exposed to a digital phone frequency.

"This is an indicator that exposure to mobile phone frequencies, such as could be used by mobile phone users, seems to dispose to the development of cancer."

On May 7, 1997 Dr. Hocking presented the results of a study of neurological symptoms in 40 mobile phone users. When asked about this study on the *7:30 Report* of May 7, Dr. Hocking replied:

"Yes, these are studies I've been doing on people who use mobile phones and who develop symptoms when using the phones. This arose from some other observations I've made when working for Telstra that staff and some customers were developing symptoms. I've now followed that up with a detailed survey of over 40 people around Australia who have developed symptoms. They complained mainly that they developed a burning or dull feeling on the side of the head where they have using their mobile phone. It tends to come on several minutes after they made their call and may last for hours. Associated with this they may get feelings of nausea, disturbances in their vision and at times other neurological symptoms."

When asked by the *7:30 Report* presenter "With all due respect to these people, how do you know they are not just psychomatic symptoms?" Dr. Hocking replied:

"Yes, this question has been asked by quite a few people. First of all there is the consistency of symptoms. People from all over Australia with no connections, produce a rather similar story. Secondly, there are now reports coming from overseas, Scandinavia, Great Britain and America of people getting similar kinds of symptoms. Thirdly, there is a statement from the Department of Communications recently out about the development of "hot spots" in the brain. This means a concentration of energy which would give a possible explanation for these symptoms. Fourthly, and most interestingly, these symptoms were in fact observed over 30 years ago in a laboratory set up."

Presenter, *7:30 Report*: "Bruce Hocking, while all these studies are proceeding, what about the issue of prudence and particularly for young kids using mobile phones. Young kids with fast growing cells?"

"Well, I think this is one of the things which should be taken on board, arising from the Adelaide and other studies. That whilst we might seek to set perfection with further studies, there is already some information there which must strike a cautionary note for many people. This would lead to strategies of prudent avoidance, for example, I think there should be restraint on the marketing of mobile phones directly to young children."

Presenter, *7:30 Report*: "You, I think, are critical on the way the government has approached this. What is the basis of this criticism?"

"I think that if you look at the overall policy management of this issue, of both the health and public concern that goes with it, there's a couple of things. First of all, I think it's a mistake to put the major responsibility for this issue into the Department of Communications and the Arts. They have a potential conflict of interest. They are a major revenue raiser for the government, from license fees as well as the proposed sales of Telstra and of future frequencies for mobile phones.

They would not be wanting to create too much concern that some of these products may be unhealthy to the public, as that would impact on their revenues, and yet they are responsible for the dissemination of information regarding this. I think it would be fairer to the government and the public alike if the responsibility for all health - health public issues were moved firmly into the Department of Health, in the Public Health Branch area and administered out of there."

(Dr. Bruce Hocking on the *7:30 Report*, May 7, 1997)

Quoting Dr. Brendon Nelson, Liberal party backbencher, speaking for minister for Health Michael Wooldridge, on the *7:30 Report* of May 7, 1997. Discussing the Royal Adelaide Hospital study.

" and what it shows is that there is a biological effect from electromagnetic energy, and in particular, that emitted by mobile phones In itself, we are aware, and we have quite honestly stated that there appears to be some kind of hot-spot that may be attracted to one part of the brain. Now whether that has an adverse impact, WE DON'T YET KNOW."

Quoting from Letter by Edward J. Markey, ranking Democrat, Congress of the United States, House of Representatives, Subcommittee on Telecommunications, Trade and Consumer Protection, to Dr. David A. Kessler, Commissioner, Food and Drug Administration. (April 7, 1997)

"As you may know, the then-House Telecommunications and Finance Subcommittee held an oversight briefing in February 1993, to ascertain the current state of scientific knowledge on the potentially adverse health effects of radio frequency (RF) exposure from cellular telephones"

"Subsequent to this briefing, I directed the General Accounting Office (GAO) to prepare a report on the existing scientific research at that time. The GAO reported in 1994 that available data were insufficient to determine whether portable wireless phones posed a health risk"

"In 1993, when I first raised the issue of cellular phone safety, there were roughly 15 million people in the United States using such phones. Today, there are 45 million users of wireless phones, yet we are still unable to certify the safety of this product for American Consumers because adequate research apparently has not yet been performed."

● Quoting letter from Diane E. Thompson, Associate Commissioner for Legislative Affairs, Food and Drug Administration, Department of Health & Human Services, to Edward J. Markey (as above) May 5, 1997.

"Little is known about the possible health effects of repeated or long-term exposure to low levels of radiofrequency radiation (RFR) of the types emitted by wireless communications devices. Indeed, much controversy exists within the scientific community regarding the potential for health effects from any type of low-intensity RFR"

"To the best of our knowledge, there have been no definitive research results since 1993 that can serve to completely reassure the public that portable wireless phones are safe."

Media Release from the Australian Consumer's Association, publishers of *Choice Magazine*, May 9, 1997.

"CAUTION ADVISED FOR MOBILE PHONES"

The Australian Consumers' Association (ACA) has advised mobile phone users to minimise their exposures to the electro-magnetic radiation emitted by mobile phones.

"While there is no scientific proof that mobile phone radiation can be harmful, neither is there proof that it is safe" said Steve Horrocks from ACA."

"If it turns out that there is a problem with electro-magnetic emissions at mobile frequency ranges, then using a device that operates so close to your head is an obvious reason for concern."

"It would seem sensible to take a few precautions until more is known about the potential risk. Mobile users should consider their usage patterns and habits to see what they can do to reduce their exposure. There are a number of practical things that mobile phone users can do if they are concerned about the potential health risk."

The Australian Consumer's Association has advised on ways that exposure can be minimised, including:

*don't use your mobile phone when a normal phone is handy;

*always extend the antenna;

*consider using an after-market hands-free kit;

*consider installing a car kit;

*if you have a digital phone try and use it in open space as much as possible so that the phone can transmit at a lower power level;

*limit the number and duration of calls.

"Consumers may balk at the cost of a hands-free kit or a car kit. Perhaps they can look at the other benefits that will come from using this sort of equipment."

"There are also a number of shielding devices on the market that claim to provide protection from radiation to mobile users. The effectiveness of these products is still on trial. Mobile users should first find out as much as they can about them before deciding to purchase."

We are concerned about the Federal Government's approach to the potential health risk. The Government's recently announced research program and public health campaign must be a genuine attempt to better understand the possible effects of radiation on human biology and to communicate the findings to the public. The independence of the research program is vital."

The Government should initiate effective consultation with consumers on the research program and the public health campaign. There is a need to do more than communicate to consumers through a public relations exercise - an effective dialogue with the community is essential where there is a potential public health risk."

Article 12

Quotable Quotes: *Senator Alston on Telecommunications Code*

On February 1996, Senator Richard Alston, then Opposition spokesperson on Communications:

"It is outrageous that the (Keating) Government has ignored community concerns and encouraged an open slather approach at odds with practice in the rest of the world.

"In contrast, the coalition has consistently called for almost two years for a tighter Code which gives more power to local communities. Once we are in government, a firm and balanced Code will be introduced, giving councils and their constituents more say over the communications infrastructure in their areas. There will be enforcement of the carrier's responsibilities under the Code and where carriers fail to abide by the Code, fines will be imposed. There will be an early examination of the feasibility of awarding compensation where the installation of telecommunications infrastructure substantially and permanently affects the value of residential premises."

In April 1997, Senator Alston, now Minister for Communications and the Arts wrote in the Australian Mobile Telecommunications Association's newsletter:

"We are witnessing an exciting time in the evolution of the telecommunications industry in Australia. The heavy hand of regulation is being substantially removed by the new Telecommunications Act, which takes effect on 1 July 1997. This presents tremendous opportunities to industry players. Clearly, industry associations such as AMTA bear a substantial responsibility to inform their members about these opportunities. The new Act also imposes new responsibilities on the industry as a whole. Of course increased freedom means increased responsibility. The Government is keen to see the industry take up the challenge of self-regulation with vigour and a willingness to cooperate. It is self-regulation that will foster competition and growth and innovation leading to benefits for all Australians. Of course, the Government has ensured that there are regulatory safeguards to operate in the public interest should self-regulation not be possible immediately in some areas.

"The legislation represents a fundamental shift in the way the Government views the telecommunications industry. While we have kept industry-specific regulation, particularly in relation to consumer safeguards and trade practices law, we have also provided the mechanism for the industry to determine technical standards and to develop codes of conduct in consumer related areas. These are particularly relevant to the fast-growing and highly competitive mobile communications sector.

"The Government will be watching keenly the success of these self-regulatory mechanisms. While I am pleased to note the progress made in "umbrella" bodies such as the Telecommunications Access Forum (TAF) and the Australian Communications Industry Forum (ACIF), there is so much more to do. Groups such as AMTA clearly have a major role to play here. I encourage all players to participate constructively in the development of industry codes and standards.

"The new regulatory environment is evolutionary. We do not expect enormous upheavals from day one. The Government will work closely with groups such as AMTA to ensure that the mechanisms are reviewed and strengthened on an ongoing basis, and that particular industry concerns are dealt with appropriately.

"Like all who observe it, I am excited about the enormous potential of the telecommunications industry. The mobile telephone segment of the industry has been one of the most dynamic and fast changing. The future of that segment, and the industry as a whole, is largely in the hands of the industry itself. Ultimately, this future must be determined through co-operation and enthusiasm and the willingness to deliver quality communications services to all. Good luck."

Article 13

Two views on the U.K. Dolk transmitter studies

Quoting from Senator Richard Alston, Minister for Communications and the Arts, Senate speech of 5 March 1997 attacking Dr. Neil Cherry:

"The facts are that the United Kingdom department of health recently published a national study which concluded that people living close to radio or television transmitting masts are not at increased risk of developing leukemia. Dr Cherry simply refuses to take notice of that. This man is not interested in the facts."

Comments on Senator Alston's statement by Professor Ivan Beale. Dr. Beale is a committee member on the joint Australian/New Zealand Standards Committee for the current RF/MW standard AS 2772-1 1990. Dr. Beale's reply (5/3/97):

"The UK study referred to by Senator Alston was not published by the UK Department of Health. In fact there are two studies, not one. The authors are Dolk et al., and both are published in the American Journal of Epidemiology, vol 145, 1997. In fact, both studies found a decline in risk with increasing distance from a transmitter, for adult leukemia. Additionally, one study (Sutton Coldfield) found a significantly elevated risk for adult leukemia within 2 km of the transmitter, whereas the other study (multiple sites) did not. These findings seem inconsistent with the Senator's statement.

"Several of Senator Alston's statements could be fairly summarised as saying something like this:" the responsible science-based view is that there is no scientific evidence that radiofrequency radiation associated with telecommunications and broadcasting places the public at risk for adverse health effects.

"My comment is this: Any competent literature review would conclude that there is substantial evidence of biological effects in animals and cell cultures and of adverse health effects in humans, of exposure to RF fields too weak to produce significant heating. Protection standards have not been based on this evidence because it is not yet sufficiently coherent to yield thresholds for adverse effects. In my view it is irresponsible to say that this evidence is unscientific or unsubstantiated, and it is irresponsible to say that this evidence proves that the public are at risk.

"What is responsible, is to say that there is legitimate reason for concern, and that we should adopt a precautionary approach until such time as the evidence is more coherent. It's a pity that the debate reported in this Hansard was not more responsible and balanced in its consideration of this issue."

Article 14

Telecommunications litigation

The Telecommunications industry is well aware of the potential for future liability from any number of sources, not necessarily health related. The recent Telstra "COT" cases are an example. It is understandable that carriers take steps to protect themselves from this possibility, however when those steps involve limiting the access to legal representation by the public, concerns need to be raised.

A worrying example of attempts to stifle legal address against the industry was reported back in 1995 when a public interest group discovered the practice of at least one major Australian telecommunications carrier "paying off" sections of the legal fraternity in order to avoid future litigation.

This information comes from the NSW Public Interest Advocacy Centre, a legal Clearing House for public interest legal matters. To quote from their PICK Bulletin No. 5, May/June 1995:

"In seeking to assist one public interest, the Clearing House has been beset by obstacles which deserve investigation in the public interest. A resident group concerned about the health implications of a telecommunications development in their area [mobile phone tower] sought assistance to challenge the development, which is adjacent to a kindergarten, baby health centre and residential premises. The CSIRO has released a report substantiating some of the health concerns raised by the residents.

Attempts by the Clearing House to secure legal advice for the group were met with rejection from 12 member firms. **According to the firms, the corporation in question has an arrangement with 43 law firms whereby the firms undertake not to act against it in any matter in return for receiving some part of its legal budget.**

The result: any person attempting to obtain redress against an activity of the corporation which appears to offend the public interest, is denied access to lawyers with relevant experience."

This situation certainly raises a serious issue of the power of corporations to affect the accessibility of legal services to the community."

Mercantile Mutual cites possible property owner liability.

As reported in *The Australian*, July 4th 1997, Mercantile Mutual, a leading insurance company, has cited the potential dangers of electromagnetic radiation as part of its opposition to stop the construction of a mobile phone base station on one of its properties.

The stand by Mercantile Mutual raises the question on the potential for future liability of property owners who give permission for telecommunications base stations to be operated on their property.

In a letter to Vodafone, who planned to erect a tower on the roof of one of Mercantile Mutual's Sydney offices, located in a densely populated area, the insurance company said, "there is an increasing body of scientific and medical evidence of the risk to health posed by exposure to emissions from telecommunications base stations."

"Accordingly, in view of the potential health risks, the location of a base station on the property would expose an unacceptably large number of people to electromagnetic energy and emissions"

"The risk to health may expose us as owners of the property to liability for injury to persons who are or who are alleged to have been exposed to emissions from the base station. The amount of such claims is impossible to calculate."

Vodafone, in defiance of the wishes of Mercantile Mutual, took the case to the Telecommunications Industry Ombudsman, who ruled that Vodafone had the right to proceed, despite the property belonging to Mercantile Mutual.

Under the previous National Telecommunications Code, carriers effectively had the right to install their infrastructure on private property without owner's permission. However, under the new Code which took effect on July 1, 1997, which require council permission for many installations, councils who do not have their own guidelines in place to protect sensitive areas, such as schools and day care centres, may possibly be exposed to future liability.

Mobile phone firm sued over tumour death

Reprinted from the U.K. The Daily Mail, August 6, 1997, from Nick Hopkins in New York.

"A mobile phone company is being sued for millions of pounds following the death of a heart surgeon from a brain tumour.

"Dr. Dean Rittmann's family has filed a civil suit against Motorola claiming his illness was caused by radiation emitted from his phone. The test case follows disturbing studies into the potential health risks of using handsets. If it succeeds, it could have devastating implications for the mobile phone industry worldwide and a London law firm has already indicated it is preparing cases of its own.

Dr. Rittmann, who lived in Texas with his wife Ellen and four children, died aged 41 in October 1994, following a brief illness. He was a heart transplant surgeon in Houston and had been fit and healthy until shortly before the tumour was diagnosed. Mrs. Rittmann is suing Motorola and two other firms, NEC and General Electric. Her husband owned a Motorola phone for several years and had also used models from the other two companies. Lawyers representing Mrs. Rittmann say she feels the firms have not been truthful about the hazards of using the phones. She claims that if her husband had appreciated the dangers, "he would still be alive".

Although the precise claim for damages has not been set, it would run into millions, said the lawyers. The case will have its first hearing on September 1 at a district court in Houston, but a full trial is not expected until next year.

British lawyer Martyn Day is investigating cases similar to the Rittmann action and is anxious "to hear from anyone who believes they have been damaged by mobile phone use".

The mobile phone industry is being urged to fund proper studies into the dangers. "It is critical to get some answers", said Susan Putnam, a research associate at the Harvard Centre for Risk Analysis.

Motorola refused to discuss the case, but the Cellular Telecommunications Industry Association, an umbrella organisation for mobile phone manufacturers, insisted: "There is no evidence to prove mobile phones are dangerous."

Comment:

To further add to the telecommunications industry's concern, a large legal firm in Australia has now entered the field, according to an article in the Sunday Herald Sun, on August 10, 1997, entitled "Cancer watch on mobile phones" from which the following is reprinted.

'Legal giant Slater and Gordon is preparing for action against mobile phone makers on behalf of people who claim to have contracted cancers or other illnesses from regular mobile phone use. Company partner Andrew Grech has confirmed researchers are collating details of cases against mobile phone manufactures overseas that could support claims by Australians. While no Australian case is thought to be imminent, one or more was almost certain within the next few years, Mr Grech said.

"Mobile phones have only been in heavy use here for the past five years and the cancers associated with their use are slow to gestate," he said. In Victoria, lawyers could draw on the Trade Practices Act to support claims for compensation, Mr Grech said. "It would be fair to say the scientific jury is still out on the issue of health risks associated with mobile phone

use, but the Trade Practices Act places strict liability on manufactures to ensure the safety of their products," he said.

But Motorola's Australian managing director, Ron Nissen, said scientific and medical evidence showed cellular phones and networks were safe.'

Article 15

New cell network called a hazard by Harvard researchers

Reprinted from *The Boston Globe*, USA

By Peter J. Howe, Boston Globe Staff, June 16, 1997

More than 40 researchers and faculty members at Harvard's School of Public Health have signed a petition urging state officials to block Sprint from turning on a new enhanced cellular phone network that opponents say poses a health threat. In the latest flare up in the debate over the health risks of cell phones, Concord environmental activist Susan Clarke has persuaded the Harvard-affiliated scientists to join her fight against the new Personal Communications Service network that is to be turned on by year's end.

The petition, which Clarke plans to present to the state Public Health Department, cites "the biological plausibility of negative health impacts" from the system's pulsed digital waves and calls for "a full review and determination of its safety by the scientific community."

Sprint officials and one of their health consultants from the Massachusetts Institute of Technology insisted that their system is entirely safe.

In recent years, a small number of studies have suggested that cell-phone-type microwave radiation could cause brain cancer, eye damage, asthma, and lymphoma in mice.

But numerous other studies have denied any health risk, except for possible disruption of heart pacemakers by phones held too close to the chest. Extensive reviews by the Federal Communications Commission, Institute of Electrical and Electronic Engineers, and the National Council for Radiation protection have concluded that cell phones and PCS units are safe and that current regulations on their power levels and emissions are adequate to protect people.

"There have been literally thousands of studies to evaluate the whole range of radio frequency, and there are no health effects that can be substantiated to argue that radio frequency [emissions] should be controlled to any greater degree than they are today," said William Irwin, an MIT health physicist and consultant to Sprint.

PCS devices are essentially souped-up cellular phones that use streams of digital information to transmit sound and information much more clearly and with greater privacy than standard cell phones. They operate at 1,900 megahertz, well above the normal 800 megahertz frequency of cell phones.

Sprint and a unit of AT&T won the two franchises to build Greater Boston PCS systems that will extend to Providence, Worcester, and parts of New Hampshire and Maine and compete with Cellular One and Bell Atlantic Nynex Mobile cell phone systems. PCS licenses have

been bought across the nation, and service has already been launched in New York, Washington, and other cities.

Dekkers Davidson, area vice president for Sprint PCS, said service will start in Greater Boston by the end of this year. Around New England, it is erecting about 300 antennas, of which 70 percent - including all those in the city of Boston - will be on rooftops or existing structures. About 100 will require new towers.

One of the Harvard petition signers, Dr. Constantin Yiannoutsos, said, "I'm not considering myself an expert" on the question of cell phones' health risks, but Clarke "showed me evidence of literature that implied they might be harmful to people. I'm trying to help in some kind of dialogue."

Another signer, Dr. Joel Schwartz, said, "There's a lot of studies that suggest there's an increased cancer risk" from exposure to microwaves.

But Davidson said, "We're talking about a very low-power device" that uses only 0.6 watts of power, a tiny fraction of what a television, microwave oven, or hair dryer uses. "We wouldn't be in business if we thought there were health issues."

A follow up to the above article, was published on the Boston Globe on June 17, 1997 by Peter J. Howe. To briefly quote from that follow-up:

"A top state Department of Public Health (DPH) official said yesterday it is highly unlikely the agency will block Sprint Corp. from turning on a new enhanced mobile telephone network that more than 40 Harvard School of Public Health researchers and faculty members call a possible health threat. Robert Hallisey, DPH director of radiation control, said the agency is eager to receive and review information cited by the Environmental Health

Advocacy League of Concord. But he said, "Right now, there's nothing to indicate that this would create a public health problem that would lead DPH to block it."

Article 16

PLEASE NOTE:

There are two distinct areas of the electromagnetic spectrum covered in this publication:

1. The powerline frequency range of 50 or 60 Hertz (cycles per second) which falls in the extremely low frequency (ELF) range of the electromagnetic spectrum, which ranges from 1 to 300 Hz. [Electromagnetic Fields] In this range electric fields are measured in Volts per metre(V/m) and magnetic fields in Amps per metre (A/m).The magnetic portion, referred to as the magnetic flux density is measured in units of either Tesla or Gauss. For fields normally encountered in the environment units are in milli-, micro-, or nanotesla (mT, uT, nT) or if in units of Gauss, in milliGauss.(mG)

2. The radio and microwave frequency range (RF/MW). For radio frequency, this is 100 KiloHertz (KHz) to 30 MegaHertz (MHz). The microwave (MW) range spans from 30 MHz to 300 GigaHertz (GHz). [Electromagnetic Radiation] The usual unit of measurement for this range is for the power density level, expressed in units of watts per square metre (W/m), milliwatts/cm sq. (mW/cm.sq.), or micro Watts/cm sq.(uW/cm/sq. Another unit is the

Specific Absorption Rate (SAR) expressed as Watts/kilogram (W/kg), which is the rate at which RF/MW radiation is absorbed in body tissues. The rate of absorption varies with frequency and body size but it is possible to determine approximately what intensity of the power density level produces a certain level of heating in the body.