

November 11, 2011

The Committee Secretary
Infrastructure and Communications Committee
Telecommunications Amendment (Enhancing Community Consultation) Bill 2011

Re: Telecommunications Amendment (Enhancing Community Consultation) Bill 2011

Dear Ms Sharon Bird MP and Committee members

I wish to bring to the committee's attention a few points of discussion that I believe are relevant to this committee's deliberations over the extent of community consultation on the siting of telecommunications facilities, essentially mobile phone towers.

First, however, I should mention my qualifications to comment on this issue.

In June of 2010 I received my PhD from the University of Wollongong after a five-year investigation of the foundations and development of telecommunication standards, both internationally and in Australia. After going through a peer review, my thesis, titled: *The Procrustean Approach: Setting Exposure Standards for Telecommunications Frequency Electromagnetic Radiation* was published on the University's academic website¹ and internationally with the International EMF Association.²

Thesis Abstract

Since the 1950s there has been an ongoing controversy regarding the possibility of health hazards from exposure to non-ionizing radiation emissions from radiofrequency and microwave (RF/MW) technology: from military radar to telecommunications. In response to these concerns, and with support from the World Health Organization's International EMF Project (IEMFP) human exposure limits have been developed by the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These limits, although differing in detail, are founded on the same scientific literature base and deem that the primary hazard to be considered in setting human exposure limits is thermal. This is defined as an excessive and harmful rise in body temperature as a consequence of exposure to high-level RF/MW emissions. This viewpoint has come to dominate the debate at an international level and is justified by these organizations as a product of expert risk assessments of peer reviewed data. The thesis challenges the validity of this viewpoint by critiquing regulatory risk assessment and the peer review and

¹ <http://ro.uow.edu.au/theses/3148/>

² http://www.iemfa.org/images/pdf/The_Procrustean_Approach.pdf

advisory processes that have shaped RF/MW regulation. It will be shown that these processes have been prone to political manipulation and conflicts of interests leading to various scientific perspectives being marginalised with reluctance on the part of regulators to make decisions that might inconvenience industry interests. To substantiate these claims the thesis provides an assessment of the development of the American RF/MW standard from the 1950's and its later revisions under the IEEE, the ongoing development of guidelines and standards by ICNIRP and IEGM and RF/MW standard development in Australia. The thesis concludes with the argument that, given the sheer number of people exposed to RF/MW from telecommunications devices, there is an urgent need to reform the standard setting process and to conduct an international re-assessment of the biological limits placed on current RF/MW standards.

Link: http://www.iemfa.org/images/pdf/The_Procrustean_Approach.pdf

Point #1: Are community concerns over possible health hazards valid?

The issue of possible adverse health effects from low-level electromagnetic fields from radiofrequency and microwave (RF/MW) transmitters has been one of the most controversial environmental issues since the 1970s. There is an extensive body of research to draw upon but it is the interpretation of that research which is problematic. My primary interest in this area has been that interpretation and the very subjective nature of expert assurances of safety that form the basis of official standards/guidelines. It is my view that the current level of scientific uncertainty due to differing interpretations of the science, differing values on what should be considered in setting health based standards, and the level of conflict of interest in expert assurances of safety, call for the use of a precautionary approach when siting mobile phone base stations. Such a precautionary approach would be along the lines of the Wingspread Statement on the Precautionary Principle. To quote:

- We believe existing environmental regulations and other decisions, particularly those based on risk assessment, have failed to adequately protect human health and the environment, as well as the larger system of which humans are but a part.
- We believe there is compelling evidence that damage to humans and the worldwide environment, is of such magnitude and seriousness that new principles for conducting human activities are necessary.
- While we realize that human activities may involve hazards, people must proceed more carefully than has been the case in recent history. Corporations, government entities, organizations, communities, scientists and other individuals must adopt a precautionary approach to all human endeavors.
- Therefore it is necessary to implement the Precautionary Principle: Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."
- In this context the proponent of an activity, rather than the public bears the burden of proof.
- The process of applying the Precautionary Principle must be open, informed and democratic, and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action."³

There is a substantial body of scientific literature that reports adverse biological effects far below the limits laid out in the Australian RF standard, which are based on the

³ Wingspread Statement on the Precautionary Principle, <http://www.gdrc.org/u-gov/precaution-3.html>

ICNIRP RF Guidelines. These are limited to providing protection against high-intensity short-term RF exposures of sufficient strength to cause actual body heating. Chronic exposures to low-intensity RF that do not cause this heating effect are excluded from consideration in the standards. My thesis examines this in some detail, predominantly on reasons why this evidence has been rejected for standard setting.

Three reviews that I have found validate community concerns over possible environmental hazards far below the Australian standard are the following:

1) *Non-Thermal Effects And Mechanisms Of Interaction Between Electromagnetic Fields and Living Matter*, An ICEMS Monograph, The Ramazzini Institute, Edired by Livio Guiliani and Morando Soffritti, European Journal of Oncology, National Institute for the Study and Control of Cancer and Environmental Diseases "Bernardo Ramazzini", Bologna, Italy, 2010.

Available online at: <http://www.icems.eu/papers.htm>

2) *BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)*, Editors C Sage and D Carpenter, Contributors: Blackman, C., Blank, M., Kundi, M., Sage, C., Carpenter, D., Davanipour, Z., Gee, D., Hardell, L., Johansson, O., Lai, H., Hanson Mild, K., Sobel, E. Xu, Z., Chen, G., Sage, A. Aug. 2007.

Available online at: <http://www.bioinitiative.org>

Earlier review:

3) *Biological Effects of Electromagnetic Fields on Humans in the Frequency Range 0 to 3 GHz: research and development. Summary and results of Russian medical literature from 1960 – 1996*. Editors: Prof. Karl Hecht and Dr. Hans-Ullrich Balzer, I.S.F. Institut für Stressforschung (Institute for Stress Research) Research & Development, Berlin, Germany, 1997.

In this summary of about 1500 original papers from the Russian medical literature from 1960 to 1996, Hecht and Balzer found a number of symptoms reported by company physicians involving several thousand industrial workers from both high voltage power plants and radar installations (RF/MW). Among these symptoms were sleep disorders, exhaustion, weariness, lack of concentration, headaches, dizziness. This was apparently at power levels too low to cause heating. As a consequence the Russian RF/MW exposure standard limit was set at a level approximately 1000 times more restrictive than most Western standards. In private correspondence with Balzer he mentioned that the condition of Neurovegetative Asthenia was symptomatic of exposure to both power frequency and RF/MW fields and was often mentioned in the literature. This is essentially the Russian medical term for what we call chronic fatigue syndrome (CFS).⁴ A partial translation is available at:

http://www.reach.net/~scherer/wma/test/emfde/e/isfe_000.htm

There are many individual studies suggestive of adverse health effects from low-level RF/MW exposure, many of which were examined in the above reviews. One study however, I consider especially relevant to the situation when mobile phone towers are

⁴ Correspondence with Hans-Ullrick Balzer in relation to the Russian medical literature on EMF exposure and immune system dysfunction, characterised by the conditions Chronic Fatigue Syndrome (CFS) and Electromagnetic Hypersensitivity (EHS), July 1999.

located in residential populated areas. This is the 1995 Study on Health Effects of the Shortwave Transmitter Station of Schwarzenburg, Berne, Switzerland. Much of the following was taken from Neil Cherry's 1997 review of this study.

Background

A short wave transmitter was installed at Schwarzenburg, near Berne, Switzerland, in 1939. A star antenna was added in 1954 with three 150 kW outputs (6.1-21.8Mhz). and a 250 kW LOG PER antenna was added in 1971. The final transmitter is only used occasionally.

Since the Seventies, health complaints had been reported by the population in the surroundings of the transmitter, and associated with its activity. On the 2nd March 1990, a petition seeking a scientific evaluation of the health damage allegedly cause by the transmitter was handed by a group of inhabitants to the Swiss Federal Department of Traffic and Energy (SFDTE). In October 1990, the Head of SFDTE commissioned a study. It was carried out by 15 doctors and scientists, primarily from the University of Berne, but also from 4 other agencies. Their report, Altpeter et al. (1995), was published in August 1995.

Altpeter et al. (1995) carried out an extensive evaluation of health affects, using a carefully crafted health diary survey. They found significant changes in various indicators which increased with proximity to the mast and were significantly worse in elderly people. They included nervousity (restlessness), difficulty in falling asleep, difficulty in maintaining sleep, general weakness and joint pains. In the summarized results concerning people living near the transmitter, aged over 45 the following was found:

- 55% suffered from disturbed sleep.
- 35% suffered from full insomnia.
- 40% complained of joint pains.
- 30% complained of limb pain.

Sleep difficulty was especially disturbing. This leads on to increasing fatigue and reduced feelings of well-being. Observed nocturnal sleep changes occurred in association with the nocturnal exposure levels. Hence the sleep disturbance is associated with a maximum exposure of 1.85uW/cm² and a mean nocturnal Zone A exposure of less than 0.7 uW/cm².

People living in a mean RF exposure of 3.8 uW/cm², which was about 100 times higher than an unexposed group, had a significantly elevated level of restlessness, sleep disruption, aches and pains and phlegm problems, all problems which were significantly worse for those aged over 45 years.

There was a clear trend for those over 45 years to show more significant reactions in association with increased shortwave RF exposure from the Schwarzenburg mast.

The variables "Nervosity and inner restlessness", "General weakness and tiredness" and "Difficulties in falling asleep" were strongly related and therefore collapsed into one variable, which could be termed "Chronic Fatigue Syndrome".

This study revealed a statistically significant association between an extremely low intensity RF field (Zone A (High intensity) average = 0.236 uW/cm²) and a wide range of health and well-being variables. While this did not constitute "proof" of effects, in

public health epidemiology, a statistically significant association which is not weakened by confounders, is sufficient for avoidance action to be taken to reduce or eliminate the risk. Hypochondria was tested for and was not found.

Interim Conclusion:

"Insomnias and joint pains, especially in the elderly, were more frequently reported in Zone A than in Zones B and C. They showed a dose-response relationship with the logistic regression and they were not related to a health-worry personality. Further studies are of need to establish a biophysical mechanism.

The Schwarzenburg Study was extended because of the significance of the initial findings. Melatonin secretion in people and cows was studied in relation to the sleep disorders identified, blood pressure was studied in relation to the health issues raised and the performance of school children was assessed in relation to brain disturbance indication such as difficulty in concentrating.

Sleep disturbance and melatonin:

Sleep difficulty was especially disturbing. Significance was added to the association when the transmitter was turned off unexpectedly and unknown to the residents, in the middle of the study. Affected sleep patterns recovered until the transmitter was turned on again, when they deteriorated again.

Melatonin, a neurohormone produced by the pineal gland to regulate the daily sleep/wake pattern was studied in a sample of people, without finding significant changes. However, saliva melatonin concentrations from exposed cows showed a strong higher nightly peak level compared to the average when nightly peak which the transmissions were on. The overall median melatonin levels for the five tested exposed cows was 17.7 pg/ml (sd=1.25) while it was 19.0 pg/ml (sd=1.32) for the non-exposed ones. This exposed cows had lower melatonin levels but not necessarily significantly lower.

Lower levels of melatonin with exposure to RF radiation would be consistent with depressed nocturnal melatonin observed with ELF exposure, Reiter (1992). In other studies reduced melatonin has also been related to elevated incidence of breast cancer, Demers et al. 1 (1991).

Blood Pressure Reporting:

A small number of inhabitants reported noticeable changes in heart beat (irregular, palpitations, pounding with effort). Individually these factors were not significant but they indicate a possible, more serious, health issue to do with stresses on the heart. The researchers therefore surveyed for blood pressure differences. When asked about their blood pressure only 55% in Zone Z and 56% in Zone B said they had normal blood pressure compared to 74% in Zone Z. The differences are significant at the $p=0.01$ level. In addition, arterial hypertension was reported more frequently in Zone A (14%) than in Zones B (8.4%) and C (7.9%).

School children's performance:

Rates of promotion of children in a school near the transmitter were compared with unexposed schools nearby. The number of school children at the highly exposed school is too small for conclusive studies of a probable effect of electromagnetic fields. However, the accumulated promotion from primary to secondary school since the

1950s, was lower in the exposed school than a control school. They concluded: "An effect of the transmitter is a possible explanation, but other influences including socio-economic differences cannot be excluded".

Hence a potential effect on children's performance does exist in association with the RF transmissions from the tower. This is consistent with human brain EEG disruption found by Von Klitzing (1995) and the reported symptom of "difficulty in concentration". "restlessness" and "difficulty of falling asleep" and "maintaining sleep", as reported by significantly more of the adults in Zone A compared to Zones B and C.

Conclusions of the Schwarzenburg study:

This is a very significant study which records statistically significant associations, with dose-response relationships for many of the factors, factors which are fundamental to human health and well-being, which have adverse effects in association with increased RF shortwave radiation at mean and median exposure levels about 1000 times lower than the so-called "public safety standard". This proves the total inadequacy of the standard for protecting the public from the significant disruption to their health and well-being identified in this study. The authors of the Schwarzenburg Study concluded:

"Our results indicate a higher frequency of disorders of a neurovegetative nature among residents up to about 1000 m from the transmitter, and are highly suggestive of a direct effect of the radio shortwave transmitter on sleep quality".⁵

In a letter to the New York based publication *Microwave News*, Dr. Josef Mayr, a Swiss consultant in electromagnetic compatibility, pointed out that that the actual risks may have been understated in this study. His letter stated, in part:

"The objective of the study was to find possible relationships between RF/MW exposures and health problems - not between living in certain zones and health problems. Why then did the researchers present nearly all the results in terms of the geographic zones? Given such misclassification of exposures, much stronger correlations between RF/MW radiation and health problems - for example, irritability, headaches, tiredness and sleep problems - would have to be expected, if the study population had been classified according to field strengths rather than geographic zones."⁶

In May 1996, an expert group at the Swiss Federal Office for Environment, Forests and Landscape (SAEFL) admitted that severe sleep disorders were correlated with RF/MW exposures, at RF/MW exposures below the thermally based RF/MW limits.⁷

An important lesson that can be taken from the Schwarzenburg study is that RF/MW standards based solely on acute thermal effects are inadequate for real-world situations where people are chronically exposed to RF/MW transmitting tower emissions. Sleep disorders and the other complaints under chronic conditions (years) can turn into serious long-term diseases. To ignore this possibility is a bad public health policy.

Another paper of relevance is one by Khurana, *et al.*: 'Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations', published in the *International Journal of*

⁵ Cherry N, Swiss shortwave transmitter study sounds warning, *Electromagnetics Forum*, Vol.1, No.2 Article 10, 1997, http://www.emfacts.com/forum/issue2/mag_9.html

⁶ Slesin L, Swiss Study Underestimated Shortwave Radiation Risks; IRPA/ICNIRP's RF/MW Health Standard Should Be Stricter, *Microwave News*, Vol. 16, No. 5, p. 14, Sept/Oct 1996.

⁷ *Ibid.*

Occupational Environmental Health in 2010. The abstract states:

Human populations are increasingly exposed to microwave/radiofrequency (RF) emissions from wire- less communication technology, including mobile phones and their base stations. By searching PubMed, we identified a total of 10 epidemiological studies that assessed for putative health effects of mobile phone base stations. Seven of these studies explored the asso- ciation between base station proximity and neurobe- havioral effects and three investigated cancer. We found that eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances < 500 meters from base stations. None of the studies reported expo- sure above accepted international guidelines, suggest- ing that current guidelines may be inadequate in pro- tecting the health of human populations. We believe that comprehensive epidemiological studies of long- term mobile phone base station exposure are urgently required to more definitively understand its health impact.⁸

Point #2: Does the Australian RF/MW exposure standard provide protection?

It is deceptive when claims are made that a particular mobile phone tower is safe because the emission levels are far below the current Australian RF/MW Standard⁹. The Standard does partially admit that the limit values are only designed to provide health protection against immediate biological damage (heating) from very high level (acute) exposures but avoids addressing possible adverse effects arising from prolonged exposure to environmental level RF/MW. For example, ARPANSA states the following:

At typical levels, mobile phone base station emissions are hundreds of times below the general public exposure limit of around 4.5 watts per square metre (frequency dependent) as set out in the ARPANSA standard or around 5000 times below the level where significant heating can occur.¹⁰

Whenever, community concerns are raised about a particular tower it is not concerns over being cooked – compliance with the Standard protects against this. What they are concerned about, however, is the possibility of adverse effects from prolonged exposure over months or years. The Standard is unable to address this possibility and as I have often written, this calls for a precautionary approach.

There have even been claims made that the Australian standard provides protection for everyone, young and old, 24 hours a day, 7 days a week, For example in a 2004 “information pack” produced by The federal government and ARPANSA the extraordinary statement was made:

The EME safety limits [Australian RF/MW standard] provides protection for people of all ages and health conditions (including children) whether they're exposed to EME irregularly, or for 24 hours a day, 7 days a week.¹¹

⁸ V. Khurama, et.al., ‘Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations’, *International Journal of Occupational Environmental Health*, Vol. 16, pp. 263–267, 2010

⁹ Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 Ghz (2002).

¹⁰ Fact Sheet, EME Series NO.1, Electromagnetic energy and its effects, <http://www.arpansa.gov.au/pubs/eme/fact1.pdf>

¹¹ *Mobile Phone Towers and EME” Information for Communities and Councils*, produced with assistance from the Australian Communications Authority (ACA) [now the Australian Communications and Media Authority (ACMA)] and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), 2004.

What the 2004 info pack failed to say however was that this supposed protection was only for immediate harm from heating and NOT possible biological damage as a consequence of prolonged exposure to environmental level RF/MW at power levels that do not cause a heating effect. In effect, the only assurance of safety that the Australian RF/MW standard can give is that as long as a tower complies it will not heat anybody up! A detailed analysis of the development and limitations of the Australian RF/MW exposure standard is in Chapter Five of my thesis. As for claims that the standard contains a precautionary policy that is only in reference to thermal effects resulting from high-intensity short-term exposures.

Concluding thoughts

Considering the continuing controversy over the possible health effects of mobile phone towers [if sited in sensitive areas still to be determined] and inadequacies in the Australian RF standard, it is my opinion that a precautionary approach is warranted. This would be one where the local community is given more rights of consultation in line with the recommendations in the Enhancing Community Consultation Bill, which I wholeheartedly support.

Sincerely

Don Maisch PhD