ARPANSA Radiation Protection Standard Maximum Exposure Levels to Radiofrequency Fields - 3kHz to 300 GHz Standard and selected Fact Sheet quotations (key points) along with my concerns.

"The possibility of carcinogenic effects of exposure to RF fields has received considerable attention in the last 20 years. Studies have examined the possibility that RF energy may cause DNA damage or influence tumour promotion. The balance of evidence suggests that exposure to RF fields is not mutagenic and therefore unlikely to act as an initiator or promoter of carcinogenesis (IEGMP 2000)."

This is at odds with research performed before and after these standards were published. I would suggest that ARPANSA personnel who are responsible for investigating research papers to take a look at this website http://www.powerwatch.org.uk/ which has categorised a large number research articles on Radio Frequencies effects or lack thereof based on the research findings. Some people have gone further to analyse RF studies to determine whether the researchers were independent or funded by the industry. A very interesting picture developed and should be taken into consideration when forming any position on RF safety and the relevance of our current standards. Collusion between the industry and researches are noted with manipulation of data to support a "no effect". Refer to the included article from Microwave News ""Radiation Research" and The Cult of Negative Results"

There are plenty of research papers dating back 70 years showing biological effects with some showing health implications. There is evidence that research showing positive effects with potentially significant biological implications are being swept under the carpet and proponents of microwaves lobbying to have funds cut to stop research. [1] [2]

Other examples of collusion include the recent Interphone study where crucial annexures were not included in the initial report released to the public, where a statement was made to the effect that there was no observable increase in cancers with respect to mobile phone usage which is misleading and incorrect. Where the EPA (US) was going to release a report (Jun 1990) that suggested RF be categorised as a Class B-1 probable carcinogen but was stopped by Agency officials who overruled this assessment, but they still allowed that EMFs were a "possible, but not proven, cause of cancer in humans". [2]
Also take a look at this article [1] in New Scientist where a group at Brooks Air Force Base (AFB) was tasked with reassuring residents when the Air Force wanted to install radar (microwaves) in their neighbourhood. To meet that responsibility, the Brooks group hired contractors to write Environmental Impact Statements to justify the placing of the radars—an obvious conflict of interest. Even worse, when a scientist did publish findings that might indicate a risk, Brooks selected other contractors to do experiments that suggested the scientist's research was invalid or not relevant to the safety of Air Force radar.
If I had the time and energy I am sure I could fill pages with examples of documented interference by the industry (like Motorola, DoD etc.)

DNA Damage how can this occur?

All Scientist agree that the energy levels of microwaves are far too low to break hydrogen bonds directly and certainly incapable of breaking covalent bonds found in DNA so theoretically we should never see DNA breaks. The problem is we do and this has been verified many times using a single Cell Gel Electrophoresis assay (also known as *comet assay*) even at levels of emissions typically found from mobile phones. Singh et al. Cells exposed to mobile phone microwaves over 2-3 hours show both single stranded and double stranded breaks. How is this possible? Some Scientists are suggesting that Microwaves cause an elevation of reactive oxygen species (ROS) which is both reactive and noted for its capability to damage biological molecules.

"*The mechanism by which microwaves induce DNA damage is still unclear. As is well known, ROS are reactive and readily damage biological molecules, including DNA. ROS are generated as a by-product of normal mitochondrial activity in aerobic cells. The overproduction of ROS reportedly causes severe damage to cellular macromolecules, especially the DNA. Stopczyk et al. found that oxidative stress after exposure to microwaves may be the reason for many adverse changes in cells. The study of Moustafa et al. indicated that acute exposure to the radiofrequency fields of commercially available cellular phones may modulate the oxidative stress of free radicals by enhancing lipid peroxidation and reducing the activation of SOD and GSH-Px, which are free radical scavengers. Balci et al. reported that mobile phone radiation leads to oxidative stress in corneal and lens tissues. We also detected elevated intracellular ROS levels of hLECs after mobile phone radiation at the SAR of 3 W/kg and 4 W/kg. We speculate that the surplus ROS produced by microwaves disturbs the balance between the oxidation and reduction systems, leading to DNA damage indirectly. The DNA lesions caused by ROS include oxidized bases, sugar lesions, abasic sites, DNA–protein cross-links, SSBs, and DSBs. In addition, the oxidation of proteins and lipids may also generate intermediates that attack DNA.*

These bioeffects of microwave radiation may be attributed to nonthermal mechanisms" [3]

As one can see from the research above, the pathway suggested is most likely biological and something I doubt Physicists and Electrical Engineers, who are the ones who have a lot of sway on RF Standards, have the necessary qualifications to argue against.

Motorola Funded Counter Research on Microwave DNA Damage

Dr Henry Lai and Dr Narendra Singh used a DNA Comet Assay developed by Dr Singh to determine the microwaves damaged DNA-strands. They found that nonthermal microwave exposures significantly caused single and double DNA stranded breakage in living mice brains. The cell phone company Motorola wanted to prove that these studies were wrong and that microwaves and cell phone radiation do not cause DNA strand breakage. They funded Dr Roti at Washington University, St Louis to replicate the Lai and Singh studies to try to show that they do not produce these effects. Dr Roti used a different, much less sensitive assessment method and used a cell-line not living mice. Hence it is not a replicate study. They claimed not to show any DNA strand breakage from radiation exposures. The analysis of their own published data shows that they actually did show that microwaves and cellphone non-thermal radiation significantly damages DNA strands and enhances significant repair rates in human cells. [4]

"Although there is some data indicating that biological effects could occur in various species at exposure levels marginally below the ICNIRP Guidelines, none of the data could be used to establish that exposure within the ICNIRP Guidelines would lead to an adverse health effect in humans."

This is at odds with what recent research has found particularly with respect to the Bioinitiative Report and what independent analysis of more than a 1300 research papers have found (refer to http://www.powerwatch.org.uk/). In fact a number of reports suggest that effects that can lead to adverse health effects can occur 100's to 1000's times lower than the recommended reference levels advised by ARPANSA and the ICNIRP guidelines as opposed to the "marginally below" comment specified above.

"There is insufficient data to establish that adverse health effects would result from low-level exposures, although it cannot be unequivocally stated that such effects do not exist."

"The current scientific evidence clearly indicates that there are RF exposure thresholds for the adverse health effects of heating, electro-stimulation and auditory response. The basic restrictions of this Standard are derived from these thresholds and include safety margins."

I would **not** consider 14 year old guidelines on which our 10 year old standards were developed are based on current scientific evidence. Our standards are woefully out of date and in urgent need of complete overhaul and revision. I would even go so far as to say they are irrelevant when it comes to providing long term health assurances (Local Government is using ARPANSA RF standards to claim devices are safe). An urgent review is required that not only considers latest research findings but must adequately deal with recognised non thermal effects which currently are mentioned as a possibility but not fully considered. It is time for ARPANSA to get off the fence and take action. There needs to be formal recognition by your organisation and the Government about the possibility if real dangers posed by non-ionising radiation (not limited to thermal effects) like our more enlightened friends in the European Union, please refer to European Council documents that I included with this letter i.e. document 12608 and Resolution 1815.

"There is some debate as to whether RF causes any effects below the threshold of exposure capable of causing heating and electro-stimulation, and in particular whether any effects occur at or below the exposure levels of the limits. If any low level RF effects occur, they are unable to be reliably detected by modern scientific methods, but a degree of uncertainty remains. The data of long term exposure is limited. It was considered that the evidence for possible low-level effects is so weak and inconsistent, that it does not provide a reason to alter the level of the limits. The limits specified in this Standard are designed to protect against known health effects and may not prevent possible or unknown low-level effects, although the safety margin within the limit may provide some protection against such low-level effects."

"The scientific literature has on many occasions considered the possibility that RF could cause adverse effects by mechanisms other than electrostimulation or heating, including possible effects on cell membranes, and also by other unknown mechanisms. The existence of this literature is acknowledged and has been reviewed, however data from it is unsuitable for use in standards setting."

Why was the data considered to be unsuitable? Is it because adequate exposure information is often lacking? We continue to focus only on the heat effects because thermal effects of microwaves are known and demonstrable. Non thermal effects although known cannot be fully explained adequately by scientists and I assume making it difficult to work out a level of emission that can afford personal and environmental safety. The side effect of this oversight of not including latest non thermal research in developing our RF standards is that the health and wellbeing of the current and future generations is being held hostage to poor science and closed minded attitudes. It is only when our health system becomes overburdened and the costs of supporting those who are suffering becomes unbearable will people begin to act. This same paradigm was witnessed some 20 – 30 years ago when researchers were trying to determine whether smoking cigarettes were carcinogenic. It is a terrible tragedy in the making where the wealth of corporations appears to be being placed ahead of the health and wellbeing of the general public.

"However, it is reasonable to hypothesise that any effects of unknown mechanism would be related to energy transfer by the mechanisms of absorption which are understood and quantifiable and for which this standard provides limits.

Therefore, the only residual concern is the possibility of effects of an unknown mechanism occurring at levels below the thresholds for electrostimulation or SAR heating, which might not therefore be afforded the same factor of protection as those intended by the standard in respect of the established mechanisms of tissue interaction. However, it is considered that the large safety factors which are applied, together with the absence of any confirmation of any other low-level mechanisms provide support for the ICNIRP basic restrictions giving adequate protection against any established or conceivable hazard."

How can you assure the public that the basic restrictions provide adequate protection when people such as myself are suffering due to exposure levels 1000's of times below the ICNIRP guidelines, that scientists have demonstrated through epidemiological and in-vitro studies that biological effects do occur below reference levels and include genotoxic events? I am not alone in claiming that I am affected by microwave radio frequencies. There are more and more people around the world who are showing symptoms of microwave sickness yet nothing is being done about it. The WHO describes all the non-specific symptoms with great accuracy then goes on to say that that there is no evidence that it is related to exposure to EMF which is most bizarre! Unfortunately EHS suffers are a misunderstood minority that are made to suffer in silence or face ridicule when they announce their plight to their associates and members of the local public including local doctors and government representatives.

Epidemiological Studies

"The epidemiological evidence does not give clear or consistent results which indicate a causal role of RF field exposures in connection with any human disease. On the other hand, the results cannot establish the absence of any hazard, other than to indicate that for some situations any undetected health effects must be small."

There are plenty of research papers showing effects that are repeatable which also include epidemiological evidence. The wireless industry is behaving very much the same way as the cigarette manufacturing industry by interfering with research, encouraging industry sponsored "no effect" results to be published and threatening researchers or cutting funding for those that show an effect. It appears that the industry naively believes that if a large number of research papers show inconclusive results are seeded into the research result pool that this should "balance" those showing effects resulting in confounding evidence. I am sure you are well acquainted with Don Maisch Phd who has written quite extensively on conflicts of interest between the wireless industry and Domestic and International RF standards bodies. Refer to his dissertation "The Procrustean Approach" and A Machiavellian Spin: Political and corporate involvement with cell phone research in Australia, Sept. 2010. [5]

"Cancer is the disease that has been studied most extensively, and although there are many individual associations seen, there is little overall consistency in the results. None of these studies give good information on individual levels of exposure. The studies of general populations living near radio or television transmitters relate to radiofrequency exposures likely to be well below currently accepted standards."

A number of RF studies have found that microwaves appear to be capable of causing breaks to double stranded DNA and include levels of exposure. If this is true then one can assume with some confidence that such actions would be random and could lead to many forms of disease states and not limited to a specific type. This could explain why we are seeing year on year increases in several types of cancers (leukaemia, breast and prostate cancer etc.) as RF exposure is not just limited to the head. Whole body exposure occurs daily due to Mobile Phone towers, Wireless networks both at home and public places, DECT phone base stations and more recently, smart meters being installed in every home.

It is also important to take into consideration that the Human body/cells have natural DNA repair mechanisms. This could explain why we do not see statistically significant increased detrimental health effects immediately or in the short term when people are exposed to RF. However people who face various chronic health issues will likely find their susceptibility to be more pronounced and the effects more acute as is my case. The effects of radiation damage both ionising and non-ionising is accumulative. All these parts of the puzzle when looked at holistically begin to create an alarming picture. But when selective vision is applied the picture remains conveniently vague. We are already starting to see the ravages of being exposed continuously to MW radiation with the Danish Cancer Society recently reporting that the number of men diagnosed with glioblastoma —the most malignant type of brain cancer— has nearly doubled over the last ten years [6] and figures from ONS show 50 per cent increase in brain tumours since 1999 in the UK [7]. Dr Annie Sasco, from the Epidemiology for Cancer Prevention unit at Bordeaux Segalen University highlighted at recent conference in the UK that there has been a one to two per cent annual increase in brain cancers seen in children [8]. We cannot afford to wait until there is significant number of cases because it can affect the present and future generations. Precautionary action needs to be taken now!

It is most unfortunate that ARPANSA does not measure and keep historical records of how the levels of human engineered EMF in the environment is ever increasing otherwise we could do some holistic analysis using pattern matching techniques that look at the correlation between the increasing incidences of many types of cancer such as childhood leukaemia, brain and breast cancers as well as mental issues such as autism and Alzheimer's with the level of manmade RF permeating the environment. All of these disease states have been attributed by different scientists to RF emissions.

Some real facts below:

Prevalence of Brain tumours

"Prevalence of primary brain tumours is estimated at 221.8 per 100,000 people in 2010, compared with 209 per 100,000 in 2004.1 In 2012, an estimated 66,290 new primary brain tumour diagnoses will be made in the U.S., 24,300 malignant and 41,980 nonmalignant."

http://www.braintumor.org/news/press-kit/brain-tumor-facts.html

"Brain cancer is the leading cause of cancer death in people aged 0-39 years with an average of 120 deaths per year.

Each year about 1400 cases of malignant brain cancer are diagnosed in Australia and about 1100 people die from the disease each year.

This year it's estimated* that about 1600 people will be diagnosed with brain cancer and 1300 people will die from the disease in Australia."

http://www.cancercouncil.com.au/30904/news-media/latest-news-news-media/media-releases-news-room-news-media/brain-cancer-is-leading-cause-of-cancer-death-in-young-people/?pp=30904

"The incidence of breast cancer in Australia is increasing: the number of new cases of breast cancer diagnosed in women has increased from 5,310 in 1982 to 13,567 in 20081"

http://canceraustralia.gov.au/affected-cancer/cancer-types/breast-cancer/breast-cancer-statistics

"Incidence rates for prostate cancer have increased in recent years, from 79.7 cases per 100,000 men in 1982 to 189.5 cases per 100,000 men in 2008". Men carry their mobile phones in trouser pockets or on their belts. When connected to blue tooth, emissions are much higher than when in standby mode.

http://canceraustralia.gov.au/affected-cancer/cancer-types/prostate-cancer/prostate-cancer-statistics

Autism statistics

- 1 percent of the population of children in the U.S. ages 3-17 have an autism spectrum disorder
- Prevalence is estimated at 1 in 88 births
- 1 to 1.5 million Americans live with an autism spectrum disorder
- Fastest-growing developmental disability; 1,148% growth rate
- 10 - 17 % annual growth
- $60 billion annual cost

http://www.autism-society.org/about-autism/facts-and-statistics.html

How do we account for these increases? Selecting microwaves as being the only culprit for all of the above would be naïve at best but certainly it cannot be rule out as being a possible contributor especially since so many of them exhibit growth rates that are similar to the rate of deployment of RF in our environment.

"The exposures to the head in users of mobile phones are considerably higher, and although experimental evidence shows no evidence of carcinogenic mechanisms or clearly abnormal cellular effects, recent research raises the possibility of biological or psychological effects. These experimental results are unconfirmed and inconsistent, and where effects have been shown their importance in terms of health is unclear; however the possibility of a detrimental effect is difficult to dismiss completely. Epidemiological studies concerning mobile phone users are proceeding, particularly in regard to tumours of the central nervous system."

Who wrote this particular section? Did they by any chance have affiliations with the Mobile phone industry or the purveyors of this dangerous technology? Again there are plenty of research papers that say otherwise. It appears that the writer is trying to be suggestive that some effects may be psychological which is disingenuous to people such as myself who are clearly aware of the source of their headaches, heart palpitations, lethargy etc. It also flies in the face of what some researchers are finding and what has been clearly documented by the World Health Organisation in great detail for the description of EHS (even though they fail to recognise the cause). Regarding the comment "shows no evidence of carcinogenic mechanisms or clearly abnormal cellular effects" is clearly not correct. The recent Interphone study, despite being full of flaws, showed increases in certain types of brain cancers amongst heavy users – Heavy users at the time the study was conducted would now be classified as normal users by today's standards. More recently a study (Cardis Study), published January 2, 2012 in Occupational and Environmental Medicine (available online since June 2011), concludes that there is an increased risk of glioma (a type of brain tumour) in long-term mobile phone users with high RF exposure and a lower risk for meningioma (a tumour of the membrane surrounding the brain).[9]

"Definition (from ARPANSA RF Standards) Epidemiology is 'the study of the distribution and determinants of disease inhuman populations' (MacMahon & Pugh 1970, p.1). It is the science which studies the causes of disease in human free-living populations, in contrast to studying causal mechanisms in experimental animals or cell systems.

Very occasionally, where a particular causal agent is the only (or almost the only) cause of a specific disease and has a very clear and strong effect, a causal relationship can be established on the basis of one, or only a few, well-conducted studies; examples include occupational studies of asbestos exposure, and the studies of those affected by radiation from the atomic bombs in Japan in 1945.

Much more commonly, however, the causes of a disease are established by the cumulative evidence provided by a large number of different studies, rather than by one particular study. If an association is seen between a possible causal factor and a disease (for example, between exposure to radiofrequencies and the development of cancer) a careful evaluation of the extent and quality of the studies showing that association is necessary, before concluding that there is likely to be a cause and effect relationship, or whether the associations seen are more likely to be due to other factors.

The best possible studies to assess potential hazards are studies in which individuals are selected for a study and specific information is collected on the suspected causal factor, the disease outcome, and (most importantly) other relevant factors which could be related to the disease outcome. Studies comparing health outcomes in two or more groups with different exposures are cohort studies (for example, comparing smokers with non-smokers). Studies comparing subjects with a particular disease to an unaffected control group are case-control studies (for example, studies of lung cancer patients and unaffected persons assessing differences in past smoking). These are the methods by which most recognised causes of human cancer have been identified (such as smoking, asbestos, ionizing radiation, and so on)."

I remember many years ago that Scientists had data from analysis of smokers compared to non-smokers but at the time the evidence was said to be inconclusive with the industry muddying the waters with their own half-baked research. The same is happening today with RF research leading to organisations such as yours to claim there is "no conclusive evidence" or "further research is needed". It is also unfortunate that based on the suggested study criteria mentioned above we can never truly fulfil the requirements of case controlled studies because we are ALL exposed continuously to manmade RF frequencies every day, I discount natural EMF because it is millions of times lower that what we are living in today and it is something humans would have evolved over time to handle. It is also very unlikely that scientists will be able find areas where we have exposure levels low enough and contains a sufficient population to provide a useful sample of "control subjects". To create a controlled study, people would need to live in shielded buildings and refrain from going outside unless they are wearing protective clothing/covering at all times, which would be highly impractical. People who live in rural areas are also unlikely candidates if they have mobile phone access as distances to towers are likely to be greater resulting in phones working at maximum power for transmission.

"Usually, a large number of such studies needs to be completed before a consensus can be reached on a particular causal situation."

How many studies showing an effect are considered enough before consensus is reached? 10? 100? 1000? There is plenty of evidence from independent researchers showing that radio frequencies are genotoxic (carcinogenic). Whenever a potential cancer cluster is brought to the attention of scientists any RF sources are automatically discounted especially if they are determined to be within stated RF guidelines. Instead when the cause cannot be found (by overlooking RF as a possible contributor) it is usually then closed off as a "result of some unknown environmental factor".

In 2006, the top two floors of an RMIT building in Melbourne where a number of employees had various forms of brain tumours. A number of epidemiology studies concluded it was not a cancer cluster. "The diversity of tumour types indicates that there is no single cause. There is, therefore, no evidence for a work-related brain cancer or other cancer cluster on levels 16 and 17". I find this quite disturbing considering that RF which has shown to cause DNA breaks would occur in a random fashion and thereby could be used to explain the cause of this phenomenon. Obviously if researchers restrict their criteria to existing RF standards that do not consider non thermal effects, ignore the possibility that DNA breaks may be caused through biological pathways rather than direct interactions and only looks at short term exposures, it is easily seen how the original conclusion was made. There appears to be a general reluctance to admit that RF could be the potential cause because the implications would be enormous and a 4 trillion$ industry (global) having an uncertain future.

"Cluster studies should be regarded as raising a hypothesis, which can then be tested in further studies."

Why? If we find clusters of cancers around transmission towers that are at level not seen in the general population who are not located near towers doesn't this provide some credibility? A number of studies have been performed that do show a rise in the incidence of cancers around transmissions towers yet I do not see this mentioned in any of your fact sheets or mentioned in the standards. Again I ask the question. How many studies need to be done showing a link before your organisation will consider that the evidence is sufficient to recognise there is a real and significant danger posed?

* Radio/TV towers (Michelozzi 2002, Cherry 2000, Dolk 1997, Hocking 1996),
* Mobile phone base stations (Eger 2004, Wolf and Wolf 2004)
* Electricity towers (Ahlbom et al, 2000, Greenland et al, 2000, Michael Kundi)

"**Biological Plausibility:**

Cancer is biologically plausible if the disease agent is genotoxic. RF/MW radiation significantly enhances chromosome aberrations in many studies (14-32). Four of these studies show dose response relationships (20, 21, 26, 30), and seven show significant micronuclei formation (18, 20, 21, 23, 26, 30, 32). Nine studies from five independent laboratories show direct DNA strand breakage (34-42). One of these studies shows a dose-response (35) and another shows an extremely significant DNA strand breakage, $p<0.0001$, at a very low exposure level, 0.0024 W/kg, (40). Two of the DNA studies (38, 39) claim that their data does not show that RF/MW radiation produces DNA-strand breakage. However, their data shows significant DNA breakage followed by significantly enhanced DNA repair. There is highly substantial evidence that RF/MW is genotoxic and is therefore carcinogenic."[10]

The example studies provided in the standards are too short term to discover significant effects. Also note that number of mobile towers and handsets in the 90's is significantly lower than what has been deployed today. People often move houses so this can also create uncertainty should tumours be found later in people who originally lived near a tower and then moved to a location where there towers are not in close vicinity. Cancers can take 20+ years to materialise.

The levels of RF in the environment are unprecedented especially with the ever increasing complexity of the modulated frequencies that carry the information we transmit on our cell phones, smart phones and wi-fi systems. These EMFs are largely untested with respects to their effects on human beings. We live in bizarre and irrational regulatory world where controlled medical tests of EMR on humans are unacceptable but uncontrolled exposure is accepted and unregulated.

Research into RF Bio-Effects at Low Levels of Exposure

"A further and more vexing question is whether there may exist a form of RF energy absorption that may not manifest itself in a measurable increase in tissue temperature, but could nevertheless be linked to bio-effects. These have been termed athermal or non-thermal effects, but since there is still the possibility of these being due to a local thermal mechanism, the term 'low-level effects' is preferred. These reported effects could be due to a) a differential uptake of RF energy by specific cell types or cellular components; b) non-uniformities in energy absorption patterns within an exposure system; c) a resonant absorption mechanism which is non-thermal in nature; d) experimental artefact or statistical anomaly. Whether the mechanism is actually thermal or not, or whether these reported bio-effects are real or artefactual, those effects suggesting statistically significant biological interactions at SAR levels well below 1 W/kg need to be replicated satisfactorily, particularly if they are suggestive of harm, before they can form the basis of standard setting.

Whilst these low-level effects have not been established, they cannot be ruled out and so more research is needed."

The Standards in several places provide examples where some health impacts were noted but in nearly all cases were indifferently brushed aside by saying more studies are needed. How many studies are needed before there is consensus? Who is doing these studies? ARPANSA? It appears the RF standards are trying to show balance by presenting both what appears to be evidence of health risks as well as confounding arguments. But ultimately the impression given is one of reluctance to accept that people's health could be impacted or that the standards may not be sufficient.

Unanswered Questions

"There are a number of issues that still need to be clarified in terms of their possible implications for health and welfare. Although the overwhelming majority of studies in experimental animals have failed to show a link between RF exposure and cancer, the repeat of the study by Repacholi et al. (1997) showing an excess lymphoma rate in genetically engineered mice, (referred to as the 'Adelaide Study') is awaited with interest."

I assume Repacholi mentioned above is referring to Michael Repacholi who was once head of the EMF project at the WHO? Do a Google on Michael Repacholi and one finds evidence of conflict of interests with ties to the industry. Does ARPANSA take consideration of sources of funding and potential conflicts of interest and potential industry interference when it reviews candidate studies?

"Michael Repacholi Former head of WHO's EMF project and ICNIRP chairman. Just months after leaving his post as the head of the EMF project at the World Health Organization (WHO), Mike Repacholi is now in business as an industry consultant. The Connecticut Light and Power Co., a subsidiary of Northeast Utilities, and the United Illuminating Co. have hired Repacholi to help steer the Connecticut Siting Council away from a strict EMF exposure standard. Repacholi was often accused of favouring the mobile phone and electric utility industries at the expense of public health.

Others see Repacholi's consulting work as the closing of a circle. Industry provided financial support for the EMF project and Repacholi is now using the materials he prepared at the WHO with industry money to support their policy positions." [11]

"Alterations in blood-brain barrier permeability could lead to inappropriate exposure of neural tissue to blood-borne pathogens, thus it is important to discover whether this alteration is a consequence of tissue heating at SAR levels above the basic restrictions. Similarly, changes in gene expression may also be a consequence of thermal effects, but it is important to continue to refine methods for determining local SAR and to evaluate whether any changes have any serious health implications. Neuropsychological and neurophysiological testing may suggest that altered human responsiveness may result from RF levels just below the basic restrictions, but it remains to be unambiguously demonstrated that this is the case, and that any alterations would have serious implications in terms of well-being. "

My headaches, insomnia, chest pain, digestive disturbances are occurring well below (more than a 1000 times) your basic restrictions. I am a statistical anomaly that is upsetting the apple cart so to speak. I am also not the only one. What is ARPANSA going to do to address this issue? We are not going to go away and it is likely that our numbers will increase as has been predicted by a number of scientists. Some have suggested up to 50% in the next 50 years will be suffering from EHS. [12].

Swedish neuro-oncologist Leif Salford and team have exposed thousands of laboratory rats to microwave radiation from mobile phones since the late 1990's. Their results have been consistent and alarming: not only does radiation from a cell phone damage the blood-brain barrier, but it does so at even when the exposure level is reduced a thousandfold. Even more disturbingly, and contrary to what was expected, the damage to the blood-brain barrier worsened when the experimenters reduced the exposure level. This implies that SAR ratings for cell phones may be worthless and that it may not be possible to make cell phones safer by reducing their power. [13]

"In summary, it would appear that although non-thermal effects or mechanisms cannot be ruled out, the evidence for them is inconsistent and further confirmatory studies need to be carried out, particularly in relation to SAR estimations."

So it is acknowledged that non thermal effects may exist and cannot be ruled out yet the Standards do not consider them or provide protection against them. That we need to wait until more research is done, this is a problem in itself because most of the research appears to be sponsored by the Industry with little commitment by the government to provide funds for independent research. To me it appears our priorities are completely misplaced. Rather than taking a precautionary approach and limiting the deployment of RF in our environment we are encouraging the proliferation of wireless devices and will only stop if the evidence comes in showing conclusively and repetitively that it is harmful. It is shameful that we place more emphasis on protecting revenues of the purveyors of this technology rather than the health and wellbeing of the general public.

A Public Health Precautionary Approach to RF Fields

"The limits are designed to prevent established health effects of heating, electro-stimulation and auditory response, and are set at a level that includes a safety margin."

Yet there is mounting evidence that people are actually suffering from tinnitus (ringing in the ears) since the installation of smart meters on or near their homes. Smart meter RF emissions are described by the DPI as being lower than mobile phones, baby monitors etc. and that the maximum RF EMF Power Density levels were well below the ARPANSA General Public Limit, even when the meter was forced to transmit continuously (100% Duty Cycle) so how do you explain these claims of tinnitus? I am also feeling their effects and it isn't pleasant especially when my sleep is continually being disturbed and I am waking up with severe headaches. As I stated in my letter, I am sensitive to all the devices listed above and I consider them to be all dangerous despite them also being well below the ARPANSA General Public Limit.

"An annex of the Standard discusses a public health precautionary approach to RF fields."

Unfortunately it appears to be a discussion offering several views from 3rd parties without making a firm commitment to implementing one.

“In the public health field there is a movement to adopt precautionary (sometimes called cautionary) approaches for management of health risks in areas of scientific uncertainty. The philosophy of the precautionary approach is that ‘where there are reasonable grounds for concern about a risk and there is uncertainty, decision makers should be cautious’.

Since the concept of the precautionary approach was first developed there has been considerable controversy as to what the precautionary approach actually consists of, what triggers it and how it is to be applied. Over time the concepts have been refined, the issues and elements have become clearer, and as a more structured formulation, the term precautionary principle has been used.

One example where the precautionary principle was enshrined was at the Rio Conference on the Environment and Development 1992, during which the Rio Declaration was adopted, whose principle 15 states that: ‘in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation’ (United Nations General Assembly 1992).

On 2 February 2000, the European Commission approved an important communication on the precautionary principle providing guidelines for its application (Commission of the European Communities 2000). The EC document indicated that even though scientific data may be limited, there needs to be as complete assessment as possible of the risk. Judging what is an acceptable element of risk for society is a political responsibility. The concerns of the public have to be considered and the decision making process should be transparent and involve all interested parties. To trigger the precautionary principle there needs to be reasonable grounds for concern about a possible hazard.

That document indicated that where action is deemed necessary, measures based on the precautionary principle should be:

- proportional to the chosen level of protection,
- non-discriminatory in their application,
- consistent with similar measures already taken in equivalent areas in which all scientific data are available,
- based on examination of potential benefits and costs of action or lack of action (not just economic costs),
- subject to review in the light of new scientific evidence,
- capable of assigning responsibility for producing scientific evidence for a more comprehensive risk assessment.

Those guidelines could be applied to a variety of situations of varying risk.”

When is ARPANSA going to take a stand on this issue and recommend a precautionary approach to the Government? To date it appears that the application of a precautionary approach as advised by ARPANSA verbiage “could be applied” is very noncommittal. It appears that by making such a statement your department is giving flexibility of whether to apply such a principle to the Government which has more often not been shown to be inept when it comes to making correct decisions that are in the best interest of the public. Politicians should be guided by good science and not those with vested (commercial) interests.

“This is not a simple matter – there are costs involved in adopting precautions and the science does not at all establish even indicative parameters on which a precautionary approach might be based. In relation to the general public, the Standard, nevertheless, states the principle of minimising, as appropriate, radiofrequency exposure which is unnecessary or incidental to achievement of service objectives or process requirements, provided this can be readily achieved at reasonable expense. Any such precautionary measures should follow good engineering practice and relevant codes of practice.”

So this means that commercial interests of saving costs are a higher priority than public health. Instead we should be looking at adopting one of the following versions of the precautionary principle:

“if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful falls on those taking the action.” [Wikipedia].

The most important Australian court case so far, due to its exceptionally detailed consideration of the precautionary principle, is Telstra Corporation Limited v Hornsby Shire Council. The case was heard in the New South Wales Land and Environment Court under Justice CJ Preston (24 April 2006).

The Principle was summarised by reference to the NSW Protection of the Environment Administration Act 1991, which itself provides a very good definition of the principle:
"If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reasoning for postponing measures to prevent environmental degradation. In the application of the principle... decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
(ii) an assessment of risk-weighted consequence of various options".

The most significant points of Justice Preston's decision are the following findings:

- The principle and accompanying need to take precautionary measures is "triggered" when two prior conditions exist: a threat of serious or irreversible damage, and scientific uncertainty as to the extent of possible damage.
- Once both are satisfied, "a proportionate precautionary measure may be taken to avert the anticipated threat of environmental damage, but it should be proportionate."
- The threat of serious or irreversible damage should invoke consideration of five factors: the scale of threat (local, regional etc.); the perceived value of the threatened environment; whether the possible impacts are manageable; the level of public concern, and whether there is a rational or scientific basis for the concern.
- The consideration of the level of scientific uncertainty should involve factors which may include: what would constitute sufficient evidence; the level and kind of uncertainty; and the potential to reduce uncertainty.
- The principle shifts the burden of proof. If the principle applies, the burden shifts: "a decision maker must assume the threat of serious or irreversible environmental damage is... a reality [and] the burden of showing this threat... is negligible reverts to the proponent..."
- The precautionary principle invokes preventative action: "the principle permits the taking of preventative measures without having to wait until the reality and seriousness of the threat become fully known".
- "The principle should not be used to try to avoid all risks."
- The precautionary measures appropriate will depend on the combined effect of "the degree of seriousness and irreversibility of the threat and the degree of uncertainty... the more significant and uncertain the threat, the greater...the precaution required". "...measures should be adopted... proportionate to the potential threats".

I understand that in this specific court case Telstra won because the Judge had not been made aware of all of the issues. Genotoxic effects are significant and can lead to irreversible damage to our genes. These damaged genes can be passed onto future generations creating a huge burden on our health system as well as a potential degradation in the quality of life for those affected. Scientific research has shown microwaves have genotoxic effects in a number of studies which need to be taken seriously

"*101 publications are exploited which have studied genotoxicity of radiofrequency electromagnetic fields (RF-EMF) in vivo and in vitro. Of these 49 report a genotoxic effect and 42 do not. In addition, 8 studies failed to detect an influence on the genetic material, but showed that RF-EMF enhanced the genotoxic action of other chemical or physical agents*.)[14].

Surely this constitutes a serious threat that warrants the adoption of the precautionary principle particularly with respect to the rollout of smart meters which puts at least 2 wireless transmitters in every home, many being located right next to main living areas and bedrooms. I guess the other question that begs to be answered is why fixed line communication was not considered, even as an alternative at the consumer's expense? I would have happily paid.

"The incorporation of arbitrary additional safety factors beyond the exposure limits of the Standard is not supported."

So there is no consideration for non-thermal effects, no consideration for sensitive people or those who have medical implants. I would say this is criminal and is likely to leave ARPANSA open to litigation when science finally catches up to what many of us already know. Particularly when ARPANSA's RF standards are used by device manufacturers, government and the deployers of said technology to say that their wireless devices are safe because emissions are within ARPANSA's stated limits.

"Further scientific research should provide data that helps reduce the degree of uncertainty about the effects of exposure to RF. Hence the Standard and Codes of Practice will need review in the light of new scientific evidence. Codes of Practice also have an important educational role, which can help reduce individual exposure, both public and occupational, to radiofrequency radiation. They do this by identifying potential areas of RF exposure, and giving advice on measures that individuals can take to reduce exposure to radiofrequency radiation."

When was the last time the Standards were reviewed? What measures can I take to protect myself from exposure to RF from mobile phone towers and smart meters? Can I expect compensation from the companies that install these towers and devices for the cost of shielding I will need to apply to my home in order to protect myself and my family? What about when I am shopping or walking in the neighbourhood? I am suffering daily from headaches, chest pain and lethargy ever since smart meters were installed in my neighbourhood. Complaining to Powercor gives me no satisfaction as they are denying any accountability. Instead they quote that their device emissions are below the stipulated RF standards and that they are mandated by the State Government to install them. I raised a complaint to the DPI and the Energy Minister and I am given the same drivel stating smart meter emissions are less than a mobile, less than a baby monitor etc. I say all of these devices are unsafe when exposed over a lifetime. Nobody listens or seems to care. I am at a loss of what I can do short of moving interstate or to some remote location to escape the daily torture that I am forced to face as I am being exposed continually to manmade RF emissions without my consent.

Below are a number of comments extracted from what your Organisation calls fact sheets. Unfortunately the facts do not actually stand up to scrutiny especially when one considers the mounting evidence that is in opposition to pretty much all that has been written in them.

From Fact Sheet 2 The ARPANSA Radiofrequency Radiation Exposure Standard
"The health implications of biological effects below limits specified in the RF Standard are not known. Accordingly, there is no established data for bio-effects below the limits that could be used for setting the levels of basic restrictions. There is an extensive worldwide research program into the possible health effects of low level RF exposure. ARPANSA will review the limits of the Standard if evidence does emerge of a causal link between low level RF exposure and adverse health effects in humans."

I would argue that there is a lot known about the biological effects microwaves have below and above the limits. There is over 70 years of research data available that accurately describes theses effects. What is unclear is the mechanism by which some of these effects occur, which creates a level of uncertainty. But rather erring on the side of caution we pander to the industry to allow them to foist their dangerous wares upon us and risk suffering the consequences in the future when it will be too late for many.

"As far as is currently known, RF radiation, for example, can only cause the molecules in biological material to vibrate and thereby generate heat."

This is nonsense and is the message that is continually delivered by those who hold fast to the principle that microwaves (RF) only exhibit heat effects and is typically the understanding of most electrical engineers and physicists. It is certainly not something that quite a few scientists with a background in biological sciences and medical professionals subscribe to.
This is has been disproved by many studies if you care to do some real research. Please also refer to included paper on BRIEF HISTORY OF SOVIET VS. WESTERN RADIO FREQUENCY & MICROWAVE (RF/MW) RESEARCH by Don Maisch (included with this letter) as to why we have diverging thinking on the effects of microwaves.

There are many reports in the literature of research on non-thermal effects, usually of a subjective nature. Studies that have investigated if RF radiation affects biological cells, other than by heating them, are inconclusive. In addition, the exposure levels used in these studies are higher than those mentioned above.

And also lower. Again there seems to be a reluctance to accept that non thermal effects are real. Inconclusive from what perspective? That there are quite a few studies showing no effect or not able to reproduce a result? More often or not this is due to poor or deliberately constrained research often sponsored by the industry. Refer to Microwave news and Interphone criticisms documentation included with this letter.

Mobile Telephone Communication Antennas and Health Effects Fact Sheet 4

Health Effects
"Current research indicates that, at the exposure levels indicated above, RF radiation is not known to have any adverse health effects.

The present concern that people have about RF exposure is whether these non-thermal effects also include cancer. While human studies to assess the possibility that RF exposure increases the risk of cancer are few in number, laboratory studies do not provide evidence to support the notion that RF fields cause cancer. Review groups evaluating the state of knowledge about possible links between RF exposure and excess risk of cancer have concluded that there is no clear evidence for any links. ARPANSA continues to closely monitor the research being conducted in this field.

Conclusion
No adverse health effects are expected from continuous exposure to the RF radiation emitted by the antennas on mobile telephone base station towers."

This is not true. Refer to studies performed by Dr Niel Cherry and others. Given more time I probably could dig up quite a few more recent ones than what I have listed below.
* Radio/TV towers (Michelozzi 2002, Cherry 2000, Dolk 1997, Hocking 1996),
* Mobile phone base stations (Eger 2004, Wolf and Wolf 2004)
* Electricity towers (Ahlbom et al, 2000, Greenland et al, 2000, Michael Kundi)

Mobile Telephones and Health Effects Fact sheet 13

"There is no clear evidence in the existing scientific literature that the use of mobile telephones poses a long-term public health hazard (although the possibility of a small risk cannot be ruled out)."

The statement above appears to be a common re-occurring theme in all the Mobile phone fact sheets and is clearly not true.

In response, a major project, INTERPHONE, has been organised. The INTERPHONE project is a multi-national series of epidemiological studies testing whether using mobile phones increases the risk of various cancers in the head and neck. The project comprises national studies from 13 different countries, which are coordinated by the International Agency for Research on Cancer (IARC), an agency of the World Health Organization (WHO). A pooled analysis of all the brain tumour results has suggested no overall risk for moderate mobile phone use by adults for up to 10 years."

This was reported in the media and is based on the initial report that was released for public consumption. It is however grossly incorrect as mentioned in several places in my commentary. Please refer to the included PDF on the interphone study. The Interphone study received funding from the industry and there have been comments by scientists who performed peer reviews of the said study that clearly show that the research was faulty and that the Interphone study protocol has flaws, which results in an underestimation of brain tumour risk. Yet, in spite of the design flaws and underestimated risk of brain tumours, the Interphone studies still found that there was a risk of brain tumours for heavy users. Perhaps if these flaws did not exist they would find the

same elevated risks as the industry independent studies have found? Or, could it be that the Interphone protocol was designed to not find any risk at all?

"On the specific issue of brain cancer occurring in users of these telephones, it is important to note that such cancers existed before the introduction of mobile telephones. It is simply not possible to identify the cause of any single case of cancer. Long-term studies to investigate whether mobile telephone users have a greater incidence of, say, brain cancer than the general population have not been completed."

Yes this is true but RF from other sources has been around for many years too and could be the contributors for brain cancers prior to the introduction of mobile phones. Mobile phone RF frequencies are not the only RF frequencies that have been linked to cancer. AM/FM transmitters, CB Radios, UHF/VHF 2 way radios have been around for many years too, just like brain cancer. Of course my Bachelor degree in Science has shown me that radiation is not the only source of mutagenic/genotoxic effects, chemicals, bacteria and viruses also have a role to play.

"There is no clear evidence in the existing scientific literature that the use of mobile telephones poses a long-term public health hazard (although the possibility of a small risk cannot be ruled out).
Users concerned about the possibility of health effects can minimise their exposure to the RF emissions by: limiting the duration of mobile telephone calls, making calls where reception is good, using a 'hands-free' attachment or speaker options, or by texting. Given the lack of any data relating to children and long term use of mobile phones, and their potentially long life-time use of them, ARPANSA recommends that parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting. "

There is plenty of evidence available if you look for it. Case studies to date have only looked at mobile phone usage for 10 – 15 years and cancer can take 20+ years to appear yet we are already seeing many types of cancers on the increase, as discussed earlier and it is only likely to get worse. Maybe someone should talk to Dr Teo a leading Australian Neurosurgeon because he certainly has some thoughts on this issue [15]. I do however acknowledge that the suggested techniques to minimise exposure will reduce the intensity in most situations except if in a car where reflection can occur and in situations where phones will boost output signal if reception is poor. The problem with the hands free solution is that people usually just place the phone near a different body part rather than the head, the phone maybe put in a pocket thereby irradiating different body parts and organs. DNA breaks resulting in cancer are not just limited to the brain. Another concern is that RF does not recognise boundaries and can affect people in close vicinity even though they themselves may not be using a wireless device. How do these people minimise the exposure if they are surrounded by it everywhere they go?

How is scientific evidence substantiated?
"The criteria that have to be satisfied for substantiating scientific evidence are:
a. the publication of research results in a reputable international scientific journal that includes peer review by appropriately qualified scientists and academics. This ensures that research conforms to high standards of scientific practice and that conclusions may reasonably be drawn from the work undertaken which take into account relevant considerations; and

b. the independent verification of research results. If a research result cannot be repeated by other independent researchers, doubts are raised about the original finding. "

So we have scientific studies that show biological effects lower than our current standard, have been peer reviewed and repeated yet our standards remain unchanged. What else has to happen for ASPARNA to accept that there are real health concerns?

"There is no substantiated evidence in the existing scientific literature that living close to a base station or using a mobile telephone poses a long-term public health hazard (although the possibility of harm cannot be ruled out). "

This is a repeating theme with the "possibility of harm cannot be ruled out" added to what looks like a measure to protect APPANSA or the wireless industry from potential future litigation.

"ACMA, adopted the ARPANSA limits into the Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003 and the licence conditions for radiocommunications transmitters."

I see this as a significant conflict of interest as ACMA who appears to be the enforcer of the standards also makes revenue from access to RF bands by telecommunications bodies.

Has a precautionary approach been adopted?
Throughout the world there has been a growing movement to adopt a precautionary approach. The WHO defines the Precautionary Principle as a risk management concept that provides a flexible approach to identifying and managing possible adverse consequences to human health even when it has not been established that the activity or exposure constitutes harm to health.
It is the WHO's view that scientific assessments of risk and science-based exposure limits should not be undermined by the adoption of arbitrary cautionary approaches.

As well as setting conservative exposure limits, the ARPANSA Radiofrequency Standard incorporates a requirement to minimise public exposure to RF fields where this is unnecessary or incidental to achievement of service objectives, provided this can be readily achieved at reasonable cost.

Is the last paragraph a WHO directive or ARPANSA's? Revenue protection for the industry, Wifi in most schools, shopping centres, airports, homes, smart meters in every house. This rapid and extensive deployment of wireless transmitters does not appear to be following the precautionary principle.

About the ARPANSA radiofrequency radiation exposure Standard fact sheet 4
The Standard making process
In choosing the members of the Working Group, ARPANSA consulted widely with a range of organisations so as to achieve a spread of relevant expertise. There were also representatives with appropriate interests from the community, unions and the telecommunications industry. The Radiation Health & Safety Advisory Council was also consulted on membership of the working group.

Now it is clear why our standards are hobbled especially with representation of the telecommunications industry being involved. Any recommendation that is likely to show effects will obviously be watered down if said companies revenues are going to be impacted. It is sort of like having Tobacco companies participating in the development of laws for cigarettes.

The basic restrictions, are fundamental limits designed to ensure that known adverse health effects do not arise from exposure to RF fields.

This is an incorrect statement. It is true from the perspective of known thermal effects. It provides no confidence for protection against long term exposure effects in a multi modal wireless environment or non-thermal effects which have been documented in a multitude of studies [16]. The fact that Scientist have indicated that RF effects may be accumulative, a 6 minute exposure does not give any confidence of what happens when continually exposed over a life time.

Are adverse health effects at levels below the limits of the Standard possible?
Significant safety factors are incorporated into the exposure limits – that is, the limits are set well below the level at which adverse health effects are known to occur. The Working Group developing the Standard reviewed research at low levels of exposure published since after the ICNIRP review to ensure that more recent research did not reveal problems. Furthermore, there is an extensive worldwide research effort to investigate any adverse low-level effects. The research aims to address the World Health Organization's research agenda. However, if evidence of any adverse effects does come to hand, ARPANSA will certainly review the limits of the Standard.

I have cited research articles and papers that show effects including genotoxicity. Can you advise me whether your organisation is going to review them and if the findings can be shared with the public?

Fact Sheet 4 Mobile Telephone Communication Antennas and Health Effects

Health Effects
"Current research indicates that, at the exposure levels indicated above, RF radiation is not known to have any adverse health effects.
It is considered that rises in tissue or body temperature of about 1.00C or more are required before any adverse effects will occur. In cases of pregnancy, rises in the temperature of the foetus of 2.5 to 50C are necessary before defects are seen in the newborn. These temperature rises will not occur unless the exposure level is greatly in excess of the ARPANSA RF Standard mentioned above."

Yes and what about non thermal effects?

Are mobile phone base stations a health risk?
The weight of national and international scientific opinion is that there is no substantiated evidence that living near a mobile phone antenna causes adverse health effects.

In a review of 14 studies collected from the WHO database and put together by Drs. Michael Kundi and Hans-Peter Huttera, **10 out of the 14 presently existent peer-reviewed studies analysed found significant increases in ill health effects from cell tower exposures**. (Kundi, 2008 at the London EMF International Conference) [17]. Populations close to cellular antennas show an increase in the effects of health problems in those closest to the antennas with the risk factors dropping off as distance and RFR levels decrease. Symptoms range from sleep disturbances and headaches to breast and brain cancers. Refer to included document. Of course ARPANSA and ACMA continue to be in a state of denial. I really do wonder whether your organisation has our best interests at heart or whether protecting the industry is your goal?

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