

Radiofrequency/Microwave Radiation and the International Agency for Research on Cancer (IARC)

The problem of conflict of interest & commercial influence in WHO agencies and the need for public interest representation

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Conflict of interest exists when an author (or the author's institution), reviewer, or editor has financial or personal relationships that inappropriately influence (bias) his or her actions. . . The potential for conflict of interest can exist whether or not an individual believes that the relationship affects his or her scientific judgement. Financial relationships . . . are the most easily identifiable conflicts of interest and the most likely to undermine the credibility of the journal, the authors, and of science itself."

International Committee of Medical Journal Editors²

Abstract

The International Agency for Research on Cancer (IARC), was established in 1965 as an agency of the World Health Organization (WHO) with a mission to develop strategies for cancer prevention and control. One of its prime roles is to evaluate and classify the carcinogenicity of chemicals and other substances (including electromagnetic radiation) through published monographs that will then be used by international and national health and regulatory agencies to protect public health. In order to block undue commercial influence in its assessment process the IARC has stipulated that in order to participate in its working groups, members must have no real or apparent conflicts of interests – meaning that they cannot be working for the affected industry. This does not eliminate the potential for commercial influence, however, as industry representatives, with an obvious bias to protect their commercial sector, can still be directly involved in IARC meetings. This is exemplified by the May 24-31, 2011 IARC meeting that will be discussing the carcinogenicity of radio-frequency and microwave radiation. Other examples of the problems created by allowing industry involvement in WHO advisory groups, namely the Chernobyl Forum and the Electromagnetic Field (EMF) Task Group (2005) are examined with a warning on forgetting the hard lessons learned by the WHO from its past experience with the tobacco industry.

¹ Author of "The Procrustean Approach: Setting Exposure Standards for Telecommunications Frequency Electromagnetic Radiation. http://international-emf-alliance.org/images/pdf/The_Procrustean_Approach.pdf

² International Committee of Medical Journal Editors, "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Ethical Considerations in the Conduct and Reporting of Research: Conflicts of Interest" http://www.icmje.org/ethical_4conflicts.html, Accessed Mar. 31, 2011.

The International Agency for Research on Cancer (IARC)

The International Agency for Research on Cancer (IARC) was established in 1965 as part of the World Health Organization. Its mission is to coordinate and conduct research on the causes and mechanisms of human cancer which, in turn, will be used to develop strategies for cancer prevention and control. One of the important roles of the IARC is to disseminate scientific information through publications (Monographs), meetings, coerces and fellowships. The Monographs developed by the IARC cover a wide range of environmental factors which may increase the risk of cancer, such as chemicals and compounds, occupational exposures, electromagnetic fields, physical and biological agents as well as lifestyle factors. Since 1971, more than 900 agents have been evaluated, of which more than 400 have been identified as *carcinogenic*, *probably carcinogenic*, or *possibly carcinogenic* to humans.

The IARC uses five classifications to rank substances' carcinogenic potential to humans:

- Group 1: *Carcinogenic to humans*
- Group 2A: *Probably carcinogenic to humans*
- Group 2 B: *Possibly carcinogenic to humans*
- Group 3: *Not classifiable as to its carcinogenicity to humans*
- Group 4: *Probably not carcinogenic to humans*³

Since 1971, more than 900 agents have been evaluated, of which more than 400 have been identified as *carcinogenic*, *probably carcinogenic*, or *possibly carcinogenic* to humans. This includes extremely low frequency (ELF) electromagnetic fields (EMFs) which have been classified as Group 2B: *Possibly carcinogenic to humans*.

Once a monograph is published it is used as guidance for national health agencies in order for them to set their own advice to national governments. Another, and very important use for an IARC classification would be in toxic Tort litigation.⁴ If an environmental agent is declared by the IARC to be a probable (Group 2A) or possible (Group 2B) carcinogenic agent this creates a potential for exposure to litigation for relevant industry. This fact alone is an important reason that firm conflict of interest measures need to be stipulated in the IARC assessment processes which must be based on an impartial evaluation of the available scientific data free of vested interest manipulation. A desirable state of affairs for an industry that stands to be affected by a proposed classification would be to be involved in that process in order to attempt to influence the outcome – not to aid the assessment but to subvert it to protect the industry's economic interests.

The IARC assessment process consists of interdisciplinary working groups of expert scientists who review the published studies and evaluate the weight of the evidence that an agent can increase the risk of cancer. The principles, procedures, and scientific criteria that guide the evaluations are described in the Preamble to the *IARC Monographs*.

³ IARC, Agents Classified by the *IARC Monographs*, Volumes 1–100, <http://monographs.iarc.fr/ENG/Classification/index.php>, Accessed April 8, 2011.

⁴ A toxic tort case is a special type of lawsuit, brought against the manufacturer or supplier of a chemical product which causes a toxic injury. Toxic tort cases are usually quite difficult to prove, because the connection between exposure to a toxic chemical and a resulting injury or disease is often elusive. Taken from the Metzger Law Group: http://www.toxicortorts.com/faq.shtml#toxic_cases, Accessed Mar. 31, 2011.

In drafting a monograph, five categories of participant involvement can be present at *Monograph* meetings.

- a. The Working Group are responsible for the critical reviews and evaluations that are developed during the meeting. Membership is selected on the basis of candidate's relevant knowledge and usually have published significant research related to the carcinogenicity of the agents being reviewed. There also must be an absence of real or apparent conflicts of interests. Consideration is also given to demographic diversity and balance of scientific findings and views.
- b. Invited Specialists are experts who also have critical knowledge and experience but have a real or apparent conflict of interests. They assist in the Working Group by contributing their unique knowledge and experience during discussions and can contribute text on non-influential issues in the section on exposure, such as a general description of data on production and use. Invited Specialists do not serve as meeting chair or subgroup chair, draft text that pertains to the description or interpretation of cancer data, or participate in the evaluations.
- c. Representatives of national and international health agencies often attend meetings because their agencies sponsor the programme or are interested in the subject of a meeting. Representatives do not serve as meeting chair or subgroup chair, draft any part of a Monograph, or participate in the evaluations.
- d. Observers with relevant scientific credentials may be admitted to a meeting by IARC in limited numbers. Attention will be given to achieving a balance of Observers from constituencies with differing perspectives. They are invited to observe the meeting and should not attempt to influence it.
- e. The IARC Secretariat consists of scientists who are designated by IARC and who have relevant expertise. They serve as rapporteurs and participate in all discussions. When requested by the meeting chair or subgroup chair, they may also draft text or prepare tables and analyses.⁵

As for handling conflict of interests, each participant of the above groups must complete a WHO Declaration of Interests to report financial interests, employment and consulting, and individual and institutional research support related to the subject of the meeting. IARC assesses these interests to determine whether there is a conflict that warrants some limitation on participation.⁶ Independence from industry influence in the Working Group drafting of a monograph is essential to the assessment process. This was plainly stated by Dr. Robert Baan and Dr. Vincent Cogliano from the IARC Monograph Section, in a letter to Dr. Alexander Lerchl in rejecting his application to be included in the Working Group evaluating the carcinogenic hazards from exposure to RF/MW radiation, due to a conflict of interest. Baan and Cogliano wrote the following:

⁵ IARC, Preamble to the IARC, A. GENERAL PRINCIPLES AND PROCEDURES

5. Meeting participants Monographs, Jan. 2006,

<http://monographs.iarc.fr/ENG/Preamble/currenta5participants0706.php>, Accessed April 10, 2011.

⁶ Ibid.

An IARC Monograph is an evaluation exercise that demands complete independence from all commercial interests and from advocates who might be perceived as advancing a pre-conceived position.⁷

This statement is in agreement with what Dr. Michael Repacholi from the WHO testified at an Australian Senate telecommunications Inquiry in 2001:

The WHO takes the view that there cannot be industry representation on standard setting working groups. There cannot be someone on the working group who is having an influence on health effects for an industry when they derive benefit from that industry.⁸

The IARC requirements (pre 2005) for handling conflict of interest were revised and made more transparent as a direct result of a series of critical articles published in *The Lancet Oncology* and *The Lancet* in 2003 that questioned the credibility of the IARC. Among a number of concerns, the articles highlighted concerns about “the inappropriate influence of invited specialists who had links to industry”. As a result of the concerns, *The Lancet* introduced the Policy Watch section that summarized the key findings of every IARC Monograph meeting up to 12 months before the corresponding Monograph was published. As a result of this ‘surveillance’ of the IARC Monograph process, by 2005 IARC had revised its conflict of interest policy in line with the Lancet’s Policy Watch.⁹ However, as this paper contends “inappropriate influence of invited specialists who had links to industry” in IARC meetings is still a major issue that needs to be addressed.

A questionable conflict of interest policy for IARC ‘s review of RF/MW

Drs Baan and Cogliano’s insistence of a “complete independence” from “commercial interests” for the IARC Working Group (category a) however, becomes clouded when commercial interests can still be directly involved in the preparation of a Monograph through their inclusion as “Invited Specialists” (category b). In this role, commercial interests and their advocates can “assist in the Working Group by contributing their unique knowledge and experience during discussions...” As this paper contends, however, when industry is involved in ‘assisting’ expert decisions that may adversely affect their economies they will try their best to bias the outcome for the benefit of their industry sector.

Another possible avenue for commercial influence is as Observers (d category). This is limited to participants with “relevant scientific credentials” thus limiting participation from organizations representing what might be termed the public interest or media organizations who might want to report on the proceedings. It is the opinion of this writer that those who stand to be impacted by exposure (the public) should have a organizational representative voice in the process as observers even though they may not have relevant scientific credentials. It is even more important to include a public perspective when industry representatives are allowed to be present as observers. This should be the case considering that the IARC states that they would prefer a balance of observers from constituencies with differing perspectives.

Any semblance of “complete independence” from commercial interests and their advocates is questionable in the forthcoming IARC meeting on May 24 -31, 2011 in

⁷ Letter from Drs. Robert Baan and Vincent Cogliano (IARC Monographs Section) to Dr. Alexander Lerchl, dated Oct. 26, 2010.

⁸ Repacholi, M, Inquiry into Electromagnetic Radiation, Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, Section 4.115, page 151, May 2001.

⁹ Collingridge, D., Increased transparency in IARC Monograph programme, *The Lancet Oncology*, Vol. 6, October 2005. [http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(05\)70364-8/fulltext](http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(05)70364-8/fulltext), Accessed May 3, 2011.

Lyon France. The purpose of this meeting is to conduct a risk assessment on the carcinogenicity of radiofrequency and microwave radiation (RF/MW) from mobile phones, base stations, microwave emitters such as WiFi and radar systems. Decisions made at this meeting will later be used as the basis for an IARC Monograph on RF/MW with huge implications for the telecommunications industry and civil and military use of radar. There are also huge implications for the public globally as RF/MW emission levels are relentlessly increasing as a consequence of the endless introduction of new wireless devices operating at ever higher and higher microwave frequencies.

The issue of concern here is that the IARC has invited three telecommunications industry representatives to attend the week-long May meeting as observers¹⁰. These are: Joe Elder from the Mobile Manufacturer's Forum (MMF), an international association of telecommunications mobile and wireless equipment manufacturers¹¹; Mays Swicord from CTIA, the International Association for the Wireless Telecommunications Industry that "advocates on behalf of its members at all levels of government"¹² and Jack Rowley from the GSM Association, the trade group that "represents the interests of the worldwide mobile communications industry."¹³ The other two invited observers are Claire Marrant from the Léon-Bérard Centre, Lyon, France, a cancer treatment and research hospital and Robert Nuttall from the Canadian Cancer Society.¹⁴ If a goal of the IARC is to have a balance of observers, currently this is not the case for organizations who would represent the public interest.

Having been invited to the IARC meeting as observers the industry representatives would have a strong incentive to informally advocate their respective organization's viewpoints directly to individual members of the Working Group. After all, for the industry much is riding on the outcome of the meeting and the monograph on RF/MW. At scientific conferences, discussions are not limited to official meeting times and the invited industry representatives will have all week to spin their web and attempt to influence the IARC panel informally outside of official meetings – at coffee breaks, over drinks, during meals, etc. In a letter to Christopher Wild, the Director of the IARC, *Microwave News* editor Louis Slesin pointed out that "by being in the room, observers will know what is on the panel's agenda and will have access to the panel members many times over the weeklong session. Where does a friendly chat turn into lobbying? [We] don't know, but would say the line between the two is, at best, fuzzy".¹⁵

It is extremely unlikely that the IARC will rule that RF is either *Carcinogenic to humans* (Group 1) or *Probably not carcinogenic to humans* (Group 4), so the outcome of the meeting would be either *Possibly carcinogenic to human*, (Group 2 B) or *Not classifiable as to its carcinogenicity to humans* (Group 3). The risk to the industry is that if the Monogram comes out with RF as *Possibly carcinogenic to human* this would have implications for the telecommunications industry globally. Such was admitted by Australia's Telstra Corporation in its 2004 Telstra Annual Report where it stated in bold type, under the heading "Risk factors" that "[t]he establishment of a link between adverse health effects and electromagnetic energy (EME) could expose us to liability or

¹⁰ IARC list of participants, <http://monographs.iarc.fr/ENG/Meetings/vol102-participants.pdf>, Accessed April 15, 2011.

¹¹ MMF, <http://www.mmfai.org/public/>, Accessed April 15, 2011.

¹² CTIA About Us, <http://www.ctia.org/aboutCTIA/>, Accessed April 15, 2011.

¹³ GSM World, <http://www.gsmworld.com>, Accessed April 15, 2011.

¹⁴ Slesin L., "IARC Welcomes Industry to RF-Cancer Review, *Microwave News*, March 23, 2011.

<http://www.microwavenews.com/IARC.RF.html#Continued>, Accessed April 15, 2011.

¹⁵ Ibid.

negatively affect our operations.”¹⁶ Now, if the IARC classifies RF as a possible human carcinogen this doesn’t establish a link in itself, but if considered in conjunction with other research, such as some of the Interphone studies, especially Hardell’s work in Sweden, Telstra’s fear may be well founded.

For the telecommunications Industry it can be argued that their biggest risk at the present is the possible outcome of IARC’s RF/MW Monograph. Considering the ubiquitous nature of exposure globally and the vital public health implications, this may well be the biggest and most contentious evaluation the IARC has undertaken since its inception in 1965. Because of this importance, it is unconscionable in this writer’s opinion that presently there is no provision within the IARC to balance industry involvement at IARC Monograph meetings with representation by organizations that represent the public interest.

WHO and nuclear (ionizing) radiation health hazards

In order to highlight the problems that can arise in WHO agency scientific risk assessments when commercial interests are allowed to participate, the partnership between the WHO and the International Atomic Energy Agency (IAEA) is illustrative.

A significant conflict of interest in the WHO’s decision making process, specifically for radiation health assessments, goes back to WHO’s 1959 partnership agreement with the IAEA created in 1957 as the world’s “Atoms for Peace” organization. A foundational goal of the WHO is to improve human health by fighting causes of disease, whereas IAEA’s goal is to “seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity through the world”.¹⁷ Being an organization dedicated to the proliferation of nuclear power this creates a potential conflict of interest within the WHO if possible impediments to nuclear power development are identified by WHO committees that are in conflict with IAEA goals. This is clearly indicated in the agreement statement:

Whenever either organisation [the WHO or the IAEA] proposes to initiate a programme or activity on a subject in which the other organisation has or may have a substantial interest, the first party shall consult the other with a view to adjusting the matter by mutual agreement.¹⁸

Consider a case in point. Before the 1959 WHO/IAEA agreement, in 1957, an expert WHO study group issued the following warning over the development of nuclear power:

Genetic heritage is the most precious property for human beings. It determines the lives of our progeny, health and harmonious development of future generations. As experts, we affirm that the health of future generations is threatened by increasing development of the atomic industry and sources of radiation ... We also believe that new mutations that occur in humans are harmful to them and their offspring.¹⁹

¹⁶ Telstra Annual Report (2004) , <http://www.telstra.com.au/abouttelstra/investor/docs/companyoverview.pdf>, Accessed October 12, 2005

¹⁷ IAEA, Session II: The Policy and Framework, http://tc.iaea.org/tcweb/news_archive/SessionII-PolicyFramework.pps, Accessed April 12, 2011.

¹⁸ Agreement between the World Health Organisation and the International Atomic Energy Agency, Article I – Co-operation and Consultation, http://en.wikisource.org/wiki/Agreement_between_the_World_Health_Organisation_and_the_International_Atomic_Energy_Agency, Accessed April 12, 2011.

¹⁹ WHO, Genetic effects of radiation in humans, p. 183, Report by WHO, Geneva, 1957.

This same warning was re-issued in a 1958 WHO technical report²⁰ but after 1959, for another 44 years, no further statements on potential hazards from nuclear power were issued by the WHO until 2002 with the creation of the *Chernobyl Forum*, an IAEA initiative. The Forum's first report, *The Human Consequences of the Chernobyl Nuclear Accident – A Strategy for Recovery*, led to the IAEA convening an expert group of scientists to assess the environmental effects and the WHO convening another expert group to assess the health effects and medical interventions.²¹

This led to the 2005 report, *Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts* written by the Chernobyl Forum. This report attributed less than 50 deaths as directly related to the disaster with up to 4,000 people who were highly exposed (such as emergency and recovery operation personnel) eventually dying from radiation exposure. The report did not find "profound negative health impacts" in the population living in the surrounding areas nor did it find evidence of "widespread contamination that would pose a substantial threat to human health, within a few exceptional restricted areas". In its dismissal of radiation hazards to the wider population the report claimed that poverty and "life style diseases" (such as alcoholism) and mental health problems, posed "a far greater threat to local communities than does radiation exposure". They also claimed that residents of affected areas were suffering from "paralyzing fatalism" as a result of "persistent myths and misperceptions about the threat of radiation".²²

In 2006 the WHO released a report on the progress of the Chernobyl Forum titled, *Health Effects of the Chernobyl Accident and Special Care Programmes* edited by B Bennett, Zhanat Carr and Michael Repacholi. The report purported to be "the result of a sound scientific evaluation of the available evidence and provides a firm basis for moving forward" but largely discounted harmful impacts on populations exposed to Chernobyl radiation. For example, in relation to a reported significant decrease in the health of children in areas of Russia and the Ukraine, the report dismissed this with the claim that "this has not been shown to be related to radiation dose and may be the result of increased anxiety, increased reporting, other non-radiation accident related causes or poorer health care." In its dismissal of the adverse effects of radiation the report concluded that the biggest public health problem caused by the accident as of 2006 was the impact on mental health.²³ In other words, the biggest problem was people making themselves sick by worrying over radiation.

This dismissive viewpoint was seen in an April 26, 2011 BBC documentary, "Fallout: The Legacy of Chernobyl" where it was claimed that there has been no observable impact on health from Chernobyl except for thyroid cancers in nearly Eastern European countries caused by a failure to distribute stable iodine and a few deaths and illness among highly exposed firemen.²⁴

In sharp contrast, a number of independent expert reports have claimed that the risk

²⁰ WHO Technical Report No. 151, p. 59, WHO, Geneva, 1958.

²¹ IAEA, "Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts", p. 9, <http://www.iaea.org/Publications/Booklets/Chernobyl/chernobyl.pdf>, Accessed April 12, 2011.

²² WHO, "Chernobyl: the true scale of the accident", Media Centre, Sept. 5, 2005 <http://www.who.int/mediacentre/news/releases/2005/pr38/en/index.html>, Accessed April 12, 2011.

²³ WHO, "Health Effects of the Chernobyl Accident and Special Health Care Programmes", Report of the UN Chernobyl Forum Expert Group "Health". Geneva, 2006. http://whqlibdoc.who.int/publications/2006/9241594179_eng.pdf, Accessed April 9, 2011.

²⁴ BBC Transcript "Fallout: The Legacy of Chernobyl", April 26, 2011, <http://www.llrc.org/bbcbiasonchernobyl.htm>, Accessed May 1, 2011.

assessment conducted by the WHO and IAEA through the Chernobyl Forum have downplayed the health and environmental impacts of the Chernobyl accident.

- In 2006, The German Green Member of the European Parliament, R. Harms, commissioned two British scientists, I. Fairlie and D. Sumner, to write an alternate report titled, *TORCH, The Other Report on Chernobyl* in response to the reports from the Chernobyl Forum released by the IAEA and WHO. The TORCH report highlighted that thousands of Eastern European studies had been done on the health effects of the radiation from the Chernobyl accident but had not been fully included in Western assessments as they were only available in Russian and Ukrainian. The report also noted that while the Chernobyl Forum reports seemingly downplayed adverse radiation effects it emphasized the psychosocial effects. They concluded that about 30,000 to 60,000 excess cancer deaths were predicted, which was 7 to 15 times greater than IAEA/WHO's published estimate of 4,000.²⁵
- Another report, *The Chernobyl Catastrophe: Consequences on Human Health*, was published by Greenpeace in 2006 and consisted of the expert opinion of over 50 scientists, many from Russia and the Ukraine. The report's authors stated that, in their opinion, the 2005 IAEA/WHO evaluation for disease incidence and death resulting from the radioactive contamination may have grossly underestimated the impact of the incident, both at a national and international level. The authors concluded that the "Chernobyl Accident has caused, and will cause, a significant amount of morbidity and mortality across Europe, from Scandinavia, through Western Europe, south to where Turkey straddles the border between Europe and Asia, and beyond."²⁶
- Also in 2006, the European Committee on Radiation Risks published *Chernobyl 20 years On. The Health Effects of the Chernobyl Accident* that detailed an apparent significantly increased incidence of illness and mortality in the Eastern European Territories affected by the Chernobyl radioactive fallout. This included stillbirths, miscarriages, infant and general mortality, cancer mortality, chromosomal aberrations, diseases of the cardio-vascular system and a large number of other illnesses. The authors also noted an increase in neurological disorders that they considered were a consequence of direct radiation effects on the nervous system and destruction of brain cells causing what has been termed *Chernobyl dementia*. Reported symptoms were a deterioration of memory and motor skills, convulsions and pulsing headaches. The report included an increased cancer mortality estimate for Europe by Rosalie Bertell of between 899,310 to 1,786,657 fatal cancers.²⁷
- In 2009 the book, *Chernobyl: Consequences of the Catastrophe for People and the Environment* by A.V. Yablokov, V. B. Nesterenko, and A.V. Nesterenko was published in English by the New York Academy of Sciences. The authors analyzed a large number of Eastern European scientific articles on the effects of the Chernobyl disaster and concluded that the Chernobyl Forum agencies had largely downplayed or ignored this research and as a result their assessments were in error. Using the Eastern European data the authors estimated the

²⁵ Fairlie I., Sumner D., "The Other Report on Chernobyl (TORCH) 2006, <http://www.chernobylreport.org>, Accessed April 13, 2011.

²⁶ Greenpeace, "The Chernobyl Catastrophe, Consequences on Human Health, May, 2006.

²⁷ Busby C and Yablokov AV., *Chernobyl 20 year On. The Health Effects of the Chernobyl Accident*. Brussels: ECRR/ Aberystwyth: Green Audit, 2006.

number of deaths attributable to the Chernobyl accident to be about 980,000.²⁸

The vastly differing expert opinions over the interpretation of the Chernobyl radiation data, especially the exclusion of data by the Chernobyl Forum, suggest that the IAEA /WHO partnership agreement was inappropriate in this case because the Chernobyl disaster directly conflicted with the foundational goal of the IAEA – to promote nuclear power. How this partnership influences the outcome of the April 2011 IAEA call for research to fully evaluate the health consequences of Chernobyl remains to be seen.²⁹ This also applies to future pronouncements over the ultimate health consequences of the Fukushima Daiichi nuclear disaster.

WHO and mains power-frequency non-ionizing radiation health hazards

Since the 1950s there has been an ongoing controversy regarding the possibility health hazards from exposure to low-level non-ionizing electromagnetic radiation (NIER) emissions from extremely low frequency (ELF) mains power (50 or 60 Hertz) electromagnetic fields (EMF) to radiofrequency and microwave (RF/MW) technology. In response to these concerns, and with support from the World Health Organization's International EMF Project (IEMFP), human exposure limits have been developed for both ELF/EMF and RF/MW by the International Commission on Non-Ionizing Radiation protection (ICNIRP). These limits deem the primary hazard to be considered in setting human exposure limits is immediate biological harm as a consequence of exposure to high level (acute) NIER. For RF/MW hazards this is defined as an excessive and harmful rise in body temperature as a consequence of exposure to high-level emissions. The possibility of cancer induction, either as an initiator or promoter has not been a consideration in setting human RF/MW exposure standards. It is interesting to note that both ICNIRP and IEMFP were established by just one person – Dr. Michael Repacholi. If the IARC monograph on RF/MW declares RF/MW as a possible human carcinogen, that will put pressure on ICNIRP to revisit the cancer issue.

For mains power-frequency non-ionizing radiation health hazards the primary hazard addressed has been to avoid induced electrical currents inside the body and, more recently avoiding Magnetophosphenes which are flashes of light that are seen when one is subjected to a high-intensity changing magnetic field such as when in an MRI. This changing field causes current within the optic nerve resulting in the illusion of light. The possibility of cancer being associated with exposure to power-frequency EMfs has never been a consideration in the standards as they only address immediate dangers, not chronic exposures.³⁰

As for the WHO's policy on handling conflicts of interest in its standards setting role, in May 2001, Michael Repacholi, the then head of the WHO's International EMF Project³¹ and ICNIRP founder, informed the Senate Committee that the WHO had a firm policy against industry involvement in its processes. To Quote:

The world health Organization does not allow industry to participate in either standard setting or in health risk assessment. The WHO takes the view that there

²⁸ Alexey V. Yablokov, Vassily B. Nesterenko, Alexey V. Nesterenko, *Chernobyl: Consequences of the Catastrophe for People and the Environment*, Annals of the New York Academy of Sciences, Vol. 1181, 2009.

²⁹ IARC Press release, International Group of experts calls for long-term support for research to fully evaluate the health consequences of the Chernobyl accident, April 26, 2011. <http://www.iarc.fr/en/media-centre/pr/index.php>, Accessed May 1m 2011.

³⁰ Lokan, K. *Radiation Protection in Australia*, Australian Radiation Laboratory, 1991

³¹ The current head of IEMFP is Emilie Van Deventer, an engineer by training and who has not published in the EMG bioeffects field. It is highly unusual for an engineer to run a WHO public health agency.

cannot be industry representation on standard setting working groups. There cannot be someone on the working group who is having an influence on health effects for an industry when they derive benefit from that industry.³²

ICNIRP clearly states on its website that all commission members are independent experts in their respective scientific disciplines and do not represent either their countries or institutes and specifically they cannot be employed by industry. In order to maintain this independence from industry or other vested interests it is stated:

Members are reminded frequently of the need to declare any interests detrimental to ICNIRP's status as an independent advisory body". And: "ICNIRP also does not accept funding from industry."³³

These requirements were established so that ICNIRP's credibility of its advice and guidelines cannot be said to be influenced or biased by industry vested interests. Dr. Ken Joyner, from Motorola, stressed the independence of ICNIRP from industry at the Australian Senate "Inquiry into Electromagnetic Radiation" in May 2001.

If you want to look at one standards body that has specifically excluded any industry representatives, there is the ICNIRP body. You cannot be a member of the ICNIRP if you are part of industry. They exclude you from that process.³⁴

The ICNIRP website also explains that the scientific reviews carried out by ICNIRP members are combined with risk assessments done by WHO International EMF Project working groups with the resultant being the publication of ICNIRP's EMF exposure guidelines. Therefore the claim that ICNIRP's scientific advice is value-free from industry influence must also include the same requirement for any WHO risk assessment task group. That was what Repacholi stated to the Australian Senate Committee in May 2001 (as quoted previously), "There cannot be someone on the working group who is having an influence on health effects for an industry when they derive benefit from that industry".

The WHO's EMF Task Group

In 2005 the WHO established an EMF Task Group charged with writing a new Environmental Health Criteria (EHC) document on power-frequency EMF. This would be an up-to-date assessment of the possible health hazards and would serve as the basis for any future revisions to the ICNIRP Guidelines for power-frequency EMF.

The close working relationship between ICNIRP and the WHO's EMF Task Group evaluating power frequency research was seen in the make up of the membership of the Task Group. Out of the 20 members from 17 countries, there was Paolo Vecchia, the current ICNIRP Chairman, Anders Ahlbon, Larry Anderson, and Rudiger Matthes as members of ICNIRP's main commission, with Ahlbon also on ICNIRP's Standing Committee on Epidemiology. Other ICNIRP Standing Committee members included Christoffer Johansen, Jukka Juutilainen, Alasdair McKinlay and Zhengping Xu. Another member, Eric van Rongen, was a consulting expert for ICNIRP.³⁵ In addition, Michael Repacholi, who headed the IEMFP at the time the, is also the current Chairman

³² Repacholi M., Inquiry into Electromagnetic Radiation, Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, Section 4.115, page 151, May 2001.

³³ ICNIRP - An Independent Voice In NIR Protection, <http://www.icnirp.de/what.htm>, accessed Mar. 31, 2011.

³⁴ Inquiry into Electromagnetic Radiation, op. cit., Section 4.68, page 137, May 2001.

³⁵ Slesin L., 'WHO Welcomes Electric Utility Industry To Key EMF Meeting, Bars the Press', *Microwave News*, Sept. 22, 2005, http://www.microwavenews.com/nc_sep2005.htm, Accessed Mar. 31, 2011.

Emeritis of ICNIRP.³⁶ Therefore, including Repacholi, half of the membership of the WHO task group were also members of ICNIRP, clearly indicating that decisions made by the Task Group were also approved of by ICNIRP.

Industry influence endemic in the decision making process

As reported by *Microwave News*, on October 1, 2005, the 20 member WHO Task Group writing a new Environmental Health Criteria (EHC) document on power frequency EMF included, at the request of Repacholi, representatives from the electrical utilities, or organisations with close ties with the industry. Their task was to both assist in writing the initial draft and review the completed draft.³⁷ This is in clear conflict with what Repacholi claimed was the case in his testimony in the May 2001 Australian Senate Inquiry hearings.

One of the central authors of the draft, and member of the EHC Task Group, Leeka Kheifets, was a former WHO assistant to Michael Repacholi. She disclosed in Sept. 2005 in a letter (declaring any potential conflicts of interest) to the *British Medical Journal* that she “works with the Electric Power Research Institute... and consults with utilities.”³⁸ Other power industry representatives who assisted Kheifets on preparing the draft were Gabor Mezei, from the EPRI, Jack Sahl from Southern California Edison, USA, and Jack Swanson from the National Grid, UK. When Repacholi sent a draft of the EHC out for review in early July 2005, the reviewers included representatives from the power industry bodies: The Federation of Electric Power Companies of Japan, Pacificorp (USA), Hydro-Quebec (Canada), the Utility Health Sciences Group (USA) and Exponent Inc, (USA).³⁹ The question of liability must have also been on the agenda, as Exponent has described its business activities as follows:

Exponent serves clients in automotive, aviation, chemical, construction, energy, government, health, insurance, manufacturing, technology and other sectors of the economy. Many of our engagements are initiated by lawyers or insurance companies, whose clients anticipate, or are engaged in, litigation over an alleged failure of their products, equipment or services.⁴⁰

In addition to WHO staff, the only other observers that Repacholi invited to the WHO Task Group meeting in Geneva on 3 October to recommend exposure limits, were eight representatives from the power industry. Members of the press were barred from attending. In addition the meeting was not publicized on either the WHO web site meetings list or the Bioelectromagnetics Society Newsletter’s conference calendar and very few members of the EMF scientific community, including important EMF epidemiologists, were even aware of the meeting. Only industry representatives received invitations. Epidemiologists who were directly involved in the research that the WHO’s risk assessment task group would evaluate, were not invited as observers and reviewers.⁴¹

³⁶ ICNIRP Main Commission, <http://www.icnirp.de/commission.htm>, Accessed Mar. 31, 2011.

³⁷ Slesin, L., ‘From the Field, WHO and Electric Utilities: A Partnership on EMFs’, *Microwave News*, Oct. 1, 2005. <http://www.microwavenews.com/fromthefield.html#partners>, Accessed Mar. 31, 2011.

³⁸ Letters, Childhood cancer and power lines, *British Medical Journal*, Vol. 331, pp. 634-638, Sept.17, 2005.

³⁹ Slesin, L., ‘From the Field, WHO and Electric Utilities.’ op cit.

⁴⁰) Bohme, SR, et al, Maximizing Profit and Endangering Health: Corporate Strategies to Avoid Litigation and Regulation, *Int J Occup Environ Health*, Vol. 11, No. 4, p.340, Oct/Dec 2005.

http://www.avaate.org/IMG/pdf/provecho_frente_a_saludIJOEH_1104_Bohme.pdf, Accessed Mar 31, 2011.

⁴¹ Slesin, L., ‘WHO Welcomes Electric Utility Industry To Key EMF Meeting, Bars the Pres’, *Microwave News* Sept. 22, 2005, <http://www.microwavenews.com/fromthefield.html#partners>, Accessed Mar. 31, 2011.

The *Microwave News* article pointed out that a number of independent researchers were involved in the preparation and review of the draft, but it was “highly unusual, if not unprecedented, for a WHO health document to be reviewed by so many with such strong ties to the affected industry.”⁴²

One example of an industry reviewer’s viewpoint, seeking to downplay potential health hazards, is seen in the comments from Michel Plante, representing Hydro-Quebec:

The whole section on cancer seems more like a desperate attempt to maintain some positive statistical association from epidemiological studies alive than a factual and honest presentation of arguments both, for and against, carcinogenicity.⁴³

Plante’s role as a protector of his employer’s interests in denying a cancer link with EMFs was amply demonstrated in his involvement, as a Hydro-Quebec representative, in suppressing potentially damaging cancer data in a 1994 Hydro-Quebec funded epidemiological study by Dr. Gilles Theriault et al, from McGill University. The initial analysis of the data collected from three electric utilities found that workers who had the greatest exposures to magnetic fields had twelve times the expected rate of astrocytomas, a type of brain tumour, based on a small number of cases.⁴⁴

In a later re-analysis of the data, this time looking at high frequency transients (HFT), the McGill University team found up to a 10-fold increased risk of developing lung cancer amongst highly exposed utility workers, with a “very clear” exposure-response relationship.^{45 46}

When Gilles Theriault’s McGill team wanted to further analyze the HFT data for other associations, Hydro-Quebec, which funded the \$3 million study, and therefore owned the collected data, refused further access to the data. Plante said at the time that “we have a contract problem that has to be resolved and there will be no new mandate until it is solved.” Plante argued that by Theriault publishing the findings on HFT he had violated the contract with the utilities. Many senior EMF researchers and epidemiologists saw the HFT data as having important implications and needing further analysis by other researchers.⁴⁷ Six years later (2011) the Hydro-Quebec HFT data has continued to be suppressed from any further analysis from the scientific community – and Plante, as Hydro-Quebec’s man at the centre of that suppression, has now been asked by Repacholi to review the WHO’s Environmental Health Criteria risk assessment.

It is not known if Plante was asked at the meetings about the “positive statistical association” seen in the Hydro-Quebec HFT data but he could have replied that it is not important because it has not yet been replicated!

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Theriault G, et al, “Cancer Risks Associated with Occupational Exposure to magnetic Fields Among Electric Utility Workers in Ontario and Quebec, Canada, and France: 1970-1989, *American Journal of Epidemiology*, Vol. 139, pp. 550-572, 1994.

⁴⁵ Armstrong B et al, “Association Between Exposure to Pulsed Electromagnetic Fields and Cancer in Electric Utility Workers in Quebec, Canada, and France”, *American Journal of Epidemiology*, Vol. 140, pp. 805-820, 1994.

⁴⁶ Slesin, L., ‘Transients and Lung Cancer: A “Strong” Association and a “Remarkable” Exposure-Response’, *Microwave News*, Vol. XIV, No. 6, Nov/Dec 1994. <http://www.microwavenews.com/news/backissues/n-d94issue.pdf>, Accessed. Mar 31, 2011.

⁴⁷ Ibid.

The Utility Health Sciences Group, another power industry group that Repacholi asked to review the EHC draft document, plainly indicated that they considered increased costs to industry should take precedence over health considerations when they proposed a change in the chapter on protective measures that stated:

It should also be pointed out that redirecting facilities or redesigning electrical systems may be so expensive as to be inconsistent with the low-cost and no-cost steps typically viewed as prudent avoidance.⁴⁸

The UHSG also proposed a statement be included in the summary”

It would be useful for the summary to include a clear statement that the scientific research does not establish ELF EMF as a cause or contributing factor in any disease or adverse health effect, including cancer.⁴⁹

The Myth of not accepting funding from industry

As mentioned previously, it is stated on the ICNIRP web site that in order to protect its status as an independent advisory body, “ ICNIRP also does not accept funding from industry”. However, when it comes to the WHO’s IEMFP, no such restrictions apply. Repacholi has stated that the “[EMF]Project can receive funding from any source through Royal Adelaide Hospital; an agency established through WHO Legal Department agreement to collect funds for the project.”⁵⁰ Questions of a conflict-of-interest and even money laundering could be raised at this point when it was revealed by *Microwave News* that Repacholi, while head of the EMF Project, was receiving \$150,000 annually from the mobile phone manufacturers to assist him with meeting and travel expenses.⁵¹ However, Repacholi could rightfully still claim that he does not receive any direct funding from industry sources since it is funneled through the Royal Adelaide Hospital. This arrangement may be in violation of the WHO rule against employees and consultants accepting any “gift or remuneration” from external sources “incompatible” with their duties to WHO.⁵²

A Claytons oversight committee?

In order to provide oversight for the WHO’s International EMF Project an “International Advisory Committee” (IAC) was established with a membership consisting of representatives from international and national agencies as well as WHO collaborating institutions.⁵³ In this case IAC oversight should essentially operate much the same as a Judicial oversight committee where a judicial branch of the government watches or monitors what is going on or happening in a case or matter. In the judicial arena it is a form of checks and balances that operates to keep law officers from abusing

⁴⁸ Slesin, L., ‘From the Field, WHO and Electric Utilities.’ op cit.

⁴⁹ Ibid.

⁵⁰ Repacholi, R., Welcoming speech, 9th International Advisory Committee (IAC) meeting, Istanbul Turkey, Slide #19, June 7, 2004.
http://a100.gov.bc.ca/appsdata/epic/documents/p250/1161109392050_7810f218dfa34960bb1094cf090b446d.pdf, Accessed Mar. 31, 2011.

⁵¹ Slesin, L., ‘Time To Stop the WHO Charade’, *Microwave News*, July 5, 2005,
http://www.microwavenews.com/nc_jul2005.html, Accessed Mar. 31, 2011.

⁵² WHO, ‘Response of WHO to the Report of the Committee of Experts on Tobacco Industry Documents’, op.cit.

⁵³ Repacholi, M., International EMF Project (Powerpoint presentation), WHO/ICNIRP/South Korean govt. meeting, 22-24 Oct. 2001, <http://www.who.int/peh-emf/meetings/southkorea/MikeKOREA11am22%20Oct-EMFProjOverview.pdf>, Accessed Mar. 31, 2011.

their powers.⁵⁴ In the case of the WHO's EMF Project, IAC oversight should operate to prevent WHO officials from abusing their powers - and this should include preventing the possibility of bias through conflict-of-interest. It would also be important for the IAC to maintain an "arms-length" distance from the project activities that it is supposed to monitor. Unfortunately the IAC has not fulfilled this role by failing to block industry influence of the WHO's EMF Task Group.

ICNIRP increases its ELF EMF guideline exposure limits and ignores science

Following the recommendations of its EMF Task Group, in November 2010, ICNIRP issued a revised low-frequency (powerline frequency) guideline that doubled the previous guideline limits.⁵⁵ This increase is based on what ICNIRP considers to be the "most robustly established effect of electric fields ... the induction of magnetic phosphenes, a perception of a faint flickering light in the periphery of the visual field". As for long-term biological effects, ICNIRP acknowledged the epidemiological association with prolonged low-intensity magnetic field exposures of 0.4 uT (4 milliGauss) and childhood leukaemia but then dismissed this, along with any other long-term effect, because of the "absence of established causality". As for addressing concerns over possible long term effects, such as childhood leukaemia, ICNIRP claims it only provides scientifically based advice but then provides a recommendation it these concerns are best handled through a "national risk management framework", based on a number of aspects, including social, economic and political considerations.⁵⁶

As for the possibility of DNA breaks that could indicate a cancer connection, ICNIRP states "Generally, studies of the effects of low-frequency field exposure of cells have shown no induction of genotoxicity at fields below 50 mT (500G)⁵⁷." As examined in *Microwave News*, however, this statement is disingenuous and shows that the ICNIRP could only make such a statement by ignoring a significant body of peer reviewed and published research, including evidence of "highly significant" DNA damage at levels as low as 8uT (80mG).⁵⁸ In addition Kjell Hanson Mild sent to *Microwave News* a list of eight peer-reviewed and published papers that he had been associated with. These papers, all examining low level EMF exposure, found DNA and chromosomal breaks in cells, animals (mice and rats) and humans (substation workers and train drivers).⁵⁹ The relevance of this data to the childhood leukaemia / EMF question is strengthened by Chinese research that has identified a defective gene in some children that apparently increases their risk of developing childhood leukaemia if they also live near powerlines and transformers.⁶⁰ If the existence of this gene is established by further research (replication) this would establish a mechanism on how low-level ELF magnetic fields could play a causal role in some cases of childhood leukaemia. This would then falsify ICNIRP's claim that the childhood leukaemia / EMF link cannot be considered in standard setting because there is no known causal mechanism.

⁵⁴ Wikipedia definition, http://en.wikipedia.org/wiki/Judicial_oversight, Accessed Mar. 31, 2011.

⁵⁵ <http://www.icnirp.de/documents/ELFgdl.pdf>, Accessed April 8, 2011.

⁵⁶ <http://www.icnirp.de/documents/FactSheetELF.pdf>, Accessed April 8, 2011.

⁵⁷ 50mT converts to 50,000uT and 500G converts to 500,000 mG.

⁵⁸ Slesin L., ICNIRP Guidelines on Genotoxicity, November 15, <http://www.microwavenews.com/ShortTakes.html#ST11510>, Accessed April 8, 2011.

⁵⁹ Slesin L., ICNIRP: Kjell Mild's Missing Genotoxicity Papers, November 24,2010, <http://www.microwavenews.com/ShortTakes.html#ST11510>, Accessed April 8, 2011.

⁶⁰ Slesin L., Faulty DNA Repair May Explain EMF Role in Childhood Leukemia, *Microwave News*, [http://www.microwavenews.com/docs/mwn.12\(10\)-08.pdf](http://www.microwavenews.com/docs/mwn.12(10)-08.pdf), Accessed April 8, 2011.

By ICNIRP's exclusion of data that is inconvenient to their long-held standard setting rationale it suggests that they are in effect taking up the role of risk manager for the benefit of the power industry. In this role they are aided and abetted by the WHO. The "catch-22" problem for ICNIRP is while they claim to base their advice on sound science in rejecting any low level EMF connection with childhood leukaemia and genotoxicity on grounds of a lack of an established causality, consideration of the low-level DNA breakage peer reviewed data would make their denials invalid and therefore undermine the very scientific credibility of ICNIRP, IEMFP and the WHO itself.

A forgotten lesson? Big Tobacco and WHO Decision Making

In July 2000 the WHO Committee of Experts on Tobacco Industry Documents released a 260 page report documenting the tactics used by the tobacco industry's strategies to undermine the WHO's scientific assessment of second-hand smoke.⁶¹ At the same time the WHO issued a report listing a detailed response to ensure that WHO integrity was never again undermined by underhanded industry tactics.

Although the 58 recommendations were specific to the tobacco industry's attempts to undermine research and the WHO /IARC scientific assessment processes, they equally apply to any industry that would attempt to circumvent those processes. Among the many recommendations was a WHO call to investigate industry influences on their decisions and processes; to make the findings public; to have a strong and enforceable conflict of interest and ethics policy; to disqualify any professional services from performing work on behalf of WHO if the firm also provides industry with services likely to be adverse to the interest of public health; to educate WHO investigators and collaborators about industry efforts to undermine research and the need for special vigilance in protecting the integrity of research.⁶²

Conclusion: Who represents the public interest?

It is acknowledged that in an ever increasingly globalized world the reliance on international organisations to set standards to protect public health is an irrefutable fact of modern life. It is also a fact that international organizations, such as the WHO and its various agencies charged with this task need to be "eternally vigilant" to ensure that their organisations are never co-opted by any industrial sector that would attempt to place their commercial interests above public health.

This paper presents the case that maintaining complete independence from industry vested interests is essential for maintaining scientific objectivity and credibility for WHO affiliated international agencies. This is especially important for the IAEA considering the global public health importance of its Monograph initiative.

In relation to the May 2011 IARC meeting on RF/MW, if industry is allowed to participate in the process at any level, it is essential to balance this in equal measure by also including organizations representing the public interest. In a supposedly democratic society this should be self-evident.

⁶¹ Tobacco Company Strategies to Undermine Tobacco Control Activities at the World Health Organization, Report of the Committee of Experts on Tobacco Industry Documents, July 2000.

⁶² WHO, Response of WHO to the Report of the Committee of Experts on Tobacco Industry Documents, June 10, 2000.