

## When Risk Management Goes Wrong

### New Zealand public health agencies fail public trust over Transpower's proposed 400 kV transmission line from Whakamaru to Auckland

#### Notes on the NRL/Transpower "EMF Health Forums"

Don Maisch, April 7, 2005

#### Background:

As a result of the growing energy needs of Auckland in the coming years Transpower New Zealand has commissioned a 1.5 Billion NZ dollar national grid upgrade project to meet future demands. This project involves an additional 400 kV high voltage transmission line (HVTL) being constructed across the North Island, between Whakamaru and Auckland, cutting across some of New Zealand's premier farm land. The corridor for the proposed line, though it roughly follows existing (100 / 220 kV) HVTL's corridors, will significantly increase power frequency magnetic and electric fields in homes and buildings in close proximity to the new line. The potential health impact of this proposed line is one of the major driving forces behind community opposition to this line. Another important community concern is a significant loss of property values due to visual impact of 70 meter high towers dominating affected properties on the right-of-way, an aspect not covered in compensation proposals made to property owners. There is also the need to consider other options, such as using a high voltage Direct Current line (HVDC), partial under-grounding and even the possibility of constructing a power plant in the Auckland area. These issues however are outside the scope of this paper.

This paper concentrates on the N.Z. 400kV HVTL health effects controversy as a case study in the loss of public trust in EMF "expert advice". It examines how the New Zealand National Radiation Laboratory, Transpower and their community "EMF Health Forums" have lost the concerned public's trust and have enflamed the issue by steadfastly maintaining that the so called "WHO recommendations"<sup>1</sup> adequately address all the public's health concerns, despite a large body of differing scientific evidence available to the public. That Transpower should follow the advice of the NRL is somewhat understandable. Transpower's job is to supply electricity, not evaluate the scientific literature on health effects. That responsibility falls on the NRL and the Ministry of Health.

#### NRL brochure: *Electric And Magnetic Fields And Your Health*

The main source of information available to the public from the New Zealand Ministry of Health and the National Radiation Laboratory is its brochure, "*Electric And Magnetic Fields And Your Health*".<sup>2</sup> An examination of this publication reveals a strong bias towards a viewpoint that considers that the only EMF health issues of any consequence (other than obvious fatal electric shock from direct contact with conductors) for the public are those associated with "*effects such as annoyance or pain due to small shocks and discharges*" (page 8-9). The NRL brochure follows closely the power frequency guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), an organization that claims that the weight of the

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<sup>1</sup> Referring to the EMF guideline exposure limits promulgated by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). In this case 1000 milliGauss for residential 24 hour exposures.

<sup>2</sup> *Electric And Magnetic Fields And Your health, An information brouchure on electric and magnetic fields associated with transmission lines, distribution lines and electrical equipment*, National Radiation Laboratory Ministry of health, 2001.

evidence does not support an association with EMF exposure and adverse health effects, such as cancer, and therefore does not form an adequate basis to set exposure standards<sup>3</sup>.

At the heart of public controversy and protest in New Zealand over the proposed 400 kV transmission line are the statements found in relevant scientific literature, accessible to the public, which contradict the assertions put forward by the power authorities .

### **The Otago study incorrectly referenced in the NRL brochure**

The British National Radiological Protection Board (NRPB) defines *Bias* as “any process at any stage of inference which tends to produce results or conclusions that differ systematically from the truth.”<sup>4</sup> This definition can be applied to conclusions made in the NRL brochure about the findings of a New 1998 Zealand Childhood leukaemia EMF study conducted by Otago University.

On page 10 it is stated that “A New Zealand study (Otago University) found that none of 86 cases of childhood leukaemia reported over a four year period were associated with exposure to strong magnetic fields.” Under critical examination this statement illustrates a clear bias. Professor Ivan Beale who conducted a study on chronic health states in proximity to transmission lines in Auckland<sup>5</sup> has examined the Otago study and has concluded that, “both the New Zealand study (Otago University) and a large meta-analysis that included that study (Wartenburg<sup>6</sup>) show that exposure above 2 mG (0.2  $\mu$ T) is associated with a significant 15-25% increase in the risk of leukaemia.”<sup>7</sup>

The Otago study data was sent to the Department of Psychology, Massey University in Palmerston North, N.Z. and they confirmed that “a link with EMFs and increased leukaemia risk was found . . . even though the study was small by epidemiological standards, the results GIVE CAUSE FOR CONCERN and AT THE VERY LEAST warrant concern and the need for more research. It would be wrong to conclude that there is NO association between EMFs and leukaemia!”<sup>8</sup>

The authors of the study themselves acknowledge in the conclusions that a positive association with childhood leukaemia and increased EMF exposure was seen. “This was a small study and multiple comparisons were made. The positive findings thus should be interpreted cautiously.”<sup>9</sup>

For the NRL to interpret these positive findings, even if weak, as simply finding no association illustrates a clear bias to wanting to find no effects, even when the data does not support their contention.

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<sup>3</sup> Ibid. page 13.

<sup>4</sup> NRPB, “*ELF Electromagnetic Fields and the Risk of Cancer*”, Glossary, page 178. *Doc NRPB*, **12** (1), 1-179 (2001)

<sup>5</sup> Beale I, Pearce NE, Booth RJ and Heriot SA [Association of Health Problems with 50-hz Magnetic Fields in Human Adults Living Near Transmission Lines](#) JACNEM Vol 20 No 2 August 2001

<sup>6</sup> Wartenburg, *Bioelectromagnetics* Supplement, 2001

<sup>7</sup> Correspondence with Ivan Beale, March 10, 2005.

<sup>8</sup> Correspondence with John Podd, Department of Psychology, Massey University, Palmerston North, March 9, 2005.

<sup>9</sup> JD. Dockerty, J. M Elwood, D C.G. Skegg, G. P Herbison, *Electromagnetic Field Exposures and Childhood Cancers in New Zealand*, *Cancer Causes and Control*, Vol.9, No.3, pp.299-309, May 1998.

## Discounting the Evidence

(Quotes from the NRL brochure)

Page 7: *“There are also considerable doubts that ELF magnetic fields, at the levels found around power lines and electrical appliances, could produce any effects at all . . . laboratory research, including several studies on animals exposed over their lifetime, does not suggest any effect of magnetic fields on cancer.”*

Page 12 (while making a comparison to smoking and asbestos epidemiological studies) *“similar studies on ELF fields have not shown any clear, unambiguous evidence of a carcinogenic risk.”*

Page 13 : An acknowledgement is given that the EMF epidemiological studies overall suggest an increased incidence of leukaemia associated with an average exposure greater than 4 mG (0.4 uT) but then discounts this by stating, *“Whether the magnetic fields, biases in the studies or some other factor is responsible for the increase is not known. Most researchers doubt that magnetic fields are responsible”.*

Page 15: *“ Nevertheless, the absence of a wide range of potentially harmful effects over a variety of exposure conditions gives good grounds for believing that adverse effects are unlikely.”*

As for the possibility of other health effects (such as immune system effects) arising from magnetic field exposure, on page 10 it is simply stated that *“there is no strong evidence that magnetic fields are associated with other health effects.”*

By discounting all health effects the NRL is then able to recommend the use of exposure guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) – also referred to as the WHO recommendations. (NRL brochure, page 8) These limits were proposed in 1990 and have remained essentially unchanged since that time. They allow a residential 24 hour exposure of 1000 mG (100uT) and an 8 hour exposure of 5000 mG (500uT) for occupational settings (page 8).

What the NRL brochure doesn't clarify however is that the ICNIRP exposure guidelines are totally irrelevant to community concerns. In 1991 Keith Lokan from the Australian Radiation laboratory defined these limits as the following: *“These limits represent plausible field values, below which immediate health effects are unlikely [electric shock] . They are not intended to provide protection against possible cancer induction by continued exposure at lower field levels.”*<sup>10</sup> Mr. Lokan also addressed the issue of high voltage transmission lines, quite relevant to the New Zealand situation: *“The question of what we should do about ELF as regulators, particularly with respect to HVTLs is complicated” . . . “The straight forward answer is to stick with the present default option, and do nothing in a regulatory sense, on the grounds that we do not have an adequate scientific basis to support regulatory action.”*<sup>11</sup>

Now, 14 years later, in spite of all the evidence accumulated since 1990, the same reason is being given by the NRL to justify sticking with irrelevant “guidelines” that are only voluntary

<sup>10</sup> Lokan KH, *Risk, Risk Perception and regulation – What Should the Regulator Do?*, Radiation Protection in Australia, Vol.9, No.4, pp. 134-136, 1991.

<sup>11</sup> Ibid.

anyway. In the case of New Zealand's public opposition to Transpower's proposal to construct a 400 kV HVTL, it was all too apparent that the old cover story "*we do not have an adequate scientific basis to support regulatory action*" was no longer believed. This was readily seen in the negative public response to Transpower's "EMF Health Forums" and in other information meetings where Transpower representatives met with the public. An obvious stumbling block for Transpower was the health issue. By sticking with the NRL's (and WHO/ICNIRP) 'cover story' that there were no health hazards after all, and that limits of 1000mG were still acceptable, Transpower was put in the unviable position of not being believed whatever they said. Not only was the cover story not working, but it proved to be a liability for Transpower and the NRL's credibility with the concerned public.

### **New Era Energy and New Zealand public awareness**

Working under an incorporated society *New Era Energy (NEE)*, the 12 communities, representing about 1400 properties directly affected by the proposed 400 kV HVTL route have organized themselves into co-ordinated action groups and have proved themselves very adept at capturing the attention of Transpower, the NRL and the NZ media. Seeing a burning effigy of the CEO of Transpower tied to a scale model transmission tower on the evening TV news drew national attention. NZ Prime TV featured several news stories on the EMF health effects issue, one of which featured a child with severe skin rashes while living next to a transmission line in Auckland. Another Prime TV special featured many Auckland homes, both public housing and modern subdivisions that were built directly under existing HVTLs. The intense media coverage of the issue in the print media, radio and TV ensured that public awareness of the EMF health issues spread well beyond just those directly affected by the proposed 400 kV HVTL.

As mentioned previously, the main concerns being expressed by community groups at public meeting and marches were over the potential for adverse health effects from the proposed 400 kV line. These concerns are not born out of public ignorance or paranoid fears as some industry writers have suggested<sup>12</sup>, but out of a high level of expertise in getting to the fundamental issues. For instance, Auckland medical specialist Robin Smart conducted for *NEE* a review paper on the international scientific literature on the health impacts of power frequency EMFs<sup>13</sup>. Dr. Laura Bennet, on behalf of *NEE* also authored an extensive report on the potential health impacts from the Transpower proposals.<sup>14</sup> Nominated *NEE* members have used the Internet to make personal contact with key researchers internationally and inform their members on the latest scientific research on power line health effects. Another information source that *NEE* and their branches drew upon came directly from The National Radiation Laboratory's brochure "Electric and Magnetic Fields And Your Health". On page 19 of the NRL brochure, *Microwave News* was listed as a recommended information source. Connecting with the NRL link opened to the December 2004 of the newsletter. The title of that issue was "*The Case for EMF Precautionary Policies: WHO and Public Health Officials Stand in the Way*". This issue very much encapsulated the concerns expressed by Dr. Laura Bennet and Robin Smart in their reports for *NEE*. The *Microwave News* December edition examined in detail all the EMF health evidence presented at an International conference on childhood leukaemia that had been held in London in September 2004. The many papers and presentations at that five day conference effectively countered the reasons used by Transpower and the NRL to avoid taking any action on the health issue, on the supposed

<sup>12</sup> Grahan JD, *Making Sense of Risk: An Agenda for Congress*, EMF Risk Perception and Communication, Proceedings, International Seminar on EMF Risk Perception and Communication, Ottawa, Ontario, Canada, 3 Aug – 1 Sept. 1998.

<sup>13</sup> Smart R *Health Effects of High Voltage Transmission Lines: A Survey of the Medical Literature*, <http://www.notowers.co.nz>, Dec. 2004

<sup>14</sup> Bennet, L. *Evaluation of the Potential Health Effects Associated With Extremely Low Frequency Electromagnetic Fields: A report for the rural and peri-urban areas affected by the new power pylon route proposed by transpower*, March 2005. [http://www.notowers.co.nz/articles/information/medical/22\\_evaluation.htm](http://www.notowers.co.nz/articles/information/medical/22_evaluation.htm)

grounds that the science was not good enough. Microwave News then called for precautionary policies to be enacted by health agencies for power frequency magnetic fields. The irony that the NRL recommended Microwave News as a source of information did not escape the attention of *NEE* and it was widely circulated in advance of Transpower's "EMF Health Forums.

### **A brief examination of some of the latest evidence giving the New Zealand public reasonable cause to doubt the NRL's assurance of a lack of health hazards**

Besides the reports by Robin Smart and Laura Bennet, mentioned previously, papers from a September 2004 International Conference on Childhood Leukaemia<sup>15</sup>, held in London in September 2004 had been given to the *NEE* committee. I was fortunate enough to be able to attend this important conference sponsored by the UK charity Children with Leukemia. During the 5 day conference, attended by about 235 delegates from organisations from around the world, 46 speakers gave presentations on all known potential risk factors for childhood leukaemia. These factors included ionizing radiation, viruses, air pollution, light-at-night and electromagnetic fields. The EMF factor was a key feature of the conference with 13 presentations on various EMF aspects in relation to childhood leukaemia. It was mentioned in the Keynote Address by Sir William Stewart, Chairman of the Health Protection Agency of the NRPB. To Quote:

...Non-Ionizing radiation sources such as ultraviolet radiation (UVR) from the sun and from artificial sources such as sunbeds can also increase the risk of skin cancer, particularly in children. In addition we are all exposed to radiofrequency and power frequency electromagnetic fields (EMF). Whilst exposure to EMFs at high levels of exposure is known to cause health effects resulting from the induction of currents in body tissues (at low frequencies) and heating (at radiofrequencies) the evidence for health effects at lower levels remains equivocal. There are concerns, however, that they could influence the development of childhood cancer and the proper functioning of the brain and nervous system, whilst other effects may also be possible. Presentations on this topic are a key feature of this Conference...

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At the conference, Anders Ahlbom, one of the world's leading epidemiologists, and director of the Institute of Environmental Medicine at the Karolinska Institute in Stockholm, Sweden, went through the epidemiological evidence linking power frequency magnetic fields to childhood leukemia and called it "rather strong and consistent." Ahlbom felt that there is now no further point in doing any more epidemiological studies, until we know the mechanism of interaction on how EMFs can trigger or promote cancer.<sup>17</sup>

In the early 1990s, Anders Ahlbom and Maria Feychting published a study of childhood leukemia and power lines in Sweden. This study had only a small number of cases and there was a level of uncertainty as to how reliable the results were. Ahlbom then assembled a team of epidemiologists from nine different countries, each of whom had carried out their own EMF-leukemia studies. They combined and analyzed all their raw data in a meta-analysis and found that the link between the magnetic field and childhood leukaemia became stronger. In the September 2000 issue of the *British Journal of Cancer* the researchers wrote that children who lived in fields of over 4 mG (0.4  $\mu$ T) had twice as much risk of developing leukemia as those

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<sup>15</sup> *International Scientific Conference, Childhood Leukaemia: Incidence, causal mechanism and prevention*, London, U.K. 6 – 10 Sept 2004.

<sup>16</sup> *Ibid.* Keynote Address [S1.1]

<sup>17</sup> *Leading Epidemiologists See Childhood Leukemia Risk at 4 mG*, Microwave News, Vol.20, No. 5, Sept/Oct 2000.

exposed to less than 1 mG. They also said that the “level of [statistical] significance that we see for the excess risk at high exposure makes chance an unlikely explanation.”<sup>18</sup>

Soon after in the November issue of *Epidemiology*, a second meta-analysis was published by epidemiologist Sander Greenland *et al* from the University of California in Los Angeles (UCLA). Greenland, using a somewhat different mix of past studies, came up with essentially the same result, a doubling of the risk of childhood leukaemia at 4 mG.<sup>19</sup> Together, these meta-analyses serve to strengthen the leukaemia-EMF link.

At the London childhood leukaemia conference, a Japanese study was reported that also found the magnetic field/leukaemia link, at an even higher rate. Children exposed to 4 mG or more had close to five times the expected rate of leukemia.<sup>20</sup> Also at the conference Anders Ahlbom covered the possibility of confounding by other risk factors, such as traffic air pollution, which he saw as not being credible. As far as bias in the studies he said that the effect would have been small with a very limited impact on the overall risk estimates. Ahlbom also revealed at the conference that there was probably a leukaemia risk below 4 mG, as it was unlikely that there is a threshold for the leukaemia risk. Though that risk would be quite small for any single individual, Ahlbom saw the societal risk as significant due to the huge number of children exposed to low-level fields. The net result Ahlbom said, would be that the same number of children would develop leukaemia below 4 mG as above that level, doubling the number of children at risk of childhood leukaemia<sup>21</sup>. The clear message in Ahlbom’s presentation was that the epidemiology is reliable and the EMF leukaemia risk is beyond reasonable doubt.<sup>22 23</sup>

Though largely unknown, 10 years before Ahlbom and Greenland conducted their meta-analyses, the Health Department of Victoria, Australia commissioned Melbourne University’s Statistical Consulting Centre to conduct a meta-analysis of all the studies claiming to link childhood cancer to power frequency magnetic fields. They concluded that “*there is prima facie evidence that a residential exposure to powerline frequency magnetic fields of at least 3 milliGauss is associated with an elevated risk of childhood cancer. The best estimate of such a possible effect is an odds ratio of 2.1*”<sup>24</sup>

When Ahlbom said at the Childhood Leukaemia Conference that felt that there is now no further point in doing any more epidemiological studies this was because he saw that the link with EMF exposure was so consistent and strong that there was no need to further confirm the connection with still more studies. Now the need is to find out the exact mechanism – then work on prevention. This is in stark contrast to dismissive statements put out by New Zealand’s National Radiation Laboratory.

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<sup>18</sup> A Ahlbom, N Day, M Feychting, E Roman, J Skinner, J Dockerty, M Linet, M McBride, J Michaelis, J H Olsen, T Tynes & P K Verkasalo, *A pooled analysis of magnetic fields and childhood leukaemia*, *British Journal of Cancer*, Vol. 83, pp. 692-698, Sept. 2000.

<sup>19</sup> S Greenland, AR Sheppard, R Asher, W Kaune, C Poole, M Kelsh, Michael for the Childhood Leukemia-EMF Study Group, *A Pooled Analysis of Magnetic Fields, Wire Codes, and Childhood Leukemia*, Vol. 11, No.6, Nov. 2000.

<sup>20</sup> M Kabuto, Y Honda et al, *A Japanese study on childhood leukemia in relation to residential background exposure to extremely-low-frequency electromagnetic fields*,

<sup>21</sup> *Microwave News*, Vol.20, No. 5, Sept/Oct 2000 (as above)

<sup>22</sup> *ibid.*

<sup>23</sup> It should be noted at this point that this information is available on the web site of [microwave.news.com](http://microwave.news.com), which also is a recommended source of further EMF information on page 19 of the NRL’s brochure “*Electric And Magnetic Fields And Your Health*”.

<sup>24</sup> The University of Melbourne Statistical Consulting Centre, *Epidemiological Studies of Cancer and Powerline Frequency Electromagnetic Fields*, A Meta-Analysis. Report No. 242, pp. 103-104, December 1990.

## On the NRPB's Advisory Group on Non-Ionizing Radiation (AGNIR)

As the NRPB "Doll report" is often quoted in documents, including those from the New Zealand NRL, NRPB statements should also be briefly examined here. In March of 2001, the British National Radiological Protection Board's (NRPB) Advisory Group on Non-Ionizing Radiation (AGNIR) chaired by Sir Richard Doll, released a report<sup>25</sup> that arrived at the same conclusion (a doubling of the risk at 4 mG) by simply restating the findings of the Ahlbom and Greenland studies. It did no research of its own to further contribute to the science<sup>26</sup>, but ensured that it got maximum media attention that gave the incorrect impression in the Media that Doll was the person who made the connection, as he had done so decades earlier with tobacco smoking.

Once AGNIR had the media spotlight, Doll's group started discounting the evidence with statements such as the one we see on page 8 of the AGNIR report:

In the absence of any unambiguous experimental evidence to suggest that exposure to these electromagnetic fields was likely to be carcinogenic, the Advisory Group concluded that the findings of the epidemiological studies that have been reviewed could be regarded only as sufficient to justify formulating hypotheses for testing by further investigation. They provided 'no firm evidence of a carcinogenic hazard' to either children or adults from exposure to normal levels<sup>27</sup> of power frequency electromagnetic fields."<sup>28</sup> After stating that the epidemiological studies are only good for forming hypotheses for further investigation, they later state on page 166 that "nothing would seem to be gained by further study of more cases of childhood leukaemia in relation to exposure to extremely low frequency electromagnetic fields in the UK."<sup>29</sup>

Now, if we follow AGNIR's logic in these two statements, the whole EMF health issue would forever remain in a hypothetical never-never land.

And from AGNIR's conclusions:

Laboratory experiments have provided no good evidence that extremely low frequency electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukaemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK. In the absence of clear evidence of a carcinogenic effect in adults, or of a plausible explanation from experiments on animals or isolated cells, the epidemiological evidence is currently not strong enough to justify a firm conclusion that such fields cause leukaemia in children. Unless, however, further research indicates that the finding is due to chance or some currently unrecognised artefact, the possibility remains that intense and prolonged exposures to magnetic fields can increase the risk of leukaemia in children.<sup>30</sup>

<sup>25</sup> ELF Electromagnetic Fields and the Risk of Cancer: Report of an Advisory Group on Non-Ionising Radiation, March 2001. Available at: [http://www.nrpb.org/publications/documents\\_of\\_nrpbf/pdfs/doc\\_12\\_1.pdf](http://www.nrpb.org/publications/documents_of_nrpbf/pdfs/doc_12_1.pdf)

<sup>26</sup> Correspondence with Ross Adey on the Doll AGNIR report, 26 July 2001.

<sup>27</sup> This only refers to magnetic field levels below 4 mG (0.4uT) which is a level AGNIR has called "higher levels".

<sup>28</sup> <sup>28</sup> ELF Electromagnetic Fields and the Risk of Cancer: Report of an Advisory Group on Non-Ionising Radiation, March 2001, Introduction, Item 7, page 8.

<sup>29</sup> Ibid. page 166.

<sup>30</sup> [http://www.nrpb.org/publications/documents\\_of\\_nrpbf/abstracts/absd12-1.htm#recomms](http://www.nrpb.org/publications/documents_of_nrpbf/abstracts/absd12-1.htm#recomms)

By making many such faltering statements, giving the impression of a great deal of scientific uncertainty, the NRPB was able to conclude that there was not a sufficient scientific basis for changing the existing exposure standards. The tactic of creating scientific uncertainty as an excuse to delay regulatory action has been a hallmark of the EMF issue ever since the establishment of the ICNIRP EMF guidelines in 1990. It's essentially a tactic used in the corporate world, called 'risk assessment / management'. This approach to 'risk' essentially transfers risk [of regulation] away from industry [in this case the power industry] by transferring the health risk to the general public.<sup>31</sup> Or to quote Langdon Winner: "...the ultimate consequence of this new approach [risk assessment] will be to delay, complicate, and befuddle issues in a way that will sustain an industrial status quo relatively free of socially enforced limits."<sup>32</sup>

It is an unfortunate fact that many of the Western world's national radiation health agencies (such as the NRL in New Zealand and ARPANSA in Australia) have apparently taken up a role of protecting the power industry against EMF regulation 'in the nation's interest' by avoiding public health protections. For a growing percentage of the concerned public however, this is no longer acceptable – as seen in the case of New Zealand.

### **Transpower's response to public concerns: "EMF Health Forums"<sup>33</sup>**

In November 2004 Transpower held a series of project "Information Days" to provide information about the 400 kV project and to "get a better understanding of local concerns".<sup>34</sup> One of the concerns raised was the health effects issue and that, combined with community protests, were deciding factors in Transpower deciding to hold a series of "EMF Health Forums" during 15–16 March 2005. Two in Hamilton on the 15<sup>th</sup> and two in Matamata on the 16<sup>th</sup>.

The Forums were advertised on Transpower's web site as being chaired by an independent facilitator, with a panel of "independent international experts". It was also mentioned on the site that Transpower operates within the "EMF guidelines recommended by the Ministry of Health (through the National Radiation Laboratory) which follow those set by the World Health Organisation (WHO)". It was also mentioned that these guidelines would be discussed at the forums.<sup>35</sup> The purpose of these forums was to decisively answer the concerned public's health concerns.

My own involvement with the Transpower 400kV issue began when *New Era Energy* contacted me in 25 February 2005 with a request to consider coming to Hamilton during the Transpower's EMF Health Forums as another "independent expert" to discuss the health issues at a series of public meetings. *NEE* originally hoped to be able to nominate a speaker to the Forum but this was declined by Transpower. *NEE* was then concerned that as all speakers at the Transpower's EMF Forum were selected by Transpower, or recommended to Transpower by the NRL, they would most likely be representing a viewpoint supporting Transpower. I accepted the invitation and was in NZ from the 12<sup>th</sup> to the 19<sup>th</sup> of March which allowed me to attend the first Hamilton EMF Health Forum on the 15<sup>th</sup>.

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<sup>31</sup> Risk & Regulation, Editorial: The Risk Industry by **Bridget Hutter** and **Michael Power**

<sup>32</sup> Langdon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, 1986

<sup>33</sup> For further details of Transpower's EMF Health Forums see: <http://www.gridupgrade.co.nz/?id=5297>

<sup>34</sup> <http://www.gridupgrade.co.nz/?id=5223>

<sup>35</sup> <http://www.gridupgrade.co.nz/?id=5297#contentsection13211>



## Transpower's Hamilton EMF Health Forum

The Forums were chaired by Chris Laidlaw, A Regional Councillor in Wellington and well known compare of a Sunday morning radio program. Mr. Laidlaw stated at the start of the proceedings that just because the speakers were being paid by Transpower to attend, this did not mean that the panel presenters were speaking for Transpower and were quite independent in any opinion that they gave.

### Expert speakers:

See transpower's web site<sup>36</sup> for full CVs on the speakers

**David Black** (Forum Conveiner) is a New Zealand Occupational & Environmental Physician and consultant member of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), otherwise known as the WHO recommendations. While serving on the Australian Standards TE/7 committee: Human exposure to electromagnetic fields Dr. Black strongly supported the adoption of the ICNIRP guidelines, which do not recognize the existence of low-level health effects.

**Andrew Wood** is Associate Professor in Biophysics at Swinbourne University, Victoria. Dr. Woods has served as a consultant to the WHO, advising on national strategies for non-ionizing radiation and is currently a consultant for the Electricity Supply Association of Australia (ESAA) as well as serving on numerous Australian government committees, including chair of the Australian Radiation Protection & Nuclear safety Agency's (ARPANSA) ELF Working Group (with the task of developing a new Australian on power frequency exposure limits.

**Note:** Relevant to this discussion, at the Annual 2003 conference of the Australian Radiation Protection Society (ARPS), Dr. Woods gave a presentation that compared the public's concerns over health hazards from EMFs to a newspaper article about Russian museum worker's fears over a curse supposedly placed on a Russian sacred icon on display – with an obvious inference that the public's concerns over EMF were just as irrational.<sup>37</sup>

**Martin Gledhill**, is a Senior Scientific Advisor for the N.Z, National Radiation Laboratory. His responsibilities relevant to this discussion include the development of public information on EMFs, Development of EMF exposure guidelines, measurement of RF and ELF sources, estimation of likely exposures in installations and giving presentations on various aspects of EMFs on health to professional groups, university courses, etc.

**Jerrod Bushberg** is the Director of Health Physics Programs at the University of California at Davis, and is a Clinical Professor of Radiology and radiation Oncology at the UC Davis School of Medicine. He has performed health & safety analysis on RF & ELF (power frequency) transmissions systems since 1978. He has extensive experience and lectures on the science of Risk Assessment and on Effective Communication in the public sector.

**Ruth Miller**, Associate professor, Dept of Electrical & Computer Engineering, Kansas University. Previous education in electrical engineering. Dr. Miller is a senior member of the

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<sup>36</sup> <http://www.gridupgrade.co.nz/?id=5297#contentsection13365>

<sup>37</sup> Woods A. "Effective Protection against Non-Ionizing Radiation (NIR) or: the Devil's in the Detail", ARPS-28 Conference, Hobart Function and Conference Centre, Oct.28, 2003.

industry association The Institute of Electrical and Electronics Engineers Inc. (IEEE). Her technical areas of interest are in electromagnetics, bioelectromagnetics and health effects of electromagnetic fields. Has done substantial technical research for electrical utilities and has written critical reviews of the epidemiological literature on power frequency magnetic fields and cancer, including a paper, "What is Truth?": Creating Scientific Consensus without Compromising Truth"<sup>38</sup>

## On the Epidemiology

The presentations of all five speakers were made for slightly over 2 hours and were followed by an hour of questions from the audience. Each of the speakers in turn were unified in their opinions that the epidemiological studies that were the basis of the 4 mG (0.4 uT) EMF / childhood leukaemia connection were flawed and unreliable. Some of the reasons given were that they were biased in their interpretation, the statistics were not acceptable, many studies were badly designed, such as using questionable wire coding, air pollution from roadway traffic could be the factor rather than EMFs, and there was no known EMF mechanism that could conceivably cause leukaemia. The overall conclusion of the speakers was that because of these faults with the population studies the apparent association with EMF and leukaemia in the epidemiological studies was very weak and therefore there is really no cause for public concern.

## A question of bias

The issue of bias in interpreting epidemiological studies came up when I pointed out to the panel, and audience during the question & answer that findings in two of the studies as presented by the speakers were incorrectly reported.

## Misreporting the Linet Study

Ruth Miller put up a slide that stated that the 1997 National Cancer Institute Linet study of 638 children with leukaemia found no association with the disease and exposures up to 2 mG (0.2 uT). This would be in agreement with the original NCI press release, on July 2<sup>nd</sup> 1997. To Quote:

A comprehensive study by researchers from the National Cancer Institute (NCI) and the Children's Cancer Group (CCG) found no evidence that magnetic fields (EMFs) in the home increase the risk for the most common form of childhood cancer."<sup>39</sup>

In this case-control study the researchers found that, in general, children who lived in homes with high measured magnetic fields were not significantly more likely to be diagnosed with acute lymphoblastic leukemia (ALL) than children living in homes with lower magnetic field levels. Nor was ALL found to be more likely among those whose homes were classified in high categories of 'wire-code,' a surrogate measure of magnetic fields that is based on the thickness, configuration, and distance from the home of nearby power lines.<sup>40</sup>

And as reported in the February 1998 issue of *EMF Update*, published by the Electricity Supply Association of Australia:

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<sup>38</sup> Presented at the Annual Meeting of the American Scientific Affiliation, Wenham, Maine, August 2000.

<sup>39</sup> Maisch D. Powerline Frequency Electromagnetic Fields and Human Health - Is it the time to end further research? An Overview of Three Recent Studies, JACNEM Vol. 17 No. 1, page 5, June 1998

<sup>40</sup> *ibid.*

A major scientific study published in the 3 July edition (1997) of the New England Journal of Medicine reported no statistically significant correlation between magnetic field exposure in the home and the incidence of childhood leukemia.

Don MacPhee from LaTrobe University's School of Microbiology was quoted in *The Australian* that the results of the NCI Study backed his claims that power lines did not emit enough energy to cause childhood cancer or any other form of cancer. MacPhee said that it was mostly the media, and scientists of "dubious quality", that had perpetuated the myth that there was any link between power lines and cancer. "*Its just absolute non-sense*", Dr. McPhee said.<sup>41</sup>

It is unfortunate that the authors of the official NCI press release, which by their dismissive statements, created a scientific "urban myth" that this study is convincing evidence that there is no connection with power frequency EMFs and childhood leukaemia. As with so many other "urban myths" it has been shown to be untrue.

If one takes the time to examine the study in detail, and not just go by press releases, one reads that the researchers actually acknowledge, in no less than four places, a statistically significant increase in acute lymphoblastic leukemia (ALL) in children exposed to powerline magnetic fields in excess of 3 milliGauss.<sup>42</sup>

The NCI researchers were able to dismiss this fact by arbitrarily setting a 2 mG level as a cut-off limit. Only by setting that artificial limitation could they conclude that there was no association. The fact is, that if they had used the 3 mG level as a cut-off point in their calculations, the conclusions would have been exactly the opposite - that there is a statistically significant connection between powerline magnetic fields and childhood leukemia at levels over 3 mG.

On July 4th 1998 I contacted Professor Ross Adey (now deceased), one of the best known bio-electromagnetic researchers in the world. Dr. Adey is the author of numerous books and research papers on the bio-effects of EMFs. He had conducted a \$3 million research program for Motorola and had been a committee chairman on the USA National Council on Radiation Protection and Measurements (NCRP). His comments on the NCI study are as follows:

A number of us worked on the NCI paper through last weekend. Sam Milham, the Washington State epidemiologist and a pioneer in this field, points out that if they had included the 3 mg level in their cutoff, the conclusions would have been exactly the opposite - that there is a significant risk. And selection of 2 mG is quite arbitrary. David Savitz used 3 mG in some of his work. Obviously there is no steep threshold beyond which risks rise exponentially. At the recent Bologna International Symposium, Schuz from the University Mainz had a paper combining kids from Berlin and Southern Saxony in high exposure homes to give leukemia odds ratio of 6.8 for young kids (under 4 years). So the dismissive attitude of NCI is totally unrealistic.<sup>43</sup>

As Ruth Miller would have been well aware of the limitations of the Linet study, the question immediately arises why did she avoid mentioning them in her presentation? A clear case of bias,

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<sup>41</sup> *The Australian*, July 4, 1997.

<sup>42</sup> Linet MS, Hatch EE, Kleinerman RA, Robinson LL, Kaune WT, Freidman DR, Severson RK, Haines CM, Hartsock CT, Niwa S, Wacholder S, Tarone RE. "Residential Exposure to Magnetic Fields and Acute Lymphoblastic Leukemia in Children." *The New England Journal of Medicine*, 337 (1):1-7, (1997)

<sup>43</sup> Maisch D. as above, page 8.

as defined by the NRPB: *“any process at any stage of inference which tends to produce results or conclusions that differ systematically from the truth”*.

### **Misreporting the Otago study**

In Martin Gledhills' (NRL) presentation one of his slides gave the findings of the Otago Childhood EMF study as finding no association with magnetic field exposure, the same as it is reported in the NRP brochure, *“Electric And Magnetic Fields And Your Health”*.

As examined on page 1 and 2 of this paper, the Otago study also suffers from bias when interpreted by the NRL.

When I pointed out at the Forum that the findings of both the Linet and the Otago studies had been incorrectly reported by the two presenters, panel did not disagree but admitted that this was a noted criticism of the studies.

However David Black, while speaking for the panel, was of the opinion that one must go by the published statements of the authors, though these statements may differ from the true outcome of the studies.

Thus the EMF Health Forum panel has qualified for the NRPB's definition of bias: *“any process at any stage of inference which tends to produce results or conclusions that differ systematically from the truth”*.

The truth is that both these studies do indicate an association with childhood leukaemia for children exposed to higher level magnetic fields over 3 mG (0.3 uT). To say otherwise is essentially trying to deceive the public. In the case of Transpower's "EMF Health Forums" the overwhelming opinion<sup>44</sup> of the public that attended the Forums was that Transpower's experts were not to be truthful.

Martin Gledhill did make a statement that even if the EMF / leukaemia link was true, the risk was very small and only one or two children a year or so would be affected and in a country like New Zealand based on 900,000 children it would take 80 years to see even one case. The public response to this was that there was some doubt and therefore the public were being treated like guinea pigs. The public response was very negative to Gledhill's mathematics at this point with several people walking out at this point in obvious disgust.

### **The 1996 NAS/NCR Report**

The NAS/NCR report was also mentioned by the Panel members as still another review of the science that gave an all clear to power line EMFs. This is referring to the 1996, US National Academy of Sciences, National Research Council's (NAS/NRC) review of the EMF literature: "Possible Health Effects of Exposure to Residential Electric and Magnetic Fields". The conclusions of this report were that "there is no conclusive and consistent evidence showing that exposure to residential electric and magnetic fields produces cancer, adverse neurobehavioral effects, or reproductive and developmental defects".

Of significant importance are the words, "conclusive and consistent". Like the more familiar phrase in law, 'beyond reasonable doubt', 'conclusive and consistent' implies a certain standard of evidence that needs to be met before taking action. Using that type of reasoning, the NRC

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<sup>44</sup> As discussed at several public meetings during the days following the Forums.

Committee concluded that research results do not show that EMF exposure at a residential environmental level causes adverse health effects.<sup>45</sup>

The 1996 NRC press release stated: "To date, they have found no evidence to show that EMFs can alter the functions of cells at levels of exposure common in residential settings. Only at levels between 1,000 and 100,000 times stronger than residential fields have cells shown any reaction at all to EMF exposure... In fact, exposure may actually help the body in some subtle ways, for example by speeding up the healing process after a bone is broken."

In the Electrical Supply Association of Australia's (ESAA) newsletter *EMF Update* of January 1997, it is reported:

In an extensive review of the scientific literature relating to the possible health effects of exposure to residential electric and magnetic fields... the (NAS) concluded that 'the current body of evidence does not show that exposure to these fields presents a human-health hazard...' NAS appointed an expert committee of 16 scientists to review 17 years of research . . . in hundreds of studies on three continents. The present report is the result of that effort . . . It [the NAS report] is an important benchmark document in the history of the EMF scientific debate against which future research findings will need to be viewed.<sup>46</sup>

### **Limitations of the NAS/NRC Report not mentioned at Transpower's EMF Health Forums**

Is the NAS/NRC report a conclusive vindication for EMFs in the health issue? The answer to that question depends upon your viewpoint. If you take a narrow legalistic interpretation for conclusive evidence, the 'not guilty' verdict may seem appropriate, especially if you take into account only the evidence considered by the NRC Committee.

However if you take a scientific interpretation and consider all the available evidence, so many scientific studies were excluded from the 'extensive' NAS/NRC report, that its conclusions cannot be considered a proper review of the scientific literature up to 1995.

In its review of the literature, the NRC Committee restricted itself to considering only studies published in peer-reviewed journals up to mid-1995, when the report was drafted.

In fact the NAS/NRC Committee only considered approximately half the evidence which was available to it in 1995. Dr. Kjell Hansson Mild of the National Institute for Working Life in Sweden, asked Dr Stevens, chair of the NRC Committee, how "the report turned out to be so biased in its selection of papers". Mild, past president of the Bioelectro-magnetics Society, noted that the report mainly included papers that showed no effect and omitted those that found a biological response.<sup>47</sup>

Excluded from the NAS/NRC findings was the extensive body of occupational studies, such as the Ontario Hydro worker study, which found that workers exposed to high levels of magnetic and electric fields had leukemia rates that were up to 11 times greater than expected.<sup>48</sup>

<sup>45</sup> National Research Council, *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*, National Academy Press, Washington DC, USA, 1996.

<sup>46</sup> Electrical Supply Association of Australia's (ESAA) newsletter *EMF Update* of January 1997

<sup>47</sup> Letter by Dr. Kjell Hansson Mild to Dr. Charles Stevens, chairman of the NAS Committee. *Microwave News*, Jan/Feb 1997, p. 2.

<sup>48</sup> *Microwave News*, July/August 1996

In fact the committee acknowledged that workplace studies "have increased rather than diminished the likelihood of an association between occupational exposure to [EMFs] and cancer". The NAS committee only did what has been called a "superficial overview" of this literature because the official reason was that it was not directly relevant to the committee's assignment.<sup>49</sup>

Also excluded from the findings was the entire body of research into the effect of environmental low level EMF exposure on melatonin, known as the melatonin hypothesis (low level magnetic field exposures may reduce the pineal gland's production of cancer-inhibiting melatonin and the ability of melatonin to suppress breast cancer cells). This hypothesis is supported by five *in vitro* studies, from three major laboratories, as well some human exposure studies finding a reduction in melatonin levels in workers exposed to EMFs. The body of this research implicates prolonged powerline frequency magnetic field exposure in the order of 12 mG with possible hormone disruption.<sup>50</sup>

To be fair to the NAS/NRC report, the meta-analysis of 11 residential epidemiological studies was one of the most thorough conducted to that date. What it did find is that there is a reliable statistical association between childhood leukemia and power line proximity, as classified by wire codes.

However, because the committee was looking for conclusive evidence of a connection with EMFs, it was able to dismiss all data which failed to meet this criterion and therefore could not conclude EMFs were to blame. Epidemiology looks for increases in risk factors, it does not deal with conclusive proof. By setting such an impossible standard, the National Academy of Science was able to dismiss the EMF link with childhood cancer and announce to the world that there was nothing to worry about.

So rather than being an "important benchmark document in the history of the EMF scientific debate against which future research findings will need to be viewed" the NAS/NRC study appears to have been designed, by its limitations, to give an assurance of safety, when the evidence does not warrant that conclusion.

And most importantly, this review is very dated, done well before both the later Ahlbom and Greenland meta analyses just to mention two.

### **A final comment on the EMF Health Forums**

There is much more that could be commented on but the mis-reporting of just these three is illustrative of the bias against health effects by the panel. They all supported the ICNIRP guidelines of 1000mG (100 uT) as sufficiently supportive of public health and their unwillingness to depart from that stand was certainly a factor in loss of public trust in their expert advice. My impression of the Forums was that Transpower was hoping to dampen the public's health concerns by dazzling them with an array of experts well versed in the science. What they got instead was a rather bumbling road show that only further enflamed public concerns. During the three days I spend in the area afterwards, meeting with hundreds of those

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<sup>49</sup> *Microwave News*, Nov/Dec. 1996, p.8.

<sup>50</sup> Maisch DR. *Melatonin, Tamoxifen, 50-60 Hertz Electromagnetic Fields and Breast Cancer: A Discussion Paper*. Tabled in the Australian Senate, 29 October 1997.

concerned citizens, I met no one who was happy with what was presented at the EMF Health Forums. Typical was the response one farmer gave to Laura Bennet after the Forum “This is a Transpower funded stitch up from start to finish”.

A quote I briefly mentioned earlier from the latest issue of the U.K. publication “Risk & regulation sums up the current situation in New Zealand quite succinctly.

Organisations may get safer because they simply transfer risk to those least able to transfer it themselves, namely the general public. This explains why there is no evidence to date, nor is there likely to be, that public trust in corporations is improved by the industry of certifications and disclosures they currently produce. **The general public is smart and knows that this is all secondary risk management.**<sup>51</sup>

On 12 April 2005 I received an email from Solina Theron from Prime TV in New Zealand saying that Transpower have told them that they have decided to run no more public discussion forums, saying “they don't get anywhere”.<sup>52</sup>

### **The NZ media reporting on the HVTL health issue**

Any discussion on public awareness of the 400 kV HVTL health issue would be incomplete without examining the active role taken by the New Zealand media in publicizing the issue to a wider audience than landholders directly affected by proximity to the proposed transmission line.

A factor that exacerbated the problem for Transpower in the public arena was the fact that many homes in Auckland were allowed to be built immediately under high-voltage transmission lines, a situation that even one of the experts brought over from the US by Transpower disagreed with. This expert (Dr. Ruth Miller) stated on national TV that people should not be allowed to live under transmission lines and that she was very surprised that there were houses directly under powerlines in New Zealand (due to electrical safety issues<sup>53</sup>). Her TV statement, taken out of context<sup>54</sup> by the TV program, received great TV airing over several days and tended to make a mockery out of Transpower's assurances of safety.

In early March Prime TV's Paul Holmes show (a current affairs program) featured a street, Timandra Place, in Massey, a suburb of Auckland where many of the residents were suffering ill health. The residents had long been blaming their health problems on the nearby transmission line and large substation at the end of the street. Both the substation and transmission line were emitting an incessant “hum” that was a constant reminder to the residents – and made it an obvious source to blame for their illnesses.

One family was interviewed with five children, the three oldest were healthy but the two born since they moved into the house are very ill. One had leukaemia, epilepsy and a skin condition called Nethertons Syndrome and the other asthma and Nethertons Syndrome. Even the family cat has had deformed kittens since being there. Other families on the street are having ill

<sup>51</sup> Risk & Regulation, Editorial: The risk industry. <http://www.lse.ac.uk/resources/riskAndRegulationMagazine/>

<sup>52</sup> Email correspondence with Solina Theron, The Paul Holmes Show, Prime TV New Zealand, April 12, 2005.

<sup>53</sup> It is not uncommon for transmission lines to break and fall in high winds. Obviously a clear hazard for people living in homes directly underneath.

<sup>54</sup> Dr. Miller had earlier confirmed with the interviewer Paul Holmes that she considered that there were no disconcerting health effects from living under pylons including the proposed 400kV line.

children who have been conceived and raised on the street. Another family also reported having the family cat with deformed kittens.

Professor Roger Booth, who worked on the Auckland Chronic health study with Ivan Beale (mentioned earlier) was interviewed and he mentioned their study found there was a relationship that the people who were living with higher magnetic field strengths tended to report more chronic illnesses than those in the lower field strength category. Booth said that studies like Ivan Beale's show that you do have associations but he could not say that the substation was the reason for their illnesses. He did say however, that it's certainly something that needs to be taken seriously.<sup>55</sup>

As no EMF readings were taken at and around the homes at Timandra Place at the time, it would be unfair to place the blame on EMFs as a factor in the resident's health problems. However for the people directly affected, they thought it reasonable to think that some environmental factor was at play in the street, with the hum and unsightly presence of the substation and transmission lines the most visible reminder that they may be the cause.

On Monday, March 14<sup>th</sup>, by prior arrangement, I spent much of the afternoon with a Prime TV camera crew taking EMF measurements around Massey, including Timandra Place, mentioned above. From interviewing many of the Timandra residents it did seem that it was indeed a sick place to live but the magnetic fields in that particular street were quite low (maximum of 1.7 mG at the substation fence). I stated to the reporter that at these low levels it was impossible to connect EMFs with the health problems. However, the residents remarked that within days of the Paul Holmes show, three Transpower service crews, all wearing difference coloured coats, did extensive work in the substation and since then the 'humming' from the substation and adjacent transmission line was only a fraction of what it was previously. That would tend to indicate that the loads on the lines were previously unbalanced, which would have given off higher magnetic fields with a more audible hum.

However in another nearby street we found many homes directly beneath 220 kV transmission lines, with elevated magnetic fields of over 35 mG in the homes. This footage was aired on the Paul Holmes show the following evening after the first Transpower EMF health Forum and was shown immediately before a taped face-to-face interview by Paul Holmes with Transpower's independent EMF expert, Dr. Ruth Miller, from Kansas and myself discussing the health issue.

The transcript of the later Paul Holmes interview with Dr. Ruth Miller from Kansas State University and myself is as follows:

**P Holmes:** *More anger and meetings today about the health effects of living underneath those high voltage power lines. Never mind the sheer Stalinist ugliness of that river of steel which Transpower has proposed to run through Whakamaru to South Auckland. That alone would be enough for many of us to take to the streets. It's the health worries that has got the people going. Does living under those high voltage wires cause illness and particularly illness and disease in children?*

*Well, last week we saw some savage skin problems in kids living near a substation in Massey, near Auckland. An Australian researcher who's here in the country who's PhD which he is doing at the moment is looking at high voltage lines and health risks. Solina Therion took Don Maisch to yet another cluster in Massey under powerlines to take some magnetic field readings.*

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<sup>55</sup> Taken from the Paul Holmes show transcript



**(Cut to film clip showing the previous day's EMF measurements in Massey):** It began with a shot of me taking magnetic field measurements inside and around a public housing home directly under a 220 kV transmission line. Measurements were in the 30 – 37 mG range. I compared these levels with the 4 mG level being associated with a doubling of the risk of childhood leukaemia as well as other immune system effects and that the evidence for these illnesses was now well beyond reasonable doubt. I said that homes should not be built here and that it should be a right of way paddock, not a place where people live. I called the situation of still allowing a 1000 mG exposure limit, and allowing homes to be located right under the lines as no longer justified, just as their standards that they [NRL / Transpower] are hiding behind are also not justified. I said that the real thing that the standards [1000mG] provide protection against is litigation for the Industry and its not protecting public health as it is supposed to.

**Cut back to Paul Holmes:**

**P Holmes:** *Don, you found 36 mG under those lines but the NZ Ministry of Health says 1000 mG is okay. Is the Ministry wrong do you think?*

**D Maisch:** *Yes, I would say so. I attended a conference in London last September, in which a lot of the new evidence was presented and I think we now have enough evidence to say its beyond reasonable doubt .*

**P Holmes:** *Beyond reasonable doubt there is a problem over 4 mG?*

**D Maisch:** *Yes, there is a slight increase in childhood leukaemia above 4 mG. It is a small risk but it is a significant risk when you look at the data.*

**P Holmes:** *So when you look at what is being proposed by Transpower would you say you would believe there is a clear link between illnesses in people living underneath or near them?*

**D Maisch:** *It is hard to put it that way. It depends upon several issues, it depends upon the right of way – how close the homes are to the lines. The case we looked at the other day was a worst-case situation – it was directly underneath the span of the lines.*

**P Holmes:** *Dr. Miller, I take it you believe there are no health worries about living near those lines being proposed?*

**R Miller:** *That is correct.*

**P Holmes:** *Transpower would hardly bring you all the way from Kansas State, Manhattan, Kansas to New Zealand if they thought that there would be a problem, would they?*

**R Miller:** *I don't know what you mean.*

**P Holmes:** *I mean that Transpower would be unlikely to bring somebody who thought that there was something wrong with the lines.*

**R Miller:** *That is for you to ask Transpower, not me.*

**P Holmes:** *Do you believe there are no health problems associated with those proposed lines?*

**R Miller:** *That is correct.*

**P Holmes:** *So you disagree completely with Mr. Maisch?*

**R Miller:** *That is correct.*

**P Holmes:** *You believe there are no discernable health effects from living under those pylons and powerlines such as are being proposed?*

**R Miller:** *That is correct.*

**P Holmes:** *Don't?*

**D Maisch:** *I think from my own experience over the past few years- I have been working with a group of Doctors in Melbourne and we have been doing surveys and looking at people who are sick and looking at a possible link with exposures. What we are seeing is a fairly clear link. We are not talking about leukaemia now, we are looking at chronic health states. You have to look at a study here by Ivan Beale from Auckland University. He looked at chronic health states in proximity to transmission lines. This is getting into a wider issue now, not just childhood leukaemia. What we are basically saying is – yes there is concern here. The guidelines which are basically 19 years old...*

**P Holmes:** *(to Dr. Miller) So you disagree with all of that? You disagree with all that research he is talking about?*

**R Miller:** *He is talking about a small fraction of the research. There is overwhelming evidence from the research that there is no effect of low level magnetic fields.*

**P Holmes:** *The problem is that you scientists argue what are the rest of us to think? You know – that's the worry.*

**R Miller:** *Yes, that's true but there is a lot more scientists on my side than on his.*

**P Holmes:** *Can I ask you Dr. Miller. If you had the choice of bringing your kids up under pylons or not bringing them up under pylons which one would you choose?*

**R Miller:** *I would not live under pylons but I don't think they should let you live under pylons. I think that they should, as they do in the US, keep a right of way and the reason is for electrical safety. I am very surprised that there are houses directly under powerlines in this country.*

**P Holmes:** *All-right, but if you had the choice of bringing up your kids up near powerlines or pylons or not bringing them up near powerlines or Pylons what would you choose?*

**R Miller:** *I wouldn't choose on that basis. It would matter far more other issues. The proximity of a line outside the right of way would not be a deciding factor.*

**P Holmes:** *So how close is too close, then to lines carrying 400kV*

**R Miller:** *In the US about 23 meters is the edge of the right of way, and again that is to do with electrical safety and the ease of maintaining the line.*

**P Holmes:** *So you think living that close there would be no discernable chronic health effects?*

**R Miller:** *That is correct.*

**P Holmes:** *Don, you would disagree with that?*

**D Maisch:** *I am just thinking about some research done in France. They have found health effects from 400 kV transmission lines up to 100 meters, and down to 2 mG. They found a blood condition which needs to be further researched, and there is other evidence too – a lot of evidence which is not in the guidelines which they haven't even considered. It is no longer justifiable.*

**P Holmes:** *Okay, what is the risk in Australia, Don? Would the Transpower option be acceptable in Australia?*

**D Maisch:** *Well, I think that in Australia you wouldn't see the number of homes under transmission lines. We are very similar – the authorities follow the same guidelines. So we have the similar issue over there.*

**P Holmes:** *So, Don Maisch thank you very much for your time, and thank you Dr. Ruth Miller very much. – Both of you for your enlightening comments.*

END

### **Its all a question of risk management, not science**

Over the past few years the concept of risk management<sup>56</sup> for environmental health hazards has come under a standardization process that began in 1995 with a risk management standard produced by a joint Australian / New Zealand standards committee<sup>57</sup>. This standard examined 'international best practice' in relation to risk management and incorporated many aspects of that into its local standard. As this standard met the "many of the needs of overseas organizations"<sup>58</sup> it gained a wide following outside of the Australasian region. The 1999 revision to AS/NZS 4360 has gone on to be an almost de facto global standard and has been adopted by a number of multi national corporations as the basis of their corporate risk management programs.<sup>59</sup> As defined in AS/NZS 4360 risk management is a corporate business tool that enables "organizations to minimize losses and maximize opportunities. Risk management is as much about identifying opportunities as avoiding or mitigating losses".

The latest guidance on a global approach to risk management is in a September 2004 publication from the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in September of 2004.<sup>60</sup>

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<sup>56</sup> Defined in the AS/NZS 4360 risk management standard as: Risk management is recognized as an integral part of good management practice. It is an iterative process consisting of steps, which, when undertaken in sequence, enable continual improvement in decision-making. Risk management is the term applied to a logical and systematic method of identifying, analyzing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organizations to minimize losses and maximize opportunities. Risk management is as much about identifying opportunities as avoiding or mitigating losses. This Standard may be applied at all stages in the life of an activity, function, project or asset. The maximum benefit is usually obtained by applying the risk management process from the beginning

<sup>57</sup> AS/NZS 4360: 1999 Risk Management

<sup>58</sup> Standards Australia, A globally accepted Standard for Risk Management, by Kevin Knight.

<http://www.riskmanagement.com.au/Default.aspx?tabid=149>

<sup>59</sup> *ibid.*

<sup>60</sup> <https://www.lse.ac.uk/resources/riskAndRegulationMagazine/internal/editorialTheRiskIndustry.htm>

## **COSO and environment health risks**

The ability of COSO to properly assess and manage environmental risks to the public from the manufacturing activities from industry is very much called into question by the qualifications of its sponsoring organizations, all of which represent the views of the corporate sector, as stated on its web site:

The Commission was jointly sponsored by the five major financial professional associations in the United States, the American Accounting Association, the American Institute of Certified Public Accountants, the Financial Executives Institute, the Institute of Internal Auditors, and the National Association of Accountants (now the Institute of Management Accountants). The Commission was wholly independent of each of the sponsoring organizations, and contained representatives from industry, public accounting, investment firms, and the New York Stock Exchange.<sup>61</sup>

As mentioned in the latest issue of the UK Risk and Regulation Magazine, the ongoing risk management standardization process has come to have the status of “global blueprints”, where nation states and their regulatory organizations are adopters, rather than originators, of management knowledge, especially in the case of risk management.<sup>62</sup>

Taking COSO as an example, it is of concern to this writer that private sector organizations dealing with corporate sector financial affairs (protecting the bottom line) are effectively in charge of setting the guidelines for risk management of environmental hazards resulting from corporate business activities. Some might call that a conflict of interest to say the least. These risk management guidelines are then promoted as “global blueprints” for national regulatory bodies to incorporate uncritically for their countries. A risk management regime that allows corporations to minimize financial losses and maximize opportunities. Who is looking after the public interest with the risks that they are exposed to?

### **Enter ICNIRP & EMF risk management**

Another private sector organization that has assigned itself the specific task of providing a global risk management protocol specifically for the health hazards of non-ionizing electromagnetic field (EMF) exposure is the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP promotes itself as providing sound advice on managing the risks of EMF exposure, based on thorough evaluations of the published scientific literature. It claims that its advice is solely based on established health effects, with no consideration given for economic or social issues. Both the World Health Organization (WHO) and ICNIRP are now pushing for global acceptance (harmonization) of the ICNIRP guidelines by encouraging national agencies, such as the New Zealand Ministry of Health and its National Radiation Laboratory to uncritically accept ICNIRP’s viewpoint on EMF risks to health.

### **Five dubious ICNIRP claims**

ICNIRP claims that there are many benefits for countries, such as New Zealand having harmonized standards for EMF exposures, it is claimed that such benefits include<sup>63</sup>:

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<sup>61</sup> [http://www.sox-online.com/coso\\_cobit\\_coso.html](http://www.sox-online.com/coso_cobit_coso.html)

<sup>62</sup> <https://www.lse.ac.uk/resources/RiskAndRegulationMagazine/internal/editorialTheRiskIndustry.htm>

<sup>63</sup> Power Point presentation: Base Stations For Mobile Telephony: Possible Effects and Health Policies Paolo Vecchia, National Institute of Health, Rome, Italy, Chairman of ICNIRP, Bahrain 2005

- **Increased public confidence that governments and scientists agree on health risks.** – As has been shown in the New Zealand case, public confidence in the NRL and the health Ministry has been lost by the agency's continuing insistence on following ICNIRP /WHO recommendations. And ICNIRP's claim that "scientists agree on health risks" ignores significant scientific disagreement over what those health risks are.
- **Reduces debate and fears about EMF.** – Not true: Because of the new Zealand health agencies maintaining ICNIRP's no health hazards policy and thereby losing the public's trust this has enflamed the public's fears about EMFs, not reduced it.
- **Provides health protection for everyone at the same high level.** - As this "health protection" is only for immediate health hazards at high levels of exposure and not for prolonged chronic exposure, which is the public's main concern, its health protection claim is irrelevant.
- **Avoid confusion in the public mind and stress about health effects from EMF exposure when there are different EMF limits required by different authorities.** - The confusion in the New Zealand concerned public mind was over the discrepancy between official claims that there are no health concerns versus a significant body of evidence for the reality of hazards. It had little to do with differing limits set in some countries, such as Switzerland and Italy.
- **Choosing exposure limits that cannot be justified, either scientifically or logically, have already created some mistrust of the science, and in the authorities.** - The New Zealand concerned public leveled this same claim at ICNIRP's exposure limits and their denial of environmental level EMF health hazards, which as can be seen in the New Zealand case, directly have created mistrust of their science and the authorities that quote it.