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The Conceits of Setting EMF Standards

Australia To Triple Its Limit to 3,000 mG

At a time when there are calls for tightening EMF power-frequency exposure standards to address cancer risks, Australia is moving in the opposite direction. In mid-May, a committee working under **ARPANSA**, the national radiation protection agency, distributed a draft proposal that would triple the permissible exposure levels for the general public. If the rules are adopted, children could be exposed to up 3,000 mG, 24/7—that's one thousand times higher than the 3 mG threshold for childhood leukemia indicated by epidemiological studies, and three times higher than the **ICNIRP** recommended **limit** of 1,000 mG.

Work on the new EMF standard started back in 2002. ARPANSA picked **Andrew Wood**, a biophysicist at Swinburne University to lead the effort (see ***MWN*, S/O02**, p.3). ARPANSA and Wood agree that ambient levels of EMFs are generally harmless. The **EMF Fact Sheet** on the ARPANSA Web site, for example, opens with the following reassuring message in large type: "On balance, the scientific evidence does not indicate that exposure to 50 Hz EMFs found around the home, the office or near power lines is a hazard to human health." Wood has offered a similar opinion on any number of occasions.

Wood released a preliminary draft of the new Australian standard at the end of 2006. He recommended limits that were very similar to the old ones. Back in 1989, Australia's National Health and Medical Research Council (NH&MRC) had set an interim EMF standard that was identical to the one adopted by ICNIRP that same year. (In those days, ICNIRP was still part of **IRPA**.)

Wood did make one important change. He deleted, as ICNIRP had done in 1998, a short-term limit—a loophole—that allowed exposures of up to 10,000 mG for "a few hours per day" while at the same time he proposed that the public could be exposed up to 3,000 mG under certain special circumstances. ICNIRP does not allow any such exception. For areas where the fields may exceed 1,000 mG, that draft standard would have required that documentation be prepared explaining why they are "practically necessary." Signs would also have had to be posted advising people to limit their time in the area as well as listing phone numbers and

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Web addresses where "comprehensive information about the likely exposure levels and possible risks to health" could be found.

More than 60 public comments on Wood's 2006 draft standard flowed in and a good number favored a greater emphasis on a precaution, especially in light of the risk of childhood leukemia. On the other side, the electric utilities complained that there was no need to tighten the standard. The Energy Networks Association, (**ENA**), an industry trade group, **stated** that the proposal was "overly conservative and costly." The ENA warned that, "The increased use of warning signs in public areas required by the draft standard could be expected to increase community concern about the EMF issue rather than reduce it."

On May 22, two-and-a-half years after the first draft, Wood's committee distributed a new proposal to ARPANSA's Consultative Group, made up of interested parties, from pro-environment to pro-industry, who are not part of the official process. Wood had added a few pages on precaution and highlighted them with a new title for the standard. What had been *Exposure Limits for EMFs* was now *Limits and Precautionary Measures for Reducing Exposure to EMFs*. Wood had also made a more important and less publicized change: The 1,000 mG limit had been replaced by 3,000 mG. A 3,000 mG limit would no longer be a special case, it would be the standard. All the rules for precautionary signage for magnetic fields had been deleted. No one would now have to be told if they might be exposed to more than 1,000 mG.

Before going any further, we need to introduce a somewhat arcane but key feature of many EMF standards: Exposure limits, called "basic restrictions," are written in quantities that are very difficult, if not impossible, to measure. At power-line frequencies, the standard seeks to restrict the induced electric current in the retina or other sensitive tissues below a given threshold to make sure that people don't suffer muscle spasms or "see" stars (for more on this latter phenomenon look up **phosphenes**).

As you can imagine, there is no practical way to see whether the basic restrictions are being met or exceeded. No one is going to stick a probe in somebody's eye to check compliance. The basic restrictions for "spasms and stars" have to be translated into quantities that can be measured. These are called "reference levels." At power frequencies, the reference levels are written in terms of ambient electric and magnetic fields. If all this sounds overly complicated, that's because it is. If compliance were a priority, the standard would be written in terms of quantities that are easily measured and enforced, as they are for most other toxic agents.

What prompted Wood and ARPANSA to triple the limit? How did it happen and why? A simple explanation would be that the government wanted to make it easier to site new power lines and substations. If the public could be convinced that EMFs are innocuous except at extremely high levels, a major stumbling block would be cleared away. No doubt, that's part of the story.

The rest is about how Wood and ARPANSA tried to make it appear as if the new standard is based on what is new, well-established biomedical knowledge. To accomplish that, they relied on an excess of artifice. We call them conceits and we spell them out below. Australia is not an isolated example. Many of the same conceits are at work in most other parts of the world, notably in the U.S. where the IEEE's **ICES**, whose membership is dominated by engineers from the military-industrial complex, runs the show.

Five Conceits of EMF Health Standards

#1. We Know What's Going On — Tripling the exposure limits sends a clear message that those writing the standard understand what EMFs do to human biology. That is, the rules can be relaxed because of what has been learned since the last time the limits were set. This is a fairy tale. We may be getting a better handle on two specific acute effects, spasms and stars, but we are making scant progress on what might happen over the long term.

In fact, in a **presentation** to an industry workshop last November, Wood stated that the basic restrictions had not changed since the 2006 draft which set the ambient limit at 1,000 mG: The thresholds for spasms and stars had remained the same. The change from 1,000 mG to 3,000 mG was not based on any new biology, but on new ways to derive the limits for ambient fields (reference levels) from the basic restrictions. As Wood **explained** at the same utility conference held two years earlier: Mathematical modeling, published early in 2005, forced a "rethink" on how reference levels are derived.

Keep in mind that very few people, other than those in industrial settings, are ever exposed to 1,000 mG, and only a minuscule minority have ever been in a 3,000 mG field. So changing the standard from 1,000 mG to 3,000 mG would affect a tiny fraction of the population.

This is all really about psychology, not science. It's a confidence trick. Wood and ARPANSA are saying: We are so sure that we understand what's going on that we can triple the standard without endangering anyone's health and that we don't need to worry about cancer, Alzheimer's disease and ALS, despite the accumulating evidence to the contrary.

#2. It's Not About Cancer — A year ago, Wood published a rationale for Australia's new EMF limits in the journal *Bioelectromagnetics*. The 15-page **paper** devotes just two sentences to childhood leukemia. The rest of the paper is about spasms and stars. He provides two references to support his decision to shunt cancer aside: The first is a **review** organized by Mike Repacholi's WHO Project which was heavily influenced by industry (see our post of **October 1, 2005**). The other is an **analysis** sponsored by **EPRI**, the industry research group. Wood seems to have been in such a rush to dispose of the leukemia issue that he made two typos in the brief citation for this paper, which had appeared in the journal *Risk Analysis*, including misspelling the first author's name (EPRI's Leeka Kheifets).

Wood makes no mention of the 2001 **decision** by **IARC** to classify power-frequency EMFs as possible human carcinogens, nor to the similar **conclusion** reached a couple of years earlier by the U.S. **NIEHS**. Wood does not offer a single word on the now-large literature that points to a cancer risk among workers exposed to EMFs. It's true that these papers don't allow a firm conclusion on the occupational cancer risks, but it's still startling that they are all ignored.

#3. Money Doesn't Matter — How could it not? Yet, ARPANSA appointed Wood to be the chair of the standards committee at the same time he was a consultant for a number of Australia's leading electric utilities, companies that would be most affected by power-line limits. In 2001 before he took on the ARPANSA assignment, Wood helped **Energex** win approval for a substation in Logan, a suburb of Brisbane. (Donna Fisher, a local activist who opposed the project features Wood's testimony in ***Silent Fields***, her account of that siting battle.) The following year, Wood gave evidence for **Powerlink Queensland** when it sought an easement to build a high-voltage power line. He testified that he was "not aware of consistent and convincing evidence of harm" below 1,000mG and that there's no way to explain how weak EMFs—below a few hundred milligauss—could possibly have any "detectable effect."

More recently, Wood published a **review paper** in *Archives of Disease in Childhood*, in which he wrote more eloquently about the "enormous societal benefits of electric power" than about the possible cancer risks. Those risks, he warned, could turn out to be "spurious."

Wood seems oblivious to the fact that conflict of interest is an issue at all. In the midst of revising the latest draft of the standard, Wood **testified** on behalf of **Transpower New Zealand** concluding that EMFs were "unlikely" to increase the risk of childhood leukemia. "The benefits of efficient power delivery are considerable," he stated, "hence the weakness of the evidence of harm … need to be borne in mind when deciding on an appropriate level of precaution." At the same time, he published his paper on the basis for the standard in the journal *Bioelectromagnetics*, declaring that he had "no conflicts of interests."

Similar conflicts are business as usual at the IEEE. Its EMF standards group, ICES, had a utility engineer (**Kent Jaffa**) chair the committee that wrote its 2002 power-frequency limits (allowing exposures of more than 9,000mG, see ***MWN*, S/O02**, p.3) and a Motorola engineer (**C.K. Chou**) is the co-chair its RF standard committee. Governmental and international panels tend to be more careful. ICNIRP's statutes stipulate that members cannot have jobs

that could "compromise [their] scientific independence."

Even the WHO **EMF Project**, which has been plagued with accusations of influence peddling, is coming around. Last month at an **EMF seminar** in Hangzhou, Zhaojin Cao of the Chinese Center for Disease Control and Prevention in Beijing questioned the wisdom of relying on the WHO's **fact sheets**—he called them "controversial" because of industry support for the project. **Emilie van Deventer**, the director of the EMF project, was co-chairing the session on standards with Cao. She responded that she has not received any money from industry since she took over the project in 2006. van Deventer declined to comment on what had gone on during the tenure of her predecessor, **Mike Repacholi**, when the fact sheets were written. She made it clear to *Microwave News* that she has no intention of undermining the integrity of the project or the public's trust by taking industry money.

#4. Precautionary Policies Scare People — This is a strange—and we believe illegitimate—theory favored by industry consultants. In the EMF field, Germany's **Peter Wiedemann** leads the charge with the financial support of **T-Mobile**. Using the results of his surveys on people's perceptions of mobile-phone health risks, he tries to convince policy makers that the precautionary principle can do more harm than good. Here's the nub of his argument as expressed in a **letter** to *EMBO Reports*, a European journal: "Subjects who received information about precautionary measures [for RF radiation from mobile phones] expressed a higher perception of risk than subjects who did not receive the information." Wiedemann calls this finding "counterintuitive." We disagree. It's a logical reaction to information that the phones may be more dangerous than people previously thought.

In her own **survey research** on mobile phones, Julie Barnett, a British psychologist, has also found that precautionary advice can increase public concern. Wiedemann cites her work to support his views, but Barnett and her colleagues from the University of Surrey offer a different point of view: The purpose of public information about risks may well be about changing people's behavior.

In **one** of his papers, Wiedemann observed, "Our study indicates that people feel more threatened by the so-called "electrosmog" when precautionary measures mention the need for increased protection of sensitive locations." While he was writing about RF radiation from cell phone towers near day-care centers, schools and hospitals, it's easy to see how the ENA, the Australian trade association, found a way to argue that ARPANSA should drop requirements for warning signs from its new standard. Wood and ARPANSA seem to have had no problem accepting this line of phony reasoning.

#5. The Limits Can Be Enforced — Much like the basic restrictions are specified in quantities that cannot be measured, the reference levels are themselves not easy to enforce. "If measured exposures are higher than reference levels," states Wood's draft, "it does not necessarily follow that the basic restrictions have been exceeded." In order to show that the standard has been violated, "a more detailed analysis is necessary…" What this means is even when you have measured fields that appear to violate the standards, you still have to do more work in order to prove that the basic restrictions have been exceeded. Good luck.

Anyone seriously interested in an enforceable standard would specify limits in quantities that are easily measurable. The basic restriction/reference level loophole is common to many EMF standards. In fact, the language in Wood's draft is taken verbatim from the 1998 **ICNIRP guidelines**.

Developing health standards is an arduous task. It usually takes years and, in the process, those writing them often lose track as to how they will be later applied. While we were writing this piece, two incidents brought this lesson home.

The first is a **news story** about a couple in **Bundaberg**, a city near the Australia's eastern coast. A new substation is being installed in the neighborhood and the local utility, **Ergon**, had run an 11 kV power line outside their bedroom window. (The substation is next to a playground and the power lines also run past a school.) In response to the couple's concerns, an Ergon spokesman told the local newspaper that all the company's power lines meet the national exposure guidelines (1,000 mG) and that the electric utility followed the principle of "prudent avoidance" on EMFs.

A few days later, we received a phone call from a government employee in a major American city who works next to a large uninterruptible power supply. The electrical wiring generates an ambient field of up to 375 mG across his six-by-six cubicle, and it's rarely less than 100 mG. The office worker has a heart condition and worries about what the possible cardiac effects of the magnetic fields. He's been told that he has nothing to worry about because his exposure is much lower than the ICNIRP or IEEE standards.

We can't help wondering how the people who write these standards would react if they or their children were in either of these situations. Would they feel safe knowing that the exposures are many times lower than the official standards? It's axiomatic: Perceived risk is always higher among those who must bear it. We are reminded of the former CEO of Con Edison, the giant New York electric utility. He took one of the toughest positions on EMFs, refusing customer requests to measure magnetic fields in their homes, then a standard practice at most other U.S. utilities. When a phone company announced plans to put a cell tower in his "backyard," he was quick to question the adequacy of the IEEE RF exposure standard, even though his worst-case exposure would be thousands of times lower.

At the ENA utility industry conference in Melbourne last November, Ray Kemp, a risk consultant, offered some advice on how to win public support for Australia's new EMF standard. We don't always agree with Kemp (see his **comments** about cell phone tumor risks), but this time we do. "Effective risk communication for ELF is not simply about the numbers," he told the audience, "It's about generating public confidence in the management of risks in a legitimate manner" (Kemp's emphasis). Using this criterion, the ARPANSA standard should be dead on arrival.