

The Lauderdale Cottage Unit Development : Is the proximity to the Nyrstar transmission line a public health hazard for future residents?

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Opposition to the proposed Lauderdale Cottage multi-storied subdivision consisting of 58 housing units (Application no. PLN 11-00361-01) has focused primarily on the historical significance of the property and the destruction of the colonial garden area if the development proceeds.

However important this issue is, there is another aspect to the proposed development that I consider must be taken into consideration by the council. This is the potential for adverse health impacts on the future residents of the subdivision, primarily an increased risk of cancer and immune system effects as a consequence of the close proximity to the transmission lines supplying power to the Nyrstar zinc smelter.

An examination of the proposed building plans for the subdivision show that a large proportion of the units, and their bedrooms, are very close to the transmission lines – so close in fact that the buzzing of the lines at night might be a noise nuisance, among other possible effects as examined herein. According to the submitted plans, the lines have a 30 metre right of way (15 meters each side of the lines) where no buildings can be located. The single, double and three story units have many of the bedrooms located facing the lines and from a recent magnetic field survey conducted at the adjacent former Hazelwood special school facility on January 31, 2011 (10:30am – 12:15am) it is possible to roughly estimate the approximate magnetic field levels in the bedroom areas, as shown on the developer's plans. The following is a representative sampling taken from just one level from the plans. Note that for the 2nd and 3rd floors the magnetic fields would be higher as the rooms are slightly closer to the wires. The following estimations are based on the January 2011 Hazelwood survey. Magnetic field measurements are in milliGauss (mG). Note that these levels will fluctuate up and down according to the current load on the line. The levels would be higher when the zinc smelters are in operation. They would also increase if the planned upgrade of the smelter goes ahead.

Taking just one floor of all the buildings it is found that 15 beds are located approx. 16-20 metres from the transmission lines, giving a possible exposure level of 6.2 – 4.6 mG for anyone sleeping in those beds, depending upon the current load at the time.

12 beds are located 25 to 30 metres away , giving a possible exposure of 4.0 – 2.2 mG

9 Beds are located 33 to 40 metres away, giving a possible exposure of 1.8 – 1.0 mG

At 60 meters exposures would be around a low 0.5 mG.

What this informal sampling of just one floor of all the buildings indicates is that a sizeable number of sleeping areas could be exposed to a magnetic field intensity where the epidemiological evidence consistently finds a doubling of the risk of childhood leukaemia at 4mG. The British National Radiological Protection Board (NRPB) has called this level a“heavy exposure” but said that few children are

exposed to this level in the UK. This may well not be true for this proposed subdivision.

It is important to note that the adjacent Hazelwood school was moved primarily because of staff and parent concerns over a possible cancer cluster at the school and concerns that it was possibly linked with the nearby transmission lines. Many of the future residents of the proposed subdivision will be living far closer to these lines than the former staff and students at Hazelwood.

The magnetic field levels in sizeable portions of the proposed Lauderdale Cottage complex are in the order of 4 mG + while the levels inside the old Hazelwood complex (excluding the pool area) varied from 2.2 mG to 0.3 mG at the time of the survey.

This needs to be put in the context of the Tasmanian Ray Lowenthal study. This research found that adults who had lived within 300 metres of a transmission line during their first 15 years had triple the risk of lymphoproliferative or myeloproliferative disorders (LPD or MPD), including Hodgkin and non-Hodgkin lymphoma, multiple myeloma and several leukemias. Those who lived near high-voltage lines from birth to five years had a five-fold increase.

When does the increased risk of childhood leukaemia begin? Most likely it is in the first trimester of pregnancy. What are the implications here for young couples who plan on having children and who move in to a Lauderdale Cottage unit 30 meters or so from the transmission lines? If this subdivision is approved, should prospective residents be warned that their children may be at increased risk of cancer? Hardly a good selling point.

It is an obvious (if inconvenient) fact, based on the weight of epidemiological evidence, that building intensive residential subdivisions in close proximity to overhead transmission lines creates a potential public health hazard for the people who will live there. There now exists a duty-of-care on the part of the Hobart Council to seriously take this into consideration. If this unit development goes ahead and adverse health effects later occur (see supplementary information) and a class action is contemplated (this nearly happened with the Hazelwood case) who would be held accountable?

For that reason I urge the council to reject any development at 74 Risdon Road, New Town.

Sincerely

Don Maisch PhD

Supplementary information

The NCRP draft ELF review (1995)

The U.S. National Council on Radiation Protection and Measurements (NCRP), a U.S. congressionally chartered organization, was contracted by the Environmental Protection Agency (EPA) in 1983 to conduct a review of the biological effects of Extremely Low Frequency (ELF) EMFs. In early 1995 the draft of the 800 page NCRP report was leaked to the New York based publication Microwave News, which published the report's findings in August 1995.¹ The final report was supposed to be approved and to be publicly available in early 1996, but final approval of the draft has never been acted upon by the federal government because of the implications for the economy and opposition from both the power industry and military. It is important to note, however, that the membership of the NCRP Committee was made up of expert scientists who do peer review and the draft recommendations reflected their consensus evaluation of the scientific literature in relation to the potential hazards of ELF magnetic fields.

The Committee's membership was described by chairman Dr. Ross Adey as "carefully selected to cover the great majority of societal interests on this scientific problem, including power industry engineers, epidemiologists, public health specialists as well as molecular and cellular biologists". The draft report generally endorsed a 2mG exposure limit. It would have immediately affected new day-care centres, schools and playgrounds, as well as have implications for new transmission lines near existing housing. A somewhat more flexible policy was applied to new housing and offices. For existing facilities, the committee recommended a more gradual approach, with stronger restrictions phased in over time if the evidence of a health risk continued to grow.²

From the Committee's Conclusions:

"In arriving at the proposed guidelines, the committee has considered available laboratory studies on bioeffects and epidemiological reports of health hazards from electric and magnetic field exposure. In key areas of bioelectromagnetic research, findings are sufficiently consistent and form a sufficiently coherent picture to suggest plausible connections between ELF EMF exposures and disruption of normal biological processes, in ways meriting detailed examination of potential implications in human health."³

From studies on humans the committee cited evidence for a link between EMF's and:

- childhood and adult cancer, including leukaemia and brain cancer.
- teratological effects and other reproductive anomalies.

¹ L. Slesin, 'Draft NCRP Report Seeks Strong Action To Curb EMFs, Committee Cites 2 mG Limit as Goal', pp. 1, 11 and 'NCRP Draft Recommendations on EMF Exposure Guidelines', pp 12-15, vol. 15, no. 4, Jul./Aug. 1995.

² *ibid*, p. 1.

³ *ibid*, p. 15.

- neuroendocrine and autonomic responses which, separately or collectively, may have pathophysiological implications.
- neurochemical, physiological, behavioural and chronobiological responses with implications for development of the nervous system.
- From laboratory studies the committee noted that EMFs:
 1. affect cell growth regulation in animal and tissue models in a manner consistent with tumour formation.
 2. increase tumour incidence and decrease tumour latencies in animals.
 3. alter gene transcriptional processes, the natural defence response of T-lymphocytes and other cellular processes related to the development and control of cancers.
 4. affect neuroendocrine and psychosexual responses.

In relation to the effect of low level EMF's on melatonin and breast cancer, the committee concluded:

"There has been a strong focus on ELF field actions in the pineal gland, relating to the pineal hormone melatonin, and on a broad series of regulatory functions mediated by this hormone. Melatonin plays a key role in controlling the 24-hour daily biological rhythm. Disturbance of the normal diurnal melatonin rhythm is associated with altered estrogen receptor formation in the breast, a line of experimental evidence now under study, or possible links between ELF field exposure and human breast cancer. Further, melatonin has general properties as a free radical scavenger, with the possibility of a preventative role in oxidative stress, recognized as a basic factor in a broad spectrum of human degenerative disorders, including coronary artery disease, Parkinson's and Alzheimer's diseases, and aging."⁴

According to the committee, problematic sources of ELF EMF included local electrical distribution systems, as well as high voltage power transmission systems. Particular appliances, including electric blankets and VDT's also rate highly as problem sources, along with various occupational environments.

The committee stated that the evidence pointed to human health hazards in common exposures to EMFs, particularly magnetic fields exceeding 0.2uT (2 milliGauss) and electric fields at intensities in the range 10-100V/m (volts per metre). They stated:

"[T]here is an implication that a significant proportion of the world's population may be subjected to a low level or risk, but a risk factor with significant societal consequences, by reason of its pervasive nature and the serious consequences for affected individuals."⁵

In their interim exposure guideline recommendations the NCRP concluded that "neither laboratory studies nor epidemiological findings can yet establish well-defined thresholds for safety guidelines." Still, it contended: "From available epidemiological and laboratory data, it appears both prudent and responsible to set limits on permissible future exposures". Therefore the NCRP committee called for

⁴ *ibid*, p. 13.

⁵ *ibid*.

"interim exposure guides", measures that "fall short of establishing either a standard or guideline, but offer guidance to limit exposure."⁶

The NCRP committee recommended an "As Low As Reasonably Achievable" (ALARA) policy that over a three year period, ambient exposures in existing homes, schools and offices would be reduced to 10 mG. After six years, there would be an option to establish a guideline of 5 mG. At 10 years a goal of 2mG would be considered, depending upon the scientific evidence at the time. As for future construction, the report recommended a 2mG exposure limit for schools and for new transmission lines near existing housing, with somewhat less strict guidelines for new housing and offices.⁷

Committee member Dr. David Carpenter, of the School of Public Health at the State University of New York, Albany, said, "In almost any other type of environmental exposures, if the evidence were as strong as the association between EMFs and cancer, there would be extensive government regulation. The major reason that many members of the committee were unwilling to set more rigorous standards was that it would be horrendously expensive and unrealistic to enforce them."⁸

In July 1995 I wrote to the NCRP committee Chairman Ross Adey and asked him in reference to telecommunications, was it advisable to base RF/MW standards solely on thermal effects. He replied, in part: "The laboratory evidence for athermal effects of both ELF (powerline) and RF/MW fields now constitutes a major body of scientific literature in peer-reviewed journals. It is my personal view that to continue to ignore this work in the course of standard setting is irresponsible to the point of being a public scandal."⁹

The BioInitiative Report

On August 31, 2007, an international working group of 14 scientists, researchers and public health policy professionals (The BioInitiative group) released an extensive scientific literature review of over 2,000 studies titled the "*BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)*".¹⁰ The purpose of the report was to document the information that the report's authors thought needed to be considered in the debate over the adequacy, or inadequacy, of existing public exposure standards. This included both extremely low frequency (ELF) and radiofrequency/microwave standards. The report includes detailed scientific data, with references, documenting a whole range of chronic low-intensity, non-thermal adverse biological effects that have been established to occur at exposure levels well below ICNIRP limits. The report reviews the risk assessment carried out by IEEE and WHO/ICNIRP that serve as the common basis for the thermally-based (and induced currents at ELF frequencies) standards and documents a systematic filtering out of scientific studies that reported low-level bioeffects and potential health effects. The report specifically examines the limitations and deficiencies of the ICNIRP Guidelines. In calling for new biologically based EMF safety standards the report contains 11 chapters examining key scientific

⁶ ibid, p. 12.

⁷ ibid, p. 11.

⁸ ibid.

⁹ Correspondence from Ross Adey, July 25, 1995.

¹⁰ BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)', C. Sage, D. Carpenter (eds.), Aug. 31, 2007, <http://www.bioinitiative.org>.

studies and reviews that have identified low-intensity biological effects which provide a scientific basis for new safety limits based on traditional public health protection approaches. As such, the BioInitiative report represents a direct challenge to the scientific validity of the standards for both ELF and RF/MW that are maintained by ICNIRP and Institute of Electrical and Electronic Engineers (IEEE C95.1). For structures near transmission lines the report recommends a **2 mG limit for workplaces and a 1 mG limit for residential areas**. Special mention is made of the need to provide extra protection for children and pregnant women because of a possible link between childhood leukaemia and in utero exposure to power frequency magnetic fields.¹¹

Inadequacy of the standards in relation to public health protection.

Over the past decade there have been a number of buildings in Australia where concerns have been raised over apparent excess rates of cancer and other illnesses amongst the occupants. A few examples are Ross House (Melbourne), the RMIT Building 108 (Melbourne), the Capalaba Post Office (Queensland), TYCO Electronics, Sydney and Hazelwood Special School (Hobart). In each case, in response to concerns that the illnesses may be due to 50 Hz extremely low frequency (ELF) magnetic fields, reassurance was given that possible health hazards were not possible as the measured levels were well below the National Health & Medical Research Council's (NH&MRC) Interim guideline reference level of 1000 milliGauss (mG) for residential exposures and 5,000 for workplace exposures

The ELF limit recommendations in the NH&MRC Interim guidelines (1989) are based on the International Radiation Protection Association's (IRPA) interim guidelines which also served as the basis for the current guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The rationale for all these guidelines is based on providing health protection only against **immediate health hazards** from high levels of exposure. This limitation was clearly explained by Dr. Keith Lokan, from the Australian Radiation Laboratory in 1991:

"One thing which we have done, though it has little direct bearing on the issue of chronic low level exposure, is to adopt the (above) recommendations on field limits. These limits represent plausible field values, below which immediate adverse health effects are unlikely, and as such serve a useful purpose. They are not intended to provide protection against possible cancer induction by continued exposure at the lower field levels implicated in the studies..."¹²

Inadequacies in the ICNIRP based guideline limits were also mentioned in the Australian Gibbs report (1991).

"Since the guidelines proceed on the basis that adverse human health effects from exposure to ELF electric fields at strengths normally encountered in the environment or in the workplace have not been established, it is apparent that they are not intended to provide protection against any adverse health effects that may be caused by such exposure, and they would not do so. The levels of

¹¹ *ibid*, p. 31.

¹² K. Lokan, 'Risk Perception and Regulation-What Should the Regulator Do?' *Radiation Protection in Australia*, vol. 9, no.4, 1991, pp. 134-136.

exposure recommended are many times greater than the levels at which it has been suggested that the fields may create a risk".¹³

As is clearly obvious from the above that the Australian EMF exposure standard is not relevant to the question of possible hazards of prolonged environmental exposure levels influencing cancer and immune system effects. Considering this significant limitation, it is disingenuous to suggest that compliance with these guidelines somehow provides adequate public health protection.

Evidence for EMFs as an immune system stressor

1) The French Connection

In 1991, as a result of public protests, media attention and a number of court cases over possible health hazards from twin 400 kV transmission lines built in close proximity to the French village of Coutiches, near Lille, the national power supplier, Electricite de France, agreed to fund a regular medical check-up of a number residents who lived close to the lines. A total of 117 residents were involved in the medical tests. They were to have a check-up and blood analysis done every six months. The initial findings, presented at the Assemblée Nationale in 1994, reported the following symptoms being found in the group:

- * General tiredness, (chronic fatigue)
- * Headaches
- * Insomnia - especially in children. It was noted that the children's insomnia would disappear when the power (and magnetic fields) was lower than usual and return when the power got back to full level. The children often could not sleep at all and often were sent to relatives' homes, where they could sleep normally.
- * hypernervosity
- * hypotension
- * iron deficiency (later identified as pseudo iron deficiency)
- * 2 cases of severe anxiety / depression
- * Nausea and dizziness¹⁴

Similar symptoms were also found in a 2008 survey by the French organization Criirem¹⁵. Taking a group of people living near two transmission lines and a control group living further away, they found that sleep disturbance, memory problems, headaches, irritability and depression were significantly more frequent amongst those living close to the lines.¹⁶

¹³ H. Gibbs, 'Inquiry into Community Needs and High-Voltage Transmission Line Development', Report to Minister for Minerals and Energy, New South Wales State Government, Australia, 1991, pp.163.

¹⁴ Report on Pseudo-iron deficiency in a French population living near high-voltage transmission lines: a dilemma for clinicians, Compiled by EMFacts Consultancy, Mar. 2001. http://www.hese-project.org/hese-uk/en/papers/pid_france.pdf, accessed Mar. 12, 2011.

¹⁵ Centre de Recherche et d'Information Indépendantes sur les Rayonnements Electromagnétiques

¹⁶ Associated Press, "The high voltage power lines are a "problem for health", acknowledges NKM. Mar. 21, 2008. <http://www.emfacts.com/weblog/?p=871>, accessed Mar. 22, 2011.

In 1994-95 while working in a hospital in Lille, France, Dr. Eric Hachulla and colleagues noticed a number of patients who had come in for a blood analysis which turned out to have very unusual parameter, unknown in the medical literature. In addition all had addresses in one area – Coutiches. Upon enquiry, it was found that they all lived close to the controversial 400 kV transmission lines. A small-scale study was arranged consisting of 31 men and 34 women and 26 children, all living less than 200 metres from the lines. For the control group they used people who were recent blood donors at the Lille blood transfusion centre. The results found that most of the people living close to the lines with magnetic field exposures of 2.0 milliGauss or more, had a blood condition characterized by low iron levels, but no symptoms of anaemia and no decrease of ferritin, which normally is associated with iron deficiency. Hachulla called this “pseudo iron deficiency” (PID) and felt that the findings were quite robust and was an objective, measureable bio-chemical effect clearly shown in people living near transmission lines. It was found that the abnormal blood parameters would return to normal levels when people moved away from the lines but that this took several months. The same effect (PID and EMF exposure) was seen in people living in another town, Bolezeele, near similar transmission lines.

In the published paper Hachulla concluded:

We speculate that EMFs may modify iron metabolism in populations subjected to 0.2 microTeslas (2 mG) or more, with a high bone marrow incorporation of the iron (that would explain the low iron level) and a rapid utilization for the metabolism of haemoglobin, sometimes with non-incorporation of (^{59}Fe) in the liver.¹⁷

¹⁷ E Hachulla, MT Caulier-Leleu, O Fontaine, L Mehianoui, P Perin, Pseudo-iron deficiency in a French population living near high-voltage transmission lines: a dilemma for clinicians, *European Journal of Internal Medicine*, vol. 11, no. 6, 2000, pp. 351-352.