

## 8. SURVEY OF RESIDENT'S CONCERNS AND MONITORING OF RADIOFREQUENCY LEVELS - OURUHIA

RR 8954

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The purpose of this report is to provide information on two surveys requested by the Council in relation to the use of the Ouruhia radio tower.

### INTRODUCTION

The Ouruhia radio tower was the subject of a resource consent hearing, heard before a Commissioner, following which the Council granted the application to broadcast on FM frequencies. This decision is being appealed by the Ouruhia Resident's Association to the Environmental Court.

Subsequently, following a deputation to the Environmental Committee by some residents, the Council resolved;

- 1. That the Christchurch City Council undertake independent measuring of radiation transmissions from the Ouruhia Tower.*
- 2. That in addition a survey be undertaken to obtain information of any effects on the health of residents and wildlife in this area.*
- 3. That an approach be made to Local Government New Zealand seeking support for research into the effects of electro-magnetic radiation.*

The work undertaken in accordance with recommendation 1 is reported here together with the results of a survey of the concerns of residents about health matters in regard to recommendation 2.

In the case of recommendation 3, Local Government New Zealand advised that they were involved in work being undertaken by the Ministries of the Environment and Health in developing guidelines for use by local authorities. The joint Ministry for the Environment/Ministry of Health project "National Guidelines on Managing the Effects of Radiofrequency Transmission Facilities" has been peer reviewed. It is expected that the draft guidelines will be presented to the Government in early February and then released for public submission in late February 1999.

### RADIOFREQUENCY MEASUREMENTS – OURUHIA RADIO TOWER

As requested by the Council, monitoring of radiofrequency has been carried out in the vicinity of the Ouruhia mast by an independent specialist, Dr Richard Keam of Keam Holdem Associates Ltd. His company is based in Auckland and specialises in microwave and radiofrequency measurements, technology, and development.

The executive summary of Dr Keam's report "Radio Frequency Measurements Performed Around the Ouruhia Broadcast Tower from 25 August to 27 August 1998" states:

*Radio frequency measurements were performed in the vicinity of the Ouruhia broadcast tower on 25 to 27 August 1998. The measurement method used equipment to specifically isolate the signals transmitted from the Ouruhia tower from those due to any other radio frequency service.*

*Excluding measurements closer than 100m from the tower, the maximum power flux density due to the Ouruhia tower measured at the 1 MHz AM frequency band was 3.5481  $\mu\text{W}/\text{cm}^2$  and this was measured at 22 Teapes Rd. The maximum power flux density measured due to the Ouruhia tower measured at the 100 MHz FM frequency band was 1.5488  $\mu\text{W}/\text{cm}^2$  and this was measured at Teapes Rd, 10m north of the bridge.*

*These measured power flux density levels are substantially lower than the 50  $\mu\text{W}/\text{cm}^2$  power flux density level specified as the maximum allowable level by the Christchurch City Council. We therefore conclude that there is no violation of the requirements of the Christchurch City Council in the vicinity of the Ouruhia transmission tower."*

A copy of the report will be tabled at the meeting, together with supplementary information provided by Dr Keam that compares the measurement data with the Council's resource consent performance standard for radio transmissions from the tower (50  $\mu\text{W}/\text{cm}^2$ ), and with the level for non-occupational exposure to radiofrequency (200  $\mu\text{W}/\text{cm}^2$ ) recommended by NZS6609.1-1990 "Radiofrequency radiation Part 1: Maximum exposure levels – 100kHz to 300GHz". The highest recorded AM power flux density is less than one-twelfth the exposure level allowed by the resource consent granted by the Council, and less than one-fiftieth the level in NZS 6609.1-1990. The highest recorded FM power flux density is less than one-thirtieth the resource consent level, and less than one-one hundred and twentieth of the level in NZS 6609.1-1990.

It is noted that the draft joint Australian/New Zealand Standard 98627 "Radiofrequency fields Part 1 Maximum Exposure Levels 30kHz to 300GHz" has just been released for public submissions. A preliminary examination of the draft joint standard shows that the recommended non-occupational exposure standards are no more stringent than the NZS 6609.1-1990 levels of 200  $\mu\text{W}/\text{cm}^2$ .

On the basis of this information it is clear that the Ouruhia Tower is operating at levels well within both the Resource Consent and New Zealand Standard levels.

#### **SURVEY OF CONCERNS OF THE RESIDENTS NEAR THE TOWER**

Prior to the local residents' request for a report the Committee, in June 1998, had noted that a number of reports which have been prepared both in New Zealand and overseas summarised the alleged health effects of electromagnetic radiation and these have generally not supported the contention of significant health effects at levels normally

experienced from such sources. The World Health Organisation is currently undertaking the International EMF Project over a period of five years but a scientific review undertaken by that group concluded that from current scientific literature, there is no convincing evidence that exposure to RF shortens the life span of humans, induces or promotes cancer. They do agree that further research was needed to clarify other alleged health effects and this is being done by the Project.

The matter of health effects has also been considered by the Environment Court. In the cases to date the contentions of the objectors, and their expert witnesses, were not supported by the Court's decision.

We have also sought the advice of the Ministry of Health on this matter of health effects and Dr Gillian Durham advised that *The number of people living in the vicinity of Ouruhia transmitter is very small for an epidemiology study, and even if real effects were caused, these would most likely be impossible to demonstrate.*<sup>1</sup> The local Medical Officer of Health, Dr M A Briesman undertook a review of rates of occurrence of serious health problems [cancer, heart disease, asthma, and overall death rates] for the Styx and Belfast areas and compared these with those for the total population. He found that no increase in either death or disease rates is apparent in the areas on that basis. He considered that *To determine whether or not some small risk exists would require a very large carefully controlled study or, indeed, because of the small size of the population it may not be possible at all to obtain any valid study results.*<sup>2</sup>

Advice was sought from the Department of Veterinary Science of Massey University in regard to the effects on animals of exposure to electromagnetic radiation. They responded that they had no references as to whether it had any effects and as the data on its effects on humans was questionable despite quite an amount of research they doubted whether there is any substantial data available regarding effects on farm animals.<sup>3</sup>

Notwithstanding the above a number of Councillors supported local residents' wishes to have a survey undertaken, however, and representatives of the Resident's Association had already approached Context (NZ) Scientific Services to undertake a survey of concerns of residents. A letter of contract was prepared between Mrs Margaret Sweet and the Council to "obtain and collate the concerns of the Ouruhia Residents with regard to the radio tower at 123 Lower Styx Road". It was not intended that Mrs Sweet be retained to conduct an epidemiological study seeking to ascertain the cause or causes of the symptoms suffered by the residents and as set out below Mrs Sweet understood this fact.

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<sup>1</sup> Durham, Dr Gillian, *Health Effects of Magnetic Fields from Power Lines and the Cumulative Effects of and Influence of Electromagnetic Radiation from Broadcast and Cellular Telephone Sources*, Letter to J.G. Dryden 31 July 1997.

<sup>2</sup> Briesman, Dr M A, *Report on the Health Survey in the Vicinity of the Ouruhia Radio Tower*, Letter to Ouruhia Residents 24 July 1997

<sup>3</sup> Stafford, K Personal Communication 13 July 1997

Some concerns were expressed to her about the questionnaire she intended to use, including those regarding sampling, apparently biased questions, and the symptoms being raised directly. Mrs Sweet rejected the professional advice in these matters in the following terms; *To me, the questions in your letter do not relate well to the type of report that I am preparing for you. They would appear more valid questions **if I were trying to establish whether or not there is a causal relationship between EMR and human ill-health.** Such an attempt, however, is quite outside the scope of the report you've asked for.*<sup>4</sup> (bolding added)

The survey was undertaken during August and September 1998 report was received towards the end of October and a copy of the full report is laid on the table.

From the Executive Summary the following points were made of the findings.

- *All people living within 2 kms of the tower were invited to participate in a survey, and data, based on a structured one-hour interview, were collected from 156 people. These people represent 80% of those living within 1.5 kms, and 50% of those living between 1.5 and 2 kms of the Ouruhia transmitter.*
- *The principal concern expressed by residents was that radiation from the transmitter was damaging their and their children's health.*
- *The enquiry found a high level of 9 symptoms which have been reported in the literature as effects of exposure to electromagnetic radiation (EMR). These symptoms (with figures in brackets for the overall incidence) were: chronic fatigue (37%), sleep problems (35%), bone and muscle pain (30%), frequent headaches (21%), a burning sensation of eyes (19%), burning sensation on the skin (19%), irritability (19%), difficulty concentrating (19%), anxiety and depression (17%).*
- *Sickness was not randomly dispersed but clustered. In the sickest cluster, where incidence of symptoms was much higher, 61% reported chronic fatigue, 50% experienced bone pain, 39% had difficulties with concentration. Percentages in the order of 30% were found for sleep problems, headaches, anxiety and depression, and sensation of burning eyes and burning skin.*
- *The clustered, non-random nature of the ill-health in the region suggests an external cause, but this may or may not indicate an EMR effect.*
- *A comparison made with a study undertaken in 1996 in Schwarzenburg, Switzerland, as a result of which that transmitter was switched off, found comparable incidences at Ouruhia for the problems of getting to sleep and staying asleep, and much higher incidences at Ouruhia for fatigue, joint pain, headaches, and difficulty concentrating. Both in Ouruhia and in Switzerland the transmitter was found to be operating well within the national standard.*
- *There was evidence that people with severe symptoms who leave the area get better. Their symptoms return when they come back, and go again when they leave.*
- *There appeared to be a general level of correspondence between the dates at which the addition of FM transmission was made to the tower and the number of people beginning to experience ill health effects for the first time.*

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<sup>4</sup> Sweet, M A, *Research on Ouruhia Residents' Concerns*, Letter to Principal Environmental Health Officer, 31 July 1998

- *Sickness was significantly related, at 0.02% level of probability, to both gender and age. A sickness index based on 6 symptoms found that 24% of women and 40% of men had none of the symptoms in the sickness index. The age range with the highest percentage of severe ill health was 40-49 years. The age ranges below 20 and above 50 had fewer people with either severe or moderate effects than the age ranges between 20 and 50.*
- *The Ouruhia residents commissioned a series of readings of the AM and FM signal strength in August 1998 and made these available to the researcher. The highest combined AM/FM reading from any single site was 2.66 v/m (AM 2.10 + FM 0.56 v/m) from a site in Turners Rd. Using the methodology specified in NZ Standard 6609, the total exposure at that site was calculated as 0.1% of the exposure limit for the public, specified in NZ Standard 6609.*
- *No relationship was found between measured EMR readings on 29 properties and the health of individuals living on those properties.*
- *There is much in recent international literature to suggest that very low levels of EM radiation (described by one researcher as “almost unmeasurably weak”), may have significant bio-effects within certain ranges of frequencies. Summaries of some of this research are included in Appendix 2.*
- *Conclusion. Two kinds of evidence suggest that symptoms found at Ouruhia are due to external causes, which may or may not be the tower. These are the fact that sickness is not random but clustered, and the fact that people get better when they leave. Two other kinds of evidence are indicative of the possibility that radiation from the Ouruhia transmitter may be causing the ill health in the area. These are the high incidence of symptoms which are known from the literature to result from EM exposure and an apparent correspondence between date of onset of symptoms and changes made to transmissions.*

Due to the controversial nature of this particular issue, and because the granting of consent by the Council is being appealed by the Residents' Association in the Environment Court, comment on Mrs Sweet's study was sought from an independent epidemiologist, Dr Michael Bates of ESR. His report is laid on the table.

In summary he has stated:

*I would have to say, quite frankly, that I found the Context investigation (as depicted by the report) to be grossly deficient in all aspects of its methodology, including study design, questionnaire design and administration, data analysis, and results presentation and interpretation. Apart from the technical deficiencies, of particular concern was a strong bias that was evident throughout the entire report - in terms of an apparent belief in a causal relationship between health effects and the Ouruhia radio mast and frequent presentation of anecdotal statements to support that belief. This was despite the fact that such an association appeared contrary to several of the more objective pieces of evidence in the report (lower prevalence of some symptoms closer to the tower, lack of association with electromagnetic field measurements, and lack of directional consistency of the effects).<sup>5</sup>*

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<sup>5</sup> Bates, Dr M, *Review of the report “Concerns of the residents of Ouruhia regarding the radio towers at 123 Lower Styx Road, Christchurch, New Zealand.”*, Institute of Environmental Science & Research Limited, Porirua, December 1998.

Context Scientific Services were sent the Dr Bates comments and Dr G.B.Sweet<sup>6</sup> has replied in part (some personal comments have been removed) as follows.

*It is difficult to respond objectively to a review which draws heavily on emotive and non-professional language, but Context will try.*

*Context strongly rejects the validity of Dr Bates' comments.*

*Dr Bates has two major complaints: the first relates to methodology, and the second to researcher bias..*

*Dr Bates has critically examined the Ouruhia study as though it were an epidemiological study prepared for an academic journal. Having set up this epidemiological straw man, he then advances a great number of criticisms, particularly of methodology. His premise is wrong, and his criticisms consistently fail to acknowledge both the context in which this report was prepared, and the terms of reference laid down by the City Council.*

*The report which the City Council commissioned was **not** an epidemiological study. It was a low budget survey aimed at drawing together the concerns of the Ouruhia residents concerning the radio tower in their community. To respond to a major point of Dr Bates, it would clearly be a challenge to any researcher to ask residents for their concerns about a radio tower, without mentioning the words radio tower. But Dr Bates would have liked it that way! Other points of methodology that he makes can be similarly responded to.*

*Another example of the inappropriateness of Dr Bates' criticism is the very serious allegation of researcher bias in the reporting of residents' concerns. He alleges that there has been selective use of residents' comments. He says, "Few if any statements are reported from the 77 people who did not believe that the tower affected them". Dr Bates might well have recognised that this is because none were made. When asked if they thought the tower had affected them the "No'es" volunteered nothing more, whereas many of the "Yes'es" felt an obligation to explain why they thought so. Context wonders how many variations Dr Bates expects in ways of saying "I do not believe the tower has affected my health"?*

*One would have thought that printing residents' opinions verbatim, without researcher comment, must constitute one of the more objective ways of articulating residents' concerns to the City Council.*

...

*Dr Bates has chosen to comment on the methodology rather than the findings of the study. It is unfortunate that he does not acknowledge the very real health problems of many Ouruhia residents, and support the gathering of more information in this area.*

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<sup>6</sup> Sweet, Dr G B, Context Scientific Services, Letter to Principal Environmental Officer, 29 December 1998

*The principals of Context have considerable scientific expertise and experience. When undertaking this study, they also set up a formal advisory committee. This advisory team included experienced researchers from the community, University of Canterbury and Lincoln University, persons with expertise in survey methodology and statistical design, electromagnetic radiation, medicine and veterinary science. Some work was also sub-contracted in the areas of statistical analysis and electromagnetic radiation. Collectively, the qualifications and experience of people inputting into this programme were very high.*

...

*Context believes the conclusion is quite clear: the Ouruhia report is a professionally - handled study involving a competent team of people with high levels of relevant expertise and integrity. It cannot be rubbished by the Establishment, and its findings should be regarded as factual.*

## **DISCUSSION**

In the case of the research undertaken, both by Dr Keam and Mrs Sweet, no new findings are apparent from information that was already available to the Council. The levels of radiofrequency emissions in the area of Ouruhia are significantly below those either contained in the New Zealand Standards guidelines (which are in line with international accepted standards to protect health) or those adopted by this Council following the lead of Auckland City Council. The survey undertaken by Mrs Sweet does not provide any direct evidence that the symptoms experienced by some of the residents in the area are related to radiofrequency emissions from the tower, indeed as noted above there does not seem to be any positive association with EMR measurements at all. Mrs Sweet was commissioned to clarify the resident's concerns not to undertake an epidemiological study and accordingly it was not anticipated that she would necessarily provide direct, or indeed any, evidence of causation.

Some representatives of the Ouruhia Residents' Association had requested further Council financial assistance to undertake another "health" survey on the basis of mediation undertaken between the Association and Radio Network in which the Council was not a party. This was on the basis of a protocol prepared by Dr Bruce Hocking, for the residents, and Dr David Black, for Radio Network. The protocol itself recognises it cannot prove anything either way. The protocol raised concerns with a member of the Canterbury Ethics Committee and it needed to be approved by that group before this Council should support the study.

The Resource Management Committee at a meeting in December 1998 agreed to provide funding in conjunction with Radio Network (up to \$9000 from the Council to be approved at the half yearly budget review) provided the following conditions were met:

1. That the conditions required by Radio Network in the letter from Chapman Tripp dated 18 December 1998 are complied with.
2. That all information forming part of and resulting from the health study be made available to the Council.
3. That the Canterbury Ethics Committee approve the protocol for the health study.

The furtherance of this latter proposal is being dealt with by the Council's Solicitor in conjunction with the Solicitor for Radio Network who had agreed to contribute originally.

#### **CONCLUSION**

The Council has now carried out the surveys as requested by residents but further work has now been required. It is clear that, in my view, no evidence of causality has emerged that would suggest health effects are tied directly to the emissions from the Tower.

There are clearly continuing conflicts between residents and experts, and between experts, in this matter. The best way ahead would seem to be for the Environment Court Appeal to proceed where the opinions can be tested.

**Recommendation:** That the matter proceed to the Environment Court.

#### **Chairman's**

**Recommendation:** That the above recommendation be adopted.