

BEFORE THE BOARD OF INQUIRY

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of applications for resource consent
and notices of requirement by
Transpower New Zealand Limited for
the North Island Grid Upgrade Project

**STATEMENT OF EVIDENCE OF DAVID RUSSELL BLACK
IN REBUTTAL ON BEHALF OF
TRANSPOWER NEW ZEALAND LIMITED
(EMF and health standard issues)**

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Introduction

1. **MY** name is David Russell Black. I wish to present rebuttal evidence to the statements of evidence of:
 - (a) Ms Julie Elliot;
 - (b) Dr Laura Bennet and Mr Adrian Kinsler;
 - (c) Mr Doug Parker on behalf of Hunua and Papanimu Valley Residents' Association Incorporated;
 - (d) Dr Robert McQueen;
 - (e) Dr Allanah Kilfoyle;
 - (f) Mr Bruce Davidson;
 - (g) Mr George Vercoe on behalf of Parahiwi Farm; and
 - (h) Mr John Makin.

2. I address the evidence of each submitter below.

Ms Julie Elliot (Submission number 0559)

3. **MS** Elliot refers to the "Bio-initiative report". This is discussed in detail by Professor Elwood in his first statement of evidence (paragraphs 29, 147-149, 468-501 and 510).

Dr Laura Bennet and Mr Adrian Kinsler (Submission number 1085 and 1091)

4. **THIS** evidence is based on a fundamental mistrust and to some extent misunderstanding of the approach to bioelectromagnetic safety taken by ICNIRP and WHO as supported by the NZ Ministry of Health (outlined by Mr Gledhill in his evidence). As a participant in this approach, I support it, and consider that it should be followed as reflecting best current practice. Nothing in their evidence persuades me to reconsider that view.

Mr Doug Parker on behalf of Hunua and Papanimu Valley Residents' Association Incorporated (Submission number 0748)

5. I note that Mr Parker suggests at paragraph 42 of his revised statement of evidence that compacting the design might reduce some field strengths.

However, the field strengths are already low compared to relevant standards and I could identify no public health benefits from any such modification.

Dr Robert McQueen (Submission number 1076)

6. **DR** Robert McQueen holds a senior academic position at the University of Waikato and is Vice Chairman of New Era Energy Incorporated, which was set up with the specific purpose of investigating "*alternatives to the 400 kV electricity line proposed by Transpower... in 2004*". Dr McQueen states clearly that he is not a practising or published academic researcher in the area of health effects of EMF although he is experienced in other research.
7. **DR** McQueen proposes to provide his evidence orally. However, he has referred to a number of papers on which he intends to rely.
8. **ALL** of these papers have been considered carefully in the assessment of this proposal and all are discussed in detail by Professor Elwood.
9. **EVEN** regarding the unsettled matter of effects on childhood leukaemia incidence, the possibility and magnitude of these risks of this has been taken into account in locating and designing the proposed North Island Grid Upgrade Project (**Upgrade Project**) and particularly having regard to the levels and frequency of expected population exposure. Even in the worst case scenario (of this uncertain relationship being confirmed in the future), it is unlikely that any expression of such effects would be seen in the populations of the Waikato or South Auckland.
10. **THERE** is a substantial volume of literature on the topic of extra low frequency magnetic fields and childhood leukaemia. The magnitude of this possible risk is understood. Professor Elwood provides a detailed explanation of this issue in his evidence in chief (paragraphs 246 and following). The continuing development of electricity distribution and use in New Zealand and elsewhere in the world takes this into account.

Dr Allanah Kilfoyle (Submission number 0498)

11. **DR** Allanah Kilfoyle provides the outline of a powerpoint presentation which is summarised by stating "*where alternatives exist, I do not believe the exposure of*

the public to the possible carcinogenic effects of a 400 kV line can be justified". That proposition and the issues which support it, including all of the evidence referred to on the previous slides by Dr Kilfoyle are covered in the statement of evidence in chief of Professor Elwood. However, with regard to the point of whether a "400 kV line can be justified" there are some important points.

12. **FIRSTLY**, the line is designed to traverse the largely unpopulated area of the country exposing relatively few people to electric and magnetic fields at all and none to biologically significant levels. The matter as to whether low levels of magnetic fields may be carcinogenic is unsettled, as has been discussed at length in my evidence in chief. However, any decisions based on that issue would be decisions of whether to continue to use mains electricity at all since most exposure arises from domestic and industrial proximity to conductors.
13. **SECONDLY**, if magnetic fields are the main consideration, then the best mitigation is to transmit and use electricity at the highest possible voltage. In that regard, a 400 kV line is far better than anything used at present in New Zealand, since the current is minimised. For example, a 220 kV line would need to carry a much greater current than a 400kV line for equivalent load and would therefore be surrounded by a more dense magnetic field.

Mr Bruce Davidson (Submission number 0874)

14. **MR** Bruce Davidson correctly states at paragraph 4.2 of his evidence that ELF electromagnetic fields can have effects on the human body if the fields are high enough. There are established deterministic effects which are protected against by the ICNIRP Guideline. Compliance with the Guideline prevents these effects.
15. **AS** Mr Davidson states (at paragraph 4.4), some animals may use the earth's static geomagnetic field as an aid to navigation. This matter has been substantially studied and it is clear that these systems are not affected by power lines both because the strength of the alternating magnetic fields are relatively small and are localised compared to the earth's field. Power lines cause insignificant perturbation (disruption) of the geomagnetic field.
16. **THE** statement which Mr Davidson makes (at paragraph 4.6) about the effects of EMF in relation to various diseases are correct, although his conclusion (at paragraph 4.7), that national and international bodies have apparently come to a

variety of conclusions, needs to be qualified. The fact is that there is very wide consensus about the appropriateness of current guidelines such as those from ICNIRP and the Standard from IEEE. Electric and magnetic fields are not a health hazard, if they are controlled according to these guidelines and the "*precautionary principle*" taken in accordance with its strict definition, is not, in my opinion, triggered by the magnitude of any residual risk from uncertainty. However, this matter is discussed in detail in the recent World Health Organisation publication EHC 238.

17. I do not agree with Mr Davidson (his paragraph 4.9) regarding the width of a transmission line easement needing to be 120 metres. I strongly disagree with the adoption of 0.4 μT as a threshold of exposure. That is unworkable in the broader community and unjustified. However, as I have stated previously, the magnetic field surrounding this transmission line will be minimised anyway when it is carrying energy at 400 kV, emphasising that if magnetic field reduction is required (I do not consider that it is), transmission at higher voltage is the best way to achieve it.
18. **MR** Davidson refers to the United Kingdom SAGE report issued in April 2007 and acknowledges that this report is a significant source of his evidence. I draw the Board's attention to the fact that this report is no more than a collection of conclusions on previously published research and does not in itself add anything to the scientific body of evidence regarding possible health effects of electromagnetic fields.

Mr George Vercoe on behalf of Parahiwi Farm (Submission number 1129)

19. **MR** George Vercoe is a trustee of the Family Trust which owns Parahiwi Farm at 544 Tauhei Road, Morrinsville. His concern is particularly that his daughter and son in law with their young family have a 30 acre block and a proposal to build a new home which would be within 450 metres of the proposed line. Mr Vercoe is asking that the original route of the line to be replaced (the ARI-PAK A line), is retained.
20. **MR** Vercoe should be reassured that, notwithstanding the assurance of safety even if a home is built immediately adjacent to the easement, at 450 metres any residual magnetic or electric fields from the line will be at or below a level that is usually encountered in suburban properties, such as would occur within or

adjacent to the township of Morrinsville in houses adjacent to public roads routinely carrying 400 volts, 11 kV and sometimes 33 kV overhead cables.

21. **THESE** levels are routinely encountered within the community and are no more than the levels, which are found in an electrically wired home, from currents flowing in the distribution system of the house and emanating from domestic appliances. On that basis, there is no reason for Mr Vercoe's family to have any reservations about continuing with their proposals for a new home, even if the line is built in the proposed location.

Mr John Makin (Submission number 0781)

22. **MR** John Makin provides evidence on behalf of residents in the Clevedon Valley. He raises the issue of international standards, guidelines and practices, citing countries such as Italy, Slovenia, Switzerland and the Netherlands, as having exposure targets significantly below the ICNIRP Guideline (page 6 of his evidence). Whilst it is true that such documents exist, they do not have the status of National Standards. Furthermore, a line built following good practice would generally meet such targets anyway.
23. I do not agree that the United Kingdom SAGE report gives a range of balanced recommendations. It may appear balanced, but that is only because it gives equal weight to relatively poorly supported ideas compared to an established scientific approach agreed by majority consensus. That in itself may not be grounds for criticism in a report intending to alert stakeholders to the existence of alternative points of view, but it cannot be regarded as the basis for making decisions which affect public health. In that case, more reliable and validated data has to be given preference.
24. **FOR** the same reasons, I do not agree with the suggestion of an easement width of 120 metres as being "*the minimum width acceptable to any reasonably enlightened society*" (page 7 of Mr Makin's evidence).

Conclusion

25. **IN** summary, nothing in the evidence which I have read alters the position and views I expressed in my evidence in chief and I can find no reasons based on

considerations of public health protection to prevent construction or alter the design of the Upgrade Project.

David Russell Black

28th April 2008