

**BOARD OF INQUIRY**  
**HAUĀURU MĀ RAKI WIND FARM PROPOSAL**

In the matter of the Resource Management Act 1991

And

In the matter of resource consent applications by Contact Wind Limited in respect of the Hauāuru mā raki Wind Farm Proposal

And

In the matter of notices of requirement and a resource consent application by Contact Energy Limited for transmission infrastructure related to the Hauāuru mā raki Wind Farm Proposal

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**REBUTTAL EVIDENCE OF DAVID RUSSELL BLACK**

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## **Introduction**

1. My name is **David Russell Black**. I refer the Board of Inquiry to the statement of my qualifications and experience in my evidence in chief. I reaffirm my commitment to comply with the code of conduct for expert witnesses in the Environment Court.
2. The purpose of this brief of evidence is to respond to the evidence of Dr Philip McDermott (on behalf of David and Pam Walter) and Elizabeth Wright as far as those briefs relate to the potential health effects of the Hauāuru mā raki Wind Farm. I address the evidence of these two submitters in turn below.

## **Elizabeth Wright**

3. At page 5 of her brief Ms Wright makes a number of assertions in relation to my evidence in chief, namely that:
  - (a) in my evidence relating to auditory effects, I do not comment on the effects on animals (sheep and cattle) that could be grazing around the pylons;
  - (b) in my evidence relating to electrical fields, I do not mention cattle, and potential adverse impacts on horses could seriously limit farming operations and resale possibilities; and
  - (c) paragraph 141 of my evidence appears to contradict paragraph 105.
4. I address each of these issues in turn.

### *Auditory effects and animals grazing near pylons*

5. My experience is that auditory effects from power lines, to the extent that they do occur occasionally, do not disturb grazing animals. Even if heard by animals, such effects are readily accommodated as part of their natural environment. For example, in dairy farming areas traversed by high tension power lines, cattle are not averse to grazing in the immediate vicinity of power poles where corona discharge is occurring. It is likely that such sounds simply become part of the ambient environmental sound to which the animals become accustomed.

### *Electrical fields*

6. Electrical fields can be felt on the surface of the human body, as the hairs on our skin are adapted to sense miniscule movements. The relatively low thresholds allowed in the ICNIRP guideline are intended to eliminate such an effect. However, the hairs of farm animals such as horses and cows and the wool on sheep has a primary insulating role, meaning that their skin is not as sensitive to electrical effects. An example of this is the way that horses and cows are often observed to use their (un-insulated and damp) noses to detect whether or not an electric fence is energised. Nevertheless, Contact has chosen to use the human standard to protect all animals which I support.
7. It follows that I do not expect farm animals to be affected by electrical fields at all.

### *Paragraphs 141 and 105 of my evidence on chief*

8. I accept that if one was to consider paragraphs 105 and 141 of my evidence together, and in isolation from the rest of my evidence, there may seem to be some inconsistency. However, I approached these paragraphs from two different, and not contradictory, perspectives.
9. In paragraph 105 of my evidence in chief I recommend caution when riding horses under a new electrical facility. On rare occasions, horses may be startled by changes to a landscape. It is unusual for horses to be startled by electric fields from transmissions lines. However, my recommendation in paragraph 105 was based on a precautionary approach. I would make a similar recommendation after the installation of a new electric fence in an area previously known to a horse to be without one.
10. By contrast, in paragraph 141 I refer to the objective scientific position on the basis of evidence of observed and reported effects. That position indicates that the transmission lines will not be expected to cause any health effects or discomfort to any animals in the vicinity.
11. So, on a precautionary approach (paragraph 105) I recommend caution with horses around the transmission lines soon after construction, even though on the scientific evidence (as reflected in paragraph 141) there will not be any effects that would be expected to cause horses to be startled by the transmission lines.

12. I note from her brief that Ms Wright has been unable to locate the conditions to which I refer at paragraph 115 of my evidence in chief. The relevant condition, as annexed to the evidence in chief of Mr Daysh (condition 6.3 in respect of the internal transmission line, found at exhibit SGD9 to Mr Daysh's evidence in chief), is a condition of the notices of requirement providing that:

*“Prior to commissioning the line an appropriately qualified person shall assess all conductive structures in the vicinity of the transmission line. As part of that assessment a risk assessment of any hazards shall be undertaken and required mitigation measures identified to address any significant risks relating to induction effects associated with the line.”*

13. It is implicit from that condition that Contact will meet the reasonable costs of mitigation. However, Contact has agreed to amend the condition to make it explicit, which I consider addresses Ms Wright's concern. This is reflected in the amended conditions attached to the rebuttal evidence of Mr Daysh.

#### **Dr Philip McDermott**

14. I have read the brief of evidence of Dr Philip McDermott relating to the potential impact of transmission lines on farming practices. At paragraph 24 of his evidence, Dr McDermott states that:

*...a precautionary approach and conservative farming practice suggest a reasonable degree of separation should be observed for calving and lambing purposes.*

15. Dr McDermott does not specify what potential effects he is referring to.
16. As I explained in my evidence in chief (and earlier report), electric and magnetic fields arising from the overhead conductors are not likely to be a source of disturbance to farm animals. There are theoretical circumstances in which effects such as induction and discharge can occur. However, even the maximum levels of voltage and current in this proposed system comfortably meet the safety margins specified by ICNIRP to avoid biological effects from electric and magnetic fields. I consider that these Guidelines are entirely protective, by a wide margin, to domestic mammals.
17. I agree that measures should be taken to ensure that electrically charged objects in particular do not interfere with animals during calving and lambing. In my experience of investigating incidents of distress caused to animals by

electrical sources, the origin of causative charges and currents is invariably poorly configured farm wiring causing interrupted earth circuits and consequent charging of metallic objects or water vessels relied on for drinking water for stock.

18. Direct or indirect effects from electric fields are unlikely to arise from the proposed transmission lines. However, the condition requiring Contact to assess conductive structures near the transmission line will ensure that any potential effects are avoided or mitigated and any problem eliminated.
19. I am entirely satisfied that compliance with ICNIRP standards, as well as best engineering design practice including the condition requiring Contact to assess conductive structures near the transmission line, will eliminate any adverse effects of electric and magnetic fields on animals.

**D R Black**