

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

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STATEMENT OF EVIDENCE OF ALAN JAMES NICHOL FOR TRANSPOWER  
NEW ZEALAND LIMITED  
(Aerial top-dressing)

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## INTRODUCTION

### Qualifications and role

1. MY name is Alan James Nichol. I am Managing Director of Robalan Air Limited (**Robalan Air**), an aerial top-dressing company based in Napier, and operating in the Hawke's Bay region. I hold a commercial pilots licence (retired), and I hold a current Growsafe pilot chemical rating and have a Grade 1 agricultural rating (the highest available).
2. I started in the aerial top-dressing industry in 1971, at the Napier branch of Fieldair Limited (**Fieldair**), a company based in Palmerston North and operating throughout the North Island and upper South Island.
3. **IN** 1971, while working as a loader driver for Fieldair, I began flight training in Piper and Cessna aircraft. I obtained a private pilot's licence in 1973, and a commercial pilot's licence in 1974. In 1976, I gained an agricultural rating (aeroplane), following agricultural flight training, based at Masterton Airport, in the Wairarapa province.
4. **IN** 1976, I commenced work as an agricultural pilot for Fieldair. I was based in Gisborne, and flew De Haviland Beaver aircraft, spreading fertiliser on Gisborne hill country. In 1979, I moved back to Napier, and was employed as an agricultural pilot at the Napier branch of Fieldair, flying a Fletcher aircraft.
5. **IN** 1986, I was appointed Pilot Manager for the Napier branch of Fieldair. As Pilot Manager, I organised and was responsible for the operation of the base. This included:
  - (a) receiving orders from clients to spread fertiliser on their properties;
  - (b) liaising with clients concerning the area of the farm to be top-dressed (this liaison might include a briefing flight over the farm with the client);
  - (c) pricing the job;

- (d) organising despatch of fertiliser from the fertiliser works to the airstrip;
  - (e) organising the driver and loader to be on the strip at the required time; and
  - (f) maintaining records to comply with Civil Aviation Authority (**CAA**) regulations and reporting requirements.
6. **AS** the sole pilot at the base, I continued to fly all agricultural aircraft operations. From time to time, during periods of heavy workload, I would arrange for Fieldair pilots from other airfields to assist with completing contracts. I would brief them about the job, the areas to be top-dressed and the airstrips to be used.
7. **IN** 1997, I started Robalan Air, after purchasing the Napier-based operation of Fieldair. The company primarily works in the Hawke's Bay area. Robalan Air holds the NZAAA accreditation programme for quality assurance. This is a certification programme developed for New Zealand conditions.
8. **ROBALAN** Air obtained an agricultural aircraft operator certificate (AG48815). This certificate enabled Robalan Air to carry out Aerial Topdressing operations under part 137. I became Chief Pilot and Chief Executive of Robalan Air. I was the sole pilot and carried out top-dressing operations under Part 137 of the Civil Aviation Rules (**Rules**).<sup>1</sup>
9. **BETWEEN** 2001 and 2006, Robalan Air operated two aircraft, and employed two pilots. The aircraft have included a Fletcher (1000kg payload) and a larger Airtractor 502B (maximum payload 1865 kg).
10. **FROM** 1976 to 2001, I personally logged 16,300 flying hours. This equates to approximately 200,000 take offs and landings from farm airstrips. This lifetime experience in the industry would make me one of a relatively small number of people with an in-depth practical knowledge of all aspects of agricultural aviation.

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<sup>1</sup> I discuss the Rules in more detail later in my evidence.

11. **AS** will be understood from my evidence, I have worked extensively with the farming community since 1971. I am also involved in horticulture, growing apricots for the early markets, squash as an export crop, and fattening beef cattle. I thus have a sound knowledge of farm practices and requirements in relation to agricultural aviation.
12. **AS** well as my commercial involvement in agricultural aviation, I have also had a strong professional involvement. Since 1997, I have been a member of the New Zealand Agricultural Aviation Association (**NZAAA**). NZAAA promotes agricultural aviation and assists and supports its members activities, including with safety, compliance, information and technical and professional matters. NZAAA membership is made up of fixed wing and helicopter agricultural aviation operators. Membership is voluntary. In 2003, I was elected onto the NZAAA governing committee.
13. **OVER** the past two years, I have been NZAAA's observer on the Aircare Safety Committee (**ASC**). This was a committee of the Aviation Industry Association<sup>2</sup> (**AIA**), and was set up with the objective of reducing air accidents by 25% by 2010. ASC is made up of representatives associated with the aviation industry. This body is currently in recess, but undertook an important educational role. The material prepared during its period of activity is still widely available.
14. **FOR** the record, I note that I have a good understanding of agricultural helicopter operations, but no operational experience.
15. I confirm that I have been involved with the North Island Grid Upgrade Project (**Upgrade Project**) since April 2005. I was approached by MWH New Zealand Limited (**MWH**) to assist with an understanding of the potential effects of the proposed 400kV capable line (**proposed line**) on aerial agricultural operations. My involvement has been along the entire length of the proposed route, including both the east and west route options. I initially assisted in identifying all airstrips in, or within, the vicinity of the routes and their distance away. Once the interim route decision was made, I was involved in farm visits and discussions with parties whose operations were potentially affected by the line. This role is still continuing.

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<sup>2</sup> The AIA is an association of members representing the interest of the different sectors within the Aviation Industry of New Zealand.

16. IN carrying out my assessment, and preparing this statement, I have considered the following documents:
- (a) Various mapped material, including the information on constraints and line plan and profiles (Notices of Requirement (**NOR**) documentation, Part X, sections 19 and 20).
  - (b) Civil Aviation Rules – Part 137 – CAA Consolidation – 12 December 2003 – Agricultural Aircraft Operations (published by the Civil Aviation Authority of New Zealand) (**Rules or Part 137**). Relevant parts of these Rules are appended to my evidence.
  - (c) Safety Guideline – Farm Airstrips and Associated Fertiliser Cartage, Storage and Application – Department of Labour and CAA, December 2006.
  - (d) Landowners Booklet "*Working on your land : A quick guide to your rights, obligations and how we will work with you*" Transpower, September 2007.
  - (e) Corridor Management – Managing development and activities within transmission line corridors – Transpower – October 2007 (brochure).
17. I have also drawn on my extensive experience, and on my site and area visits.
18. I confirm that I have read the Code of Conduct for expert witnesses in the Environment Court Consolidated Practice Note (2006). I have approached the preparation of this evidence in the same manner that I would for the Environment Court.

#### **SCOPE OF EVIDENCE**

19. IN this statement of evidence, I discuss likely impacts of the Upgrade Project on aerial top-dressing activities in the area of the proposed line. I comment on the potential effects of the construction and operation of the Upgrade Project on aerial top-dressing activities, and aircraft safety issues relating to agricultural activities.

20. I also discuss developments which are currently taking place in the aerial top-dressing industry. These developments assist in putting the potential impacts of the Upgrade Project in context.
21. MY evidence does not cover farming practices and aerial top-dressing as a farming practice. Mr Hall, in his evidence, provides an overview of farming in the area around the proposed line. I do not repeat those comments here.
22. I am also aware of the evidence of Mr Sullivan which covers aspects relating specifically to operations associated with Ardmore Airport.

#### **GENERAL COMMENT**

23. AS a general observation, it is my opinion that the proposed line would have some effects on aerial top-dressing activities, and will be an additional obstacle for agricultural and other small aircraft operating in the area. However, the choice of the western route from the two options has limited these effects to areas close to the proposed line, and a relatively small number of large properties which depend on aerial application. In my opinion, effects will be manageable, and no safety issues arise beyond those associated with normal operations by a law-abiding and responsible pilot.

#### **WORK UNDERTAKEN**

##### **Route decision stage**

24. AS noted above, I assisted in gathering information about the number and location of airstrips in and near to the routes that had been identified. It is my understanding that the initial consultation round, starting in October 2004 had demonstrated a large amount of concern in the rural community about the ability to go on using airstrips located close to the route, as well as the direct effects on farm operations and actual operators of agricultural aviation businesses. While a mapped database showing the locations of airstrips was available based on CAA information, this information was not reliable as it is no longer kept up-to-date and there is no formal registration of airstrips.
25. IT also takes a trained eye to spot airstrips in the field, as often they are little more than part of a paddock. Sometimes an airstrip may be visible because it is built up or marked. The most used airstrips may have a fertiliser storage bin

on them. These bins are often used by several properties on a shared basis. These days, it is the exception rather than the rule that each farm has its own airstrip.

#### **Inspection of the route by helicopter**

26. **IN** early April 2005, MWH arranged for me to inspect the entire length of the proposed line by helicopter. The flight was organised by Transpower New Zealand Limited (**Transpower**) for the purpose of filming the two route options, and collecting information such as the location of all houses on the route and nearby. I was asked to become familiar with the "lie of the land" and as far as possible to identify airstrips to supplement the map information and the comments that were then coming in from the consultation process.
27. **MWH** provided me with hard-copy aerial photography, maps and charts prior to the inspection flight. I searched these maps and charts for signs of airstrips. As noted earlier, it was quite difficult to identify all airstrips. It was also difficult to know which airstrips might be used to apply fertiliser to an area because, by way of example:
- (a) a farmer may use a neighbour's airstrip because it is more economical to use that airstrip than the airstrip on his or her property;
  - (b) a large property may have two airstrips; or
  - (c) two properties may each have their own airstrip, in close proximity to each other.
28. **FROM** this process, I sighted 83 airstrips in total: 33 in proximity to the west route, and 50 in proximity to the east route. This confirmed information that was independently compiled by Mr Hall. Ms Allan's evidence explains the use of this material in the route choice methodology
29. **IN** my opinion, not only the number of strips, but also their distance from the line may have been a material consideration in understanding effects, and I provided estimations of distance out to 2km (but sometimes more), from the centre line of the routes. I understand that the information was later mapped and checked in the MWH offices.

30. **GENERALLY**, the greater the distance from the proposed line, the less likely that operations will be affected. However, orientation is also relevant. An airstrip that parallels an alignment can be used even when quite close. One at right, or oblique, angles may need to be more distant to clear the proposed line. However if departure and approach can both take place away from the proposed line, proximity is not a significant issue. Airstrip elevation may also be important in terms of the ability to clear the proposed line when taking off and landing. This level of detail was not able to be taken into account at the route decision stage, but has become important in more recent negotiations with directly affected landowners.
31. **AS** I explained earlier, it is not possible to tell how important a particular airstrip is in terms of the area flown from that airstrip, and this was therefore also not able to be taken into account in the route decision. In any case, airstrips and associated potential impacts on farm operations were only one of a number of aspects being evaluated.
32. **HOWEVER**, in my opinion, had the eastern route option been chosen it would have had quite a significant effect, particularly in route sections 6 and 7. That is because the route ran along the eastern shoulder of the Haupokohe Range where there are a number of airstrips “perched” close to the Hauraki Plains. I understand that at a public meeting at Tahuna<sup>3</sup> it was strongly expressed by the local farming community that any effects on the airstrips would have a very widespread effect, as operators fly a large area of the Hauraki Plains from this location. From my experience, and a knowledge of the area, I would expect that to be the case.
33. **OF** course, airstrips are also found on the west side of the range, such as that used by Mr Rob Storey in conjunction with other farmers,<sup>4</sup> but they almost certainly relate to a smaller area because of the extensive forest landuses to the west, and the availability of other hill areas where strips are likely located beyond the Matahuru valley.
34. I therefore supported the choice of the west route which became the NOR alignment, particularly in those sections (6 and 7). While I acknowledge some likely additional cost for some farmers due to the proposed line, to my knowledge no airstrips are directly affected or rendered unusable by the

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<sup>3</sup> I did not attend this meeting but I was told about it and asked for my views by Ms Allan.

choice of the western route option in this part of the route. In this area, the ARI-PAK A and other lines are present and the community has adjusted to them.

### **Easement stage**

35. **DURING** the time that the route options were subject to consultation, I was invited to a small number of properties to discuss potential impacts on airstrips and farm operations with the farmers or landowner. These discussions were part of the consultation process and was to assist them in making submissions, as well as enabling me to understand impacts. I usually went with a property officer (Opus "case manager") or a MWH planner, and a Transpower field engineer. Once the decision was made to use the west route, this activity continued during the easement stage and I made myself available virtually on an "on call" basis.
36. **FOR** example, on 3 days in June and October 2005, I accompanied Opus and Transpower staff to 9 on-site inspections. At 6 of the airstrip inspections, the landowner was also present.
37. **AT** each visit, I inspected the airstrip to gain an understanding of the topography and the impact of any existing lines or structures on the operation of the airstrip. The Transpower or Opus staff member who accompanied me would indicate where the proposed line and towers would be sited. I then considered the practical implications of the proposed line and towers. Where relevant, I also considered the impact of removal of the ARI-PAK A line and/or the removal of nearby vegetation would have on an airstrip. I was also usually able to discuss how the landowner used the airstrip and what the likely farm needs were for aerial operations.

## **ASSESSMENT OF EFFECTS**

### **Context**

38. **FARMING** practices often involve the use of fixed-wing aircraft for fertiliser application and weed treatment on farm and forest areas. Where fixed-wing aircraft cannot be used, helicopters may be used. Helicopters are more manoeuvrable, but also more expensive to operate. Small planes can also be

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<sup>4</sup> I have visited this location and comment on it later in my evidence.

used for fire-fighting, and helicopters may be used for pest management, animal recovery, and logging.

39. **AERIAL** top-dressing does however, predominate. It is largely, but not exclusively, used for hill country land.
40. **FLAT** country land is normally top-dressed by ground spreaders (ie equipment attached to a tractor or truck purpose built for spreading fertiliser), not by aircraft. However, in wet weather, particularly during wet winters, when the ground is too wet for ground spreaders, aerial top-dressing is used. This also explains why aerial top-dressing is extensively used on the Hauraki Plains and other peaty areas.
41. **THERE** is also an increasing trend to aerial spray fertiliser for crops, like maize and potatoes, which are now found throughout the Waikato. These crops grown on flat land are often fertilised 2 to 3 times during the growing season. They may also be aerial sprayed when there is an insect infestation.
42. **AERIAL** spraying (targeting small areas of planted crops) over flat country is usually carried out by helicopter.
43. **THERE** is a trend towards achieving more accuracy in aerial fertilisation. This is driven by economics (unnecessary/wasted application is an unnecessary cost), but also by environmental concerns. Improved products and technology are contributing to this trend. In some parts of the country, regulators such as regional councils are also very vigilant in terms of top-dressing of waterways.

#### **Activities along the route**

44. **THE** area from Auckland down to Paparimu is predominately in lifestyle blocks. This land is unlikely to be aerial top-dressed for several reasons. It is quite densely populated and locals are likely to be concerned about spray or fertiliser drift. Blocks are often so small they cannot justify aerial top-dressing. Sometimes the land uses do not require much or any fertiliser application (eg hobby farming or organic farming). However there are still some blocks large enough and sufficiently remote from developed areas to be topdressed.

45. **APART** from the short stretch of forested hill country south of Paparimu, much of the land through which the proposed line passes, south to Morrinsville, is easy country (rolling downs or valley areas) and thus would be top-dressed, where required, by ground spreader or sometimes helicopter, but rarely or never by fixed wing aircraft. Ground spreading is cheapest, and helicopters can be used for targeted purposes, such as small areas of farm that are not accessible to ground spreaders (eg areas that are inaccessible or very soft ground).
46. **THE** area from Morrinsville to Whakamaru is predominantly hill country. It includes a significant area of forestry.
47. **IN** my opinion, of the land south of Paparimu, approximately 40% of the land in the vicinity of the proposed line would not be aerial top-dressed.
48. **MY** evidence now addresses the four main types of effects that have been expressed as concerns to me in discussions or have been stated in submissions or letters to Transpower that I have reviewed. These are:
- (a) safety in operations, and the implications of the proposed line;
  - (b) the consequential effects on the ability to undertake farming activities, such as fertilising and spraying;
  - (c) a range of issues seen as "third party" risk and liabilities (ie the impacts that aircraft operations could have on the proposed line); and
  - (d) direct effects on specific airstrips.
49. **FOR** each of these potential effects, I consider mitigation.

#### **Safety in operations**

50. **THE** agricultural aviation industry is extremely concerned about safety. Pilots operate in a range of complex and difficult circumstances, including difficult terrain and weather and varying loads. Operationally when working, the task is to deliver the product (eg fertiliser) to the specified area. When aircraft are

operating at low levels in variable terrain, there is an ever-present risk that accidents may happen.

51. **AIRCRAFT** operation is governed by rules established by the CAA. Part 91 of the Civil Aviation Rules (**Rules**) sets out general operating and flight rules.
52. **RULE 91.311** provides that a pilot of an aircraft must not operate the aircraft at a height less than 500 feet above ground level. Rule 91.311 also provides that aircraft must not operate at a height less than 500 feet above any obstacle or structure that is within a horizontal radius of 150 metres (approximately 500 feet) from the point immediately below the aircraft. These specific rules apply while going out to a job.<sup>5</sup> Planes leaving an airstrip are expected to climb on track at their best climb rate to reach the 500 feet, unless they are operating under Part 137 rules.<sup>6</sup> I have attached relevant sections of Part 137 to my evidence as **Appendix 1**.
53. **UNDER** Part 137 of the Rules, an exception is made to the 500 feet rule for agricultural aircraft operations. Rule 137.63 provides that an agricultural pilot may operate below 500 feet as long as any flight below 500 feet is necessary for the agricultural operation and is performed without creating a hazard to persons or property on the surface. Thus, an aircraft operationally loaded with fertiliser, and performing legitimate work may operate under 500 feet.<sup>7</sup> In these circumstances, the 150 metres horizontal separation also no longer applies and the pilot's discretion applies.<sup>8</sup>
54. **OPERATING** to these Rules places the pilot under a regime where he or she is entirely responsible for their own judgements as to personal safety and to meeting the requirements not to create a hazard to people or property on the surface as noted above. To manage this situation, the industry has a series of certification requirements. Pilots must have an agricultural rating of Grade 1 (higher) or Grade 2 to be able to operate under the exceptions that Part 137 allows.<sup>9</sup>

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<sup>5</sup> In contrast, over urban areas, the height above ground level increases to 1000 feet and the horizontal distance from any obstacle or structure increases to 600 metres.

<sup>6</sup> Other aircraft passing through the area should always be operating under Rule 93.311, and should thus be well above the proposed line. Thus, the same potential issues do not arise.

<sup>7</sup> The exceptions, of course, apply to other circumstances, such as power line inspections by aircraft, police surveillance, live deer recovery, and some emergency services.

<sup>8</sup> Clarified 17/1/08, pers com, J Fogden, General Manager, Rotary Wing/Agricultural Operations, CAA.

<sup>9</sup> This rating involves having a commercial pilots licence and then additional training with specially qualified instructors, to a CAA approved syllabus. The difference between Grade 1 and 2 is 1000 hours productive flying. Grade 2 pilots are under constant supervision. Normally it takes about 2 years to achieve Grade 1.

55. **AS** well as training and experience with their aircraft and their job, pilots rely very much on familiarity with the area within which they are working. Pilots tend to work within a region, rather than nationally. Navigational charts are available to aviation users generally, but people engaged in low level agricultural operations generally do not have the required time to read maps. Any change in an area, particularly an obstacle which protrudes above trees, buildings and fences can be of concern. New tall structures would normally be notified to the pilot by their operations managers who should have been notified by CAA (including masts, wind turbines, new transmission lines).
56. **THE** safety concern about tall obstacles is very much related to their visibility. For example, the slender tall monitoring masts that precede wind farm developments are extremely difficult to see and are of greater concern to pilots than wind turbines themselves. Similarly, in certain light conditions (ie against a dark tree background on a dull overcast day), a transmission line may be virtually impossible to see. In contrast, transmission towers will always be visible unless in cloud. The main hazard is conductors between the towers themselves.
57. **IN** these circumstances, it is very important that pilots know about the relevant transmission line from charts or their own local knowledge. This raises a particular issue about the construction stage which I return to later. I understand that in recent years Transpower has provided coordinates of all its towers to the CAA and Airways Corporation to allow their positions to be included on aeronautical maps.
58. **MOST** areas of the country have a number of transmission lines crossing them at different heights. These are well known to the industry. Some of the lines preceded the development of the aerial top-dressing industry. Generally, largely because of local knowledge, they do not cause a problem and are taken into account in planning work flight paths (ie how the pilot will ensure that the fertiliser is distributed to all necessary parts of the farm).
59. **TO** my knowledge, there have been only three fatalities caused by an agricultural aircraft colliding with high tension transmission lines, despite the large number of hours flown around these structures over the years that aerial top-dressing activities have been carried out.

60. **BECAUSE** of the size of the proposed line and towers, they would be known about by local and regional operators, and would be taken into account in planning flight paths for individual jobs. In these circumstances, they should pose no additional safety risk, unless pilots themselves choose to take additional risks in crossing over the proposed line because of its height. I note that the towers are approximately 400 metres apart on average and that the lowest ground clearance must be 12.7 metres, and thus the lowest clearance of the highest wires (the earth wires) is 42 metres. These top wires are also the most difficult to see. It will be essential that pilots are fully informed about the structure and that they continue to treat the proposed lines with respect and not take unnecessary risk in terms of safe clearances.
61. **THE** proposed line would replace an existing line over much of its distance, the ARI-PAK A line. In this area, pilots would be aware of the existing line, but would need to adjust their own understanding and habits of flying over that line, to take account of the proposed line.
62. **IN** summary, the main safety issue relates to the line's height. Visibility may be greater than the ARI-PAK A line, particularly in terms of the towers, but because the proposed line is higher it would be a more significant obstacle to avoid.

*Mitigation for safety*

63. A number of possible mitigation measures are available. I have considered these and comment on each in the following paragraphs.
64. **SAFETY** marking devices, such as flashing lights, would have little effect in daylight when agricultural operations are conducted. They would only mark the towers, which can be readily seen in daylight conditions.
65. **TRANSMISSION** lines will be marked on navigation charts. This is essential for the normal operator, but as noted above, these will not generally be used on agricultural operations. There is also usually some delay in publishing charts and the uptake of new charts.

66. **ON** towers for example, a new tool, the OCAS system<sup>10</sup> could be helpful, but, as it is based on radio contact, it may have reception problems at low levels (eg where topography obscures signals). Thus, it could not reliably assist agricultural operations.
67. **A** desirable mitigation method would be for the conductors, particularly the earth wires, to be kept in a shiny condition with suitable coatings. This would greatly enhance visibility of the wire. I understand that this could conflict with other environmental aims, such as the public desire that the proposed line be visually recessive in the countryside, and would also become an extra maintenance burden for Transpower.
68. **THE** final mitigation option would be that Transpower initially, and on a continuing basis, informs the NZAAA and the CAA of the proposed line and its presence. While this may seem an obvious thing to do, it is important that pilots do not become complacent, but are constantly reminded of the obstacle. I strongly recommend this action.

#### **Effects on farm activities**

69. **AS** discussed earlier, the proposed line would pose limits on top-dressing access to some farm areas. In theory, where the ARI-PAK A line crosses a property and is being removed at the same time, there would be little difference in the area of land that is "inaccessible" to top-dressing operations. This area would be defined by the operations decision on safe horizontal separation distances. The increase in "inaccessible" area due to the proposed line would be somewhat increased because the width of the cross-arms is greater. Because the whole structure is large, it is also likely that pilots would choose to give the structure a wider clearance.
70. **PERHAPS** more significantly, there is a greater height to climb to cross the proposed line. This height adds flight distance and time, and for precautionary safety reasons, the pilot may choose to alter his/her flight path to cross the proposed line only at a tower to enhance the safety of the operation.

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<sup>10</sup> Obstacle Collision Avoidance System, recently developed as a safety system by a Norwegian company.

71. **IN** my view, the proposed line would not stop top-dressing operations on land currently being sown with fertiliser. However, some blocks may need to be sown using a different flight pattern. By way of example, a block may have been sown by flying across the proposed line, which might no longer be practicable. If the normal flight path has to be changed to fly parallel with the proposed line, this may result in inefficiencies, and in some cases these may be significant.
72. **A** way around this issue could, in some circumstances where the farm is divided by the proposed line, be to approach the task from two different airstrips. Many properties are, in my experience, flown from two different strips, but that is dependent on a second suitably located strip being available physically, and practically, including whether a fee is charged by the owner of the alternative strip.
73. **THE** net effect for some properties may be extra complexity in covering the area and/or extra cost due to increased flight time.
74. **IT** could be logical and practical to fly at right angles and across the proposed line in some circumstance using the sophisticated guidance systems that are already available to interrupt the flow of fertiliser, and thus to confine it to the wanted sowing area and avoid top-dressing directly over the proposed line. An example could be where there is little difference in height between the proposed line and the topography being treated. In some cases, this flight pattern could be effective and would not involve much extra cost.
75. **WORKING** out the best way to cover a block or property with the proposed line would be a site by site exercise, and each operator would work out their own "best" approach. Sometimes farmer preference may also come into it.
76. **IN** my opinion, across the length of the proposed line, there are generally relatively few strips that will be rendered unusable. I discuss this further later in my evidence. Where this impact does occur, it may require some farmers to adopt a different approach, and/or to develop relationships with other strip owners. While helicopters could be suggested as an alternative, in reality, helicopters are 30-50% more expensive to apply the same product on the same site. While they do not require special landing areas, there is still the problem of getting product to them.

77. **THUS** while there are likely to be some adjustments that have to be made on many properties, and possibly some extra cost, it is my experience that the farming community is good at working out solutions to changing circumstances.
78. **WHERE** the proposed line covers new ground, such as south of Arapuni, the adjustments will be larger as the farmers have mostly not had to consider transmission lines.

### Third party effects

79. **THE** industry, perhaps like the rest of society, is becoming increasingly aware of liabilities and risks of effects on third parties. This awareness has resulted in people raising a number of issues associated with flying and the use of fertilisers etc, in the vicinity of the proposed line. I now make a few general comments in relation to the sorts of matters that have been raised in conversations with farmers and/or, I understand, at public meetings. I have also seen a letter from the NZAAA to Transpower (December 2007) relating to this very issue, which I understand is now under discussion between the two organisations.
80. **THE** first such topic is potential liability issues if a plane hits a transmission line, causing disruption to the transmission system and, consequently, downstream effects.
81. I note that, as top-dressing pilots are operating under Rule 137.63, they must operate "without creating a hazard to persons or property". A collision could be a breach of the rule. I am not able to comment on the legal situation, but I feel it is a matter that deserves consideration. However, I observe that the same issue applies in relation to all other lines, and to other structures.
82. **THE** second issue is that aerial top-dressing could result in corrosion of the proposed line due to contact with fertiliser. If top-dressing deliberately or accidentally takes place above lines dust remains on the line. While rain will normally wash this off, a heavy application could begin to corrode the line. I understand from the project engineering advisors that this is only a likely

concern if there were to be heavy applications on a frequent basis.

83. **ANY** issue relating to the insulators is not to do with corrosion. Rather, I understand from Transpower, it is to do with the build up of pollutants below the insulator sheds. Fertiliser is a conductive material, and therefore significant build up, if not washed away, could ultimately break down the insulation characteristics and affect line performance. This is more of a maintenance issue for Transpower, given that there will not be any specific restrictions on aerial top dressing operations. The use of dust-free pellet fertiliser would solve this.
84. **A** trend in the industry (economics permitting, in terms of uptake by individual properties) is towards high analysis fertilisers. This product is a comprehensive fertiliser which is uniformly pelletised (ie, granules are the same size, and there is almost no dust) and is applied at a much lower rate per hectare. Because of its pellet form, it does not drift to, or stay on, the conductor.
85. **IF** there were any liability issues arising from top-dressing and line or conductor corrosion, I would generally expect that to be as a result of poor top-dressing practice. As explained above, trends in fertilisers are to move away from dusty products and therefore, if anything, any risks are reducing.

#### *Mitigation*

86. **AS** with the safety issues I discussed earlier, the main means of mitigation of potential third party effects is awareness and education and I consider that Transpower has an important and ongoing responsibility to foster awareness.

#### **Effects on specific strips**

87. **AS** noted earlier in my evidence, I have been requested to visit and assess impacts on a number of individual airstrips at the request of other Transpower advisers. These visits have been arranged where landowners have requested specific advice in terms of the ongoing usability of their airstrip.
88. **OF** the 33 airstrips that I noted in proximity to the proposed line, only a small proportion will be significantly adversely affected. However, I have not visited all strips and it is possible that others will still be identified. Nevertheless, I am

aware that the proposed line has been a very high-profile topic in the area for at least two years now, and I would expect that landowners directly affected, or nearby landowners, who have concerns would have brought them to Transpower's notice by now.

89. **IN** the layout of an airstrip, Rule 137.109 sets limits for take-off flight paths, and Appendix A to the Rules prescribes the required take-off area. Of these requirements, Rule 137.109 is the more restrictive as it defines the clearance height and lateral distance to clear obstacles on the ground. The "take off area" lies beyond the "take off surface" (or airstrip) and can be angled slightly (by 20 degrees) to clear obstacles. I took into account these basic requirements in my assessment. I undertook no measurements, but my experience enabled me to reach an informed judgement for each of the airstrips I visited.
90. **IN** my opinion, of the nine airstrips I have inspected only three would be seriously affected. I now discuss these.

*Lyons airstrip*

91. **THE** Lyons family at Papparimu, north of the Hotel de Vin, run a large mixed farming operation on steep to rolling land. This airstrip is shown in the **Map Book, Series 2, page 6B** as the southern-most airstrip on the page (brown rectangle).
92. **THE** proposed line runs at close to right angles across the takeoff end of the airstrip, which has a good downward slope for takeoff and landing. The proposed line would make this airstrip unusable. I understand that the decommissioning of this airstrip would be a matter for compensation during the acquisition of an easement.
93. **TRANSPower** has been in discussion with the Lyons family for some time, reviewing alternatives. I understand that it was initially considered that it may be possible to realign the airstrip at right angles to the present airstrip. This realignment would require major earthworks to obtain sufficient length, but would direct that take off path away from the proposed line. A new fertiliser bin would also have to be constructed, as the present bin would lie in the middle of the new airstrip.

94. I have however considered this possibility in light of the CAA Safety Guidelines "Farm Airstrips and Associated Fertiliser Cartage, Storage and Application" published December 2006. I advised Transpower that there would be insufficient length on the site to meet the Guideline requirement by a considerable margin (approximately 25%). It is my understanding that Transpower accepts this advice and is currently in discussion over compensation with the family.
95. I have not been asked to comment on alternatives, but I do note that, from the mapped information available, there may be one or more airstrips in the vicinity that could be used, subject to private arrangements. However, cost and inconvenience would be greater.

*Scherer airstrip*

96. Mr Scherer is the user of a strip at 453 Huihuitaha Road, Putaruru. This strip is marked on **page 21B, Series 2 in the Map Book**, towards the top of the page.
97. **THIS** airstrip has a hanger where Mr Scherer's private aircraft is based. Mr Scherer uses the airstrip regularly, but no agricultural operations are undertaken from the airstrip. I understand that he uses his plane primarily for aerial photography.
98. **THE** proposed line runs directly across the eastern end of the airstrip. As takeoffs and landings are made in both directions (depending on the wind direction), in my opinion the airstrip would become unusable for the current use.
99. **IN** my opinion, the airstrip would not be suitable for agricultural operation at the present day because it is too short and undulating in nature. An economic payload would not be able to be safely lifted off this strip.
100. I am not aware of any discussions that may have been held regarding alternatives. This issue would need to arise in the case of easement acquisition negotiation.

*Ranger airstrip*

101. **MR** and Mrs Ranger, Waotu Road, Putaruru, have a sheep and cattle farm containing an airstrip. This strip is marked on **page 21B, series 2, in the Map Book**, towards the bottom of the page.
102. **THE** proposed line passes directly across the takeoff end of the airstrip. The height and proximity of the proposed line to the end of the airstrip would make it unusable.
103. **IN** my opinion, it may be possible to realign the airstrip to the southwest to avoid the proposed line on take off. Proximity to the road is not of concern. Again, I understand that issues would be considered at the time that an easement is acquired.

**Unaffected airstrips**

104. **AT** the other six properties visited, the concerns of the landowners were noted. However, in my opinion, the concerns were of little consequence in terms of the ability to operate off their strips. My comments are now set out.

*R Baker, Mangapiko Valley Road, Ohinewai (Map Book, series 2, page 11B)*

105. **THIS** airstrip is situated at right angles to the proposed line, at a distance of 1.76 kilometres. The takeoff point on the airstrip appears to be above the height of the nearest tower on the proposed line. In my view, top-dressing operations off this airstrip would not be affected by the proposed line.

*Bushmere, Paparimu Road (Map Book, series 2, page 5B)*

106. **THE** proposed line runs behind the airstrip (eg away from the takeoff direction) at a distance of about 800 metres. I consider that the proposed line would have little or no effect on this airstrip.

*Haswell, Twilight Road (Map Book, series 2, page 3B)*

107. **THE** airstrip is near the marked "Hill Pa" on the map. The proposed line runs parallel and very close to the airstrip. However, a concrete water tank on the right hand side of the airstrip, at the point of lift off, currently prevents aircraft

turning in the direction of the proposed line after takeoff. The proximity of the proposed line to the airstrip would, therefore, have no material effect on this airstrip, as a constraint already exists. In my view, no action is required in relation to this airstrip.

*D Phillips, Monument Road (Map Book, series 2, page 4B)*

108. **THE** proposed line runs parallel with the airstrip at a distance of about 400 metres. This would not pose a problem when using the airstrip for straight in approaches or takeoff to the north. However, agricultural operations turning left after take off would need to gain extra height to cross the proposed line. This would result in extra cost in time and fuel, but only when turning left off the strip. I am not able to judge the extent to which it is currently used for agricultural operations, and thus the actual impact.

*N Cheyne, Matahure (Map Book, series 2, page 10B)*

109. **THE** proposed line runs at right angles to the airstrip at a distance of approximately 900 metres. Agricultural operations off this airstrip may be affected when sowing land to the left or directly ahead of the airstrip, because they may involve a further climb to the right to gain height to clear the proposed line. This could potentially increase the cost of sowing off this airstrip.

*Vercoe, Tauhei Road (Map Book, series 2, page 14B)*

110. **THE** airstrip is used by Latto Holdings to topdress their property which is two to three kilometres distance from the airstrip. The aircraft would have to cross the proposed line, but the distance of the proposed line from the airstrip means that the proposed line would not have any effect on top-dressing operations from the airstrip.
111. **THE** airstrips I have visited and described above are typical of the range of airstrips that might be found in the Waikato. It appears likely that only two which are relied upon by farmers will be rendered unusable by the proposed line. A third airstrip will be unusable, but is not part of the aerial top-dressing activity of the area. The farmers whose airstrips are displaced would have to find other means of fertilising their land. I understand that two of the three affected people are already in negotiation with Transpower.

## Trends in the industry

112. **THE** situations I have assessed above are largely in terms of today's circumstances. However, the industry is continuing to evolve and respond to a range of influences, including economics and efficiency drives, changes in product types, improvements in technology (such as use of GPS systems, VR<sup>11</sup> technologies, efficient spreaders based on application of the Venturi effect<sup>12</sup>); and improved practices. Examples of improved practices are hard surfaced strips which can be used all year round, and strips of larger dimensions that can take bigger aircraft.
113. **BIGGER** aircraft will result in fewer flights, but also it is likely that the industry will move, as many other agricultural service industries also have, towards fewer larger operators. This trend will mean that many of the smaller airstrips on individual farms will not be used.
114. **THEREFORE**, the pattern of airstrips today will, in all likelihood, have changed over the next decade regardless of the presence of the proposed line. In the scale of the Waikato area, I would not expect that the proposed line would pose any limitations on the changing conditions. Bigger planes could operate effectively up to 12 to 15 kilometres from a base strip (compared to an average of about 6 kilometres now).

## Construction stage

115. I have noted earlier that the construction stage is a particular time of change which operators would need to be particularly aware of. There are a number of stages of construction, which are described in the evidence of Mr Rasul and Mr Patrick, which deserve consideration.

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<sup>11</sup> Variable rate technology, that is linked to a GPS farm plan that opens and closes the hopper door at the required rate, related to the speed of the aircraft. A similar system is prescription top-dressing, whereby the GPS hopper control computer follows a nutrient map of the farm and adjusts the hopper control to deliver the appropriate amount of fertiliser to the area specified by the nutrient map.

<sup>12</sup> These spreaders utilise basic physics to disperse fertiliser pallets over a wider swathe than the traditional method.

116. **WHERE** helicopters are to be used in the construction of the proposed line, operators of both the helicopters and aerial top-dressing companies operating in the area, need to be kept informed of each others' operations.
117. **THIS** liaison is particularly important when helicopters are operating below 500 feet above ground level and could be in the airspace that would otherwise be used by agricultural operators. Aerial top-dressing operators would not expect to encounter other aircraft below 500 feet above ground level as it is against the Rules to operate below this height unless on restricted activities. Radio contact is normally used to cover this situation. However, it is possible that operators may have made an early start, and not be expecting intrusion of other aircraft, such as a helicopter for some hours later.
118. I perceive a particular risk due to the staging of the construction. As I understand it, the towers would be constructed some months before the conductors and earthwires are strung in place. I understand this period is estimated to be three to six months, depending where on the proposed line the towers are located, and the construction staging. Over that period, local operators may have become accustomed to the towers without the connecting conductors and have adopted patterns of flying between them at lower levels. To avoid lack of awareness, and the consequent potential for catastrophe resulting from the changed circumstances (as a result of the conductors being put in place), it is essential that pilots are fully informed of the construction progress.
119. I consider that Transpower has a major responsibility to ensure that good and timely communication is carried out in relation to the aviation industry, particularly those likely to be undertaking low-level agricultural operations.
120. A range of methods to get this information across may be needed. I am aware that the Upgrade Project would be subject to a Construction Management Plan, including provisions for community liaison. I would recommend that particular emphasis be placed on ensuring that there is excellent and ongoing communication with the industry, and that the industry should be consulted in advance, to ascertain the most effective ways to communicate with it, particularly at the crucial construction stage.

## ISSUES RAISED IN SUBMISSIONS

121. A number of submissions raise issues in relation to aerial top-dressing. I discuss a representative selection of those submission below.

### Issues raised by Kevin Baker/Lichfield Farms Limited (Lichfield Farms) (Submission No. 1001)

122. **MR** Baker/Lichfield Farm submits that the towers are so high that aviation rules require a light to be placed on top of them, so not only will he see them in the daylight, but they will flash at night.
123. **IN** response, the need for lighting is at the discretion of CAA. As I have noted earlier, any need for lights would not be driven by agricultural aviation safety considerations, as they do not operate after twilight.
124. **MR** Baker/Lichfield Farms also raises concerns about future farming disruption. He/it submits that Lichfield Farms spends in excess of \$50,000 annually on agricultural helicopter operations. Lichfield Farms applies nitrogen and solid based fertiliser by air and annual weed spraying is done by air. Hydro seeding to sidelings is applied by air and this is an Environment Waikato regulation. Fire fighting and scrub burn off is done by air. The alignment of the proposed line will severely impact this work.
125. **IN** response, I am not able to comment in-depth, as I am not privy to this farming operation. I nevertheless acknowledge (consistent with my earlier comments) that there may be some additional cost, but the proposed line would not limit these activities, except to the extent that they are directly under the line. As I have noted earlier, in my observation, although I do not fly them, helicopters are more manoeuvrable than fixed wing aircraft, and I would expect their operations to be less affected.

### Issues raised by Maurice Samuel Bill and Cheryl Louise Bill (Submission No. 0943)

126. **MAURICE** Bill and Cheryl Bill submit that it will be dangerous for any pilot in a plane or helicopter to fertilise their hills with the towers present.

127. I am not familiar with the specific area. However, I would expect that the only effect would be possibly a need to approach the operation in a different way/using a different flight path such as, parallel with the proposed line.

**Issues raised by Janet Murial Sceats (Submission No. 0476)**

128. MRS Sceats submits that:

- (a) due to land contours, a helicopter has been used to control weeds and thistles; and
- (b) a helicopter will not be able to be used to control weeds once the lines are put in.

129. AS noted earlier, I have no helicopter experience, but I do note that helicopters are more manoeuvrable around structures than fixed wing aircraft, and so I would expect less effects than if the operation was by fixed wing aircraft.

**Issues raised by Lorraine Storey (Submission No. 0742)**

130. MRS Storey submits that:

- (a) the airstrip that they use will be unusable if the 400kV capable line goes ahead; and
- (b) three of the nearest airstrips will either be unusable or usable with limitations that will incur extra costs.

131. I am not fully aware of which airstrip is being referred to in (a), nor which 3 in (b). If the airstrip is the Baker airstrip discussed earlier in my evidence, I have visited it and consider it will not be affected. I have not visited other airstrips in the vicinity so cannot comment on the latter allegation without further details.

**Issues raised by Hon William Robson Storey (Submission No. 0740)**

132. MR Storey raises issues in relation to aerial top-dressing. Mr Storey submits that while flying will be possible, it will be restricted with extra danger and cost.

133. I have commented generally in terms of effects and agree with Mr Storey's general proposition in relation to cost. However, the degree of additional cost is a variable which can only be calculated on the basis of a detailed understanding of farm operations. I have also discussed the risk situation and if pilots are operating in accordance with the Rules, there should be no additional danger.

## CONCLUSIONS

134. **THE** proposed line would have an effect on aerial top-dressing. Overall, I consider these effects to be minor, but they do vary along the length of the proposed line.
135. **THE** main issues concern the height of the wires and the effect the height will have on a pilots' ability to sow a farm in the most efficient manner.
136. **THERE** are also visibility issues which will affect pilots' situational awareness. This could directly affect their decision making in regards to avoiding collision or contact with the proposed transmission wires, and I would advocate highly reflective lines that can be seen when in the air.
137. **A** small number of airstrips would be directly affected and would have to be decommissioned.
138. **THERE** is a potential economic disadvantage to some landowners caused by likely increase in their fertiliser application costs due to additional time in application. However, the industry is changing and some of these additional costs could be reversed over time with the increased efficiency due to those changes.



Alan James Nichol  
31 January 2008

APPENDIX 1

CAA Rules, Part 137

Subparts A, B, C



## **Part 137**

### **CAA Consolidation**

**12 December 2003**

### **Agricultural Aircraft Operations**

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Published by the Civil Aviation Authority of New Zealand

## DESCRIPTION

Part 137 prescribes rules, that are additional to and exceptions from the general operating and flight rules prescribed in Part 91, for pilots performing or being trained to perform agricultural aircraft operations. Part 137 also prescribes additional instrument and equipment requirements for aircraft conducting agricultural aircraft operations, as well as requirements for the certification and operation of persons performing commercial agricultural aircraft operations.

**This document is the current consolidated version of Part 137 produced by the Civil Aviation Authority, and serves as a reference only. It is compiled from the official ordinary rules that have been signed into law by the Minister of Transport. Copies of the official rule and amendments as signed by the Minister of Transport may be obtained from the Civil Aviation Authority or may be downloaded from the official web site at: [www.caa.govt.nz](http://www.caa.govt.nz)**

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## Subpart A — General

### 137.1 Purpose

This Part prescribes—

- (1) rules additional to the general operating and flight rules in Part 91, for a pilot performing, or being trained to perform, an agricultural aircraft operation; and
- (2) exceptions from the general operating and flight rules in Part 91 for a pilot performing, or being trained to perform, an agricultural aircraft operation; and
- (3) rules governing the certification and operation of a person performing a commercial agricultural aircraft operation.

### 137.3 Requirement for ratings

- (a) A pilot performing an agricultural aircraft operation must hold—
  - (1) a current and applicable agricultural rating issued under Part 61 for the category of aircraft used; and
  - (2) a current pilot chemical rating issued under Part 61, if dispensing an agricultural chemical.
- (b) Paragraph (a)(1) does not apply to—
  - (1) a pilot training for an agricultural rating under the direct supervision of a holder of a Category E flight instructor rating issued under Part 61; or
  - (2) a pilot performing any of the following agricultural aircraft operations:
    - (i) dropping farm supplies on farms in rural areas or delivering farm materials to farms in rural areas;
    - (ii) agricultural, forest or water area surveying at a height of less than 500 feet above terrain;

- (iii) feeding or transferring livestock on farms in rural areas.

### **137.5 Requirement for certificate**

No person may perform a commercial agricultural aircraft operation except under the authority of, and in accordance with the provisions of, an agricultural aircraft operator certificate issued in accordance with Subpart D.

### **137.7 Reserved**

### **137.9 Accidents and incidents**

A person performing an agricultural aircraft operation who is involved in an accident or incident must notify the Director of the accident or incident in accordance with Part 12.

## **Subpart B — Flight Rules**

### **137.51 Purpose**

This Subpart prescribes additional rules to, and exceptions from, the general operating and flight rules in Part 91, for a pilot performing, or being trained to perform, an agricultural aircraft operation.

### **137.53 Revoked**

### **137.55 Direction of turns at aerodromes**

A pilot performing, or being trained to perform, an agricultural aircraft operation may turn in a direction other than that prescribed in Part 91 or under Part 93, when approaching for a landing at, or after take-off from, an aerodrome if—

- (1) the aerodrome is used solely for agricultural aircraft operations;  
or
- (2) the aerodrome displays the ground signal prescribed in Part 91 indicating that an agricultural aircraft operation is being conducted from that aerodrome.

**137.57 Revoked****137.59 Revoked****137.61 Operations over congested areas**

Notwithstanding Part 91, a pilot performing an agricultural aircraft operation over a congested area of a city, town, or settlement may, for the proper accomplishment of the operation, fly below the minimum height prescribed in Part 91 if—

- (1) the pilot performs the operation on behalf of a Government department or Crown entity; and
- (2) the pilot performs the operation in accordance with conditions and limitations prescribed by the Director; and
- (3) the pilot performs the operation under the authority of an agricultural aircraft operator certificate issued in accordance with this Part; and
- (4) the holder of the agricultural aircraft operator certificate has complied with 137.205.

**137.63 Operations over non-congested areas**

Notwithstanding Part 91, a pilot performing, or being trained to perform, an agricultural aircraft operation over any area other than a congested area of a city, town, or settlement, may fly at any altitude and at any distance from an obstruction if—

- (1) the operation is performed without creating a hazard to persons or property on the surface; and
- (2) the altitude and distance for all approaches, turnarounds, and departures are necessary for the operation.

**137.65 Fuel reserves**

Notwithstanding Part 91, a pilot performing, or being trained to perform, an agricultural aircraft operation must ensure that the aircraft has the following minimum fuel reserves:

- (1) for aeroplanes, 30 minutes flight time;

- (2) for helicopters, 3 times the anticipated flight time or 30 minutes flight time, whichever is the lesser.

## Subpart C — Special Flight Rules

### 137.101 Purpose

This Subpart prescribes exceptions to the general operating and flight rules in Part 91 for a pilot performing, or being trained to perform, an agricultural aircraft operation in an aeroplane issued with a restricted category airworthiness certificate under Part 21 Subpart H for the purpose of an agricultural aircraft operation.

### 137.103 Maximum take-off weight

(a) Notwithstanding Part 91 and subject to paragraph (b), a pilot performing, or being trained to perform, an agricultural aircraft operation in an aeroplane must not take-off at a weight greater than the MCTOW prescribed in the aeroplane's flight manual unless—

- (1) the pilot complies with the procedures listed in Appendix B; and
- (2) the aeroplane is equipped with a jettison system that, in accordance with D.5, is capable of discharging not less than 80 percent of the aeroplane's maximum hopper load within five seconds of the pilot initiating the jettison action.

(b) Where there is a third party risk as defined in Appendix A, the pilot must determine the maximum take-off weight in accordance with 137.107 and 137.109.

### 137.105 Take-off distance and flight path — no third party risk

A pilot performing, or being trained to perform, an agricultural aircraft operation in an aeroplane where there is no third party risk as defined in Appendix A is not required to comply with the following:

- (1) the take-off distance specified in the aeroplane flight manual;
- (2) the take-off flight path gradient specified in the aeroplane flight manual.

**137.107 Take-off distance — third party risk**

(a) Subject to paragraph (b), a pilot performing, or being trained to perform, an agricultural aircraft operation in an aeroplane, where there is a third party risk as defined in Appendix A, must ensure that the take-off distance available is greater than the take-off distance specified in the aeroplane flight manual multiplied by a factor of 1.2.

(b) When calculating the take-off distance, the pilot must take the following factors into account:

- (1) the weight of the aeroplane at the commencement of the take-off run;
- (2) the pressure altitude of the aerodrome;
- (3) the ambient temperature at the aerodrome;
- (4) the runway surface type and condition;
- (5) the runway slope in the direction of take-off;
- (6) not more than 50% of the headwind component or not less than 150% of the tailwind component.

**137.109 Take-off flight path — third party risk**

(a) Subject to paragraph (b), a pilot performing, or being trained to perform, an agricultural aircraft operation in an aeroplane where there is a third party risk as defined in Appendix A must ensure that the take-off flight path clears all obstacles by—

- (1) a vertical distance of at least 50 feet plus  $0.025D$ ; or
- (2) a lateral distance of at least 30 metres plus  $0.1D$ —

where  $D$  is the horizontal distance travelled by the aircraft from the end of the take-off distance available.

(b) When calculating compliance with paragraph (a), the pilot must take the following factors into account:

- (1) the take-off flight path must begin at a height of 50 feet above the take-off surface at the end of the take-off distance required by 137.107 and end at a height of 500 feet above the take-off surface;
- (2) the aeroplane must not be banked at an angle exceeding 20 degrees;
- (3) obstacles which have a lateral distance greater than 150 metres from the planned flight path may be disregarded.

## Subpart D — Commercial Operations - General

### 137.151 Application for certificate

An applicant for the grant of an agricultural aircraft operator certificate must complete form CAA 24137/01 and submit it to the Director with a payment of the appropriate application fee prescribed by regulations made under the Act.

### 137.153 Issue of certificate

Subject to section 9 of the Act an applicant is entitled to an agricultural aircraft operator certificate if the Director is satisfied that the applicant——

- (1) has engaged a senior person as the Chief Executive who has the authority to ensure that all activities can be financed and carried out in accordance with this Part; and
- (2) has engaged a senior person as the Chief Pilot who holds a current chemical rating if applicable and—
  - (i) has held or holds a current Grade I agricultural rating issued under Part 61; and
  - (ii) has practical experience, acceptable to the Director, appropriate for the type of operation being conducted; and
- (3) the applicant and the senior person or senior persons required under paragraphs (1) and (2) are fit and proper persons; and