



Berrybank Wind Farm

Agricultural Aviation Expert Witness Report

by

Barry Foster

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Melbourne, Australia

1. Introduction

The Ambidji Group Pty Ltd (Ambidji) of Melbourne was contacted by Freehills, Melbourne, seeking an agricultural aviation expert to provide expert opinion in regard to aerial application matters pertaining to the proposed Berrybank Wind Farm.

I, Mr Barry Foster, have been engaged by Ambidji to act as the agricultural aviation expert to:

- Prepare an expert report in regard to any implications for the ability to undertake aerial applications on adjacent properties to the proposed Berrybank wind farm, and
- Attend and provide evidence at the planning panel hearing in February 2010.

My area of expertise is a practising commercial agricultural pilot and aerial fire fighting pilot. I am also the chief pilot of Woorayl Air Services. My qualifications and expertise are detailed in Appendix A. This qualifies me to make the expert statements contained in this report.

This expert report contains my opinions in regard to agricultural aviation matters pertaining to the Berrybank Wind Farm.

In preparing this expert report, I have read, understood and followed the requirements of the Government of Victoria – “Planning Panels Victoria Guidelines No. 1 – Expert Evidence”.

2. Background

My understanding is that two (2) submissions have been received that raised concerns in relation to the efficiency and safety of aerial applications on properties immediately adjacent to the wind farm boundaries. These submissions were:

- The submission by the Council which raises a concern about the impacts of the proposed wind farm on aerial spraying in item (o) and the further discussion of this issue on page 8 of the Agenda attached to that letter
- The submission from David Hocking who’s family owns a number of properties to the west of the wind farm site.

3. Scope of Engagement

The scope of my engagement was to:

1. Prepare an expert witness report in regard to whether there are any implications generally for the ability to undertake aerial applications on adjacent properties to the wind farm,
2. Provide comment on the two related agricultural aviation submissions, and
3. Attend and give evidence at a planning panel hearing in February 2010

4. Scope

4.1 Approach:

My approach to forming my opinions on the above was to:

- Review the documentation (See 4.2 below) and identify the likely relevant issues to consider in forming my opinions;
- Undertake both a ground and flight survey of the proposed wind farm boundaries;
- Consider the potential impact (on the land immediately outside the wind farm site) of the proposed turbine positions in regard to the safety and efficiency of undertaking aerial applications;
- Review the two provided submissions in the light of the above; and
- Apply my agricultural aircraft operational experience to discuss and reach my opinions.

4.2 Data and Documentation Reviewed:

I have reviewed the following documentation as provided to Ambidji:

- Berrybank Wind Farm: Proposed Obstacle lighting Layout: Indicative Only (which includes all turbines);
- Submission from Cuthberts, Barristers and Solicitors, on behalf of David Hocking;
- Submission from Corangamite Shire Council; and
- Relevant topographical maps encompassing the area of the proposed wind farm.

4.3 Other Investigations Relied Upon:

No other reports or technical investigations have been identified or sourced.

4.4 Assumptions:

No material assumptions were made in forming my opinion.

4.5 Limitations and Exclusions:

There were no limitations that impacted on forming my opinions. I have not excluded any issues of relevance in forming my opinion on the requested issues.

5. Findings

5.1 General Impact of Wind Farm on External Property Aerial Applications:

Having fully studied the map of the proposed Berrybank Wind Farm, I flew on 28 January 2010 to the proposed area and noted that the Berrybank area is flat to undulating country and is comprised mostly of cereal cropping and sheep grazing and encompasses both sides of the Hamilton Highway and the township of Berrybank.

On the same day I met with Mr. Syd Herron of Ambidji and we conducted a thorough ground inspection by driving the perimeter roads and some internal roads of the proposed wind farm. I noted the position of the proposed wind turbines in relation to the map.

After this, I completed an in-flight inspection with particular interest being paid to the cropping areas that are adjacent to the wind farm.

In forming my opinion on any safety and/or efficiency impacts I have taken into account the buffer required for an aircraft to turn from one spraying run to another.

A standard agricultural aircraft loaded to maximum capacity takes approximately 500metres to complete this turn. This would have an impact on the direction at which some of the spraying operations would need to be conducted. A distance of 500m from the nearest turbines would be required as a buffer zone for this operation.

The implication of this is that it will require considerably more time on the ground in the pre-planning process of any spraying operation conducted by an operator in this area. As the 500m buffer zone will have to be incorporated in all areas adjacent to the wind turbines, some fields will have to be sprayed using shorter runs that would normally be used on these fields. The operator would have to wait for more favorable wind conditions considering the mechanical turbulence created by the turbines themselves. This will have the consequence of some increase to the cost of aerial operations.

In regard to the implications for undertaking safe spraying operations in the vicinity of the wind farm; even though a wind tower is very visible to the naked eye it is another obstacle for consideration in the pre-planning process and attributes to the increased work load on the pilot during the operation.

In assessing and managing the risk of an aerial application the pilot is required to –

1. **Identify** – the risk
2. **Assess** - the risk
3. **Prioritise** – the risk
4. **Manage** – the risk

The approach to assessing and managing the risk is as follows.

Assessing and Managing Risk

When assessing risk, you must first **identify** the risk, then **assess** both the chances of any risk actually happening (*probability*) and its likely impact (*severity*). You can then **assign a priority** (*when you will 'fix' it*) as well as working out strategies to **manage** the risk using a risk management hierarchy (see below). Use the **diagram** below to help you plot the severity and probability of your risks - where your risks fall in the matrix will help you work out how quickly individual risks should be addressed.

1. **Identify** the risk
2. **Assess** the risk - probability versus severity - use the matrix below
3. **Prioritise** the risk - use the matrix below
4. **Manage** the risk - who will do what, when and how and with what resources - use the hierarchy

Risk Management Matrix

		Probability			
		Very Likely	Likely	Unlikely	Very Unlikely
Severity	Could Kill	1	1	2	3
	Causes Illness	1	2	3	4
	Medical Care Required	2	3	4	5
	First Aid Required	3	4	5	6

Priority
 1 - Immediate
 2 - 24 hrs
 3 - 1 week
 4 - 1 month
 5 & 6 - When resources are available

Risk Management Hierarchy

When working out strategies to address risks identified, the following hierarchy is useful. This hierarchy should be used on each risk identified. Clearly not all risks can be addressed by elimination, but the hierarchy does provide a useful framework for working out which type of strategies might be applied. It should be noted that strategies from a number of different hierarchy levels can be used together to effectively manage a risk. Start at the top of the hierarchy (*1 - Eliminate the risk*) and identify any strategies available, and then move down the hierarchy to identify any further strategies that can be used.

1. **Eliminate the risk** - stop doing it
2. **Substitute a smaller risk** - use a safer method
3. **Engineer around the risk** - eg. put a protective guard on machinery
4. **Administrate around the risk** - eg. write a procedure for staff to follow and train them
5. **PPE** - wear protective equipment

NOTE THAT USING PROTECTIVE EQUIPMENT (PPE) IS AT THE BOTTOM OF THE TREE.

Source: Aerial Agricultural Association of Australia (AAAA) - Member Support Kit

The next issue is where, under the above risk management matrix, does a wind farm such as Berrybank fall.

The matrix is used to assess probability and severity of risks associated with an operation (such as aerial applications) in order to prioritise actions for safe operations.

To establish a clear understanding of the matrix, the first step is to establish which column in the matrix applies to the “Could Kill” row. In my opinion it falls within the “Very Unlikely” column. My opinion is based on the conspicuity of the turbines, the distance between turbines and my views on the establishment of a 500m buffer from the wind turbines.

Hence the number “3” is the defined “Priority”. The priority of eliminating the risk for number 3 is defined as 1 week. One week means that from the time of identifying the risk it is the period required to determine a procedure and train personnel prior to implementation of the operation.

In the Strategy Hierarchy it suggests, to manage the risk successfully, that number “1” is the most important – eliminating the risk. However, the mere presence of the proposed wind turbines means that this is not possible to completely eliminate the risk. This would be the same for any wind farm.

The next consideration is whether it is possible to substitute for a smaller risk or engineer around the risk. Again, this is not possible.

However, it is possible to administrate around the risk by writing a procedure – for example, in the previous paragraphs I have suggested a 500m safety buffer zone from the turbines for turning aircraft.

Therefore I have concluded that the probability of a fatal accident is unlikely given administration around the risk. e.g. writing a procedure for staff to follow, making them aware of the wind farm obstacles and training them accordingly.

To summarise, there is some risk associated with aerial application operations near any obstacles. This operation in question is *not as safe as* if there were no wind turbines, however, with the proper pre-planning undertaken and adherence to procedures this would be a **safe operation**.

Opinion

It is my opinion *that*:

- (i) There will be some aerial application inefficiencies introduced adjacent to the wind turbines up to a maximum distance of 500m; and*
- (ii) Given proper pre-planning and procedures, aerial applications adjacent to the wind farm boundary do not represent an unsafe aircraft operational situation.*

5.2 Submission from Cuthberts on behalf of David Hocking:

Reference – Section 11.

With regard to the letter of objection on behalf of Mr David Hocking dated 9 November 2009 (Section 11) he asks the question “will agricultural aircraft be able to be used in the close proximity to the wind farm for fertilizer and spraying applications?”

Opinion

It is my opinion that *all the details that were set out in 5.1 of my submission adequately address the concerns of Mr David Hockings’ letter of objection and therefore it is my considered opinion that aerial application operations can be carried out safely around the wind farm.*

5.3 Submission from Corangamite Shire Council:

Reference – Sub-paragraph (o).

With regard to the Councils’ submission dated 24 November 2009 to “further investigate the implications of the presences of wind turbines in relation to aerial spraying and aerial fire fighting in conjunction with local fire brigades in Lismore, Berrybank and Cressy”. The brief provided to Ambidji (from Union Fenosa) is to consider the impact of the wind farm on aerial applications.

Opinion

I am of the opinion that *all the details that were set out in 5.1 of my submission adequately address the concerns of the Corangamite Shire Council letter of submission sub-paragraph (o) and therefore it is my considered opinion that aerial application operations can be carried out safely around the wind farm.*

6. Summary of Expert Opinion

Table 1 summarises my expert opinion contained in Sections 5.1 to 5.3.

Section 5.1:	General Impact of the Wind Farm on External Property Aerial Applications.
Opinion:	It is my opinion that: <i>(i) There will be some aerial application inefficiencies introduced adjacent to the wind turbines up to a maximum distance of 500m; and</i> <i>(ii) Given proper pre-planning and procedures, aerial applications adjacent to the wind farm boundary do not represent an unsafe aircraft operational situation.</i>
Section 5.2:	Submission from “Cuthberts” on behalf of David Hocking. (Specific Reference - Section 11)
Opinion:	It is my opinion that <i>all the details that were set out in 5.1 of my submission adequately address the concerns of Mr David Hockings’ letter of objection and therefore it is my considered opinion that aerial application operations can be carried out safely around the wind farm.</i>
Section 5.3:	Submission from Corangamite Shire Council. (Specific Reference - sub-paragraph (o))
Opinion:	It is my opinion that <i>all the details that were set out in 5.1 of my submission adequately address the concerns of the Corangamite Shire Council letter of submission sub-paragraph (o) and therefore it is my considered opinion that aerial application operations can be carried out safely around the wind farm.</i>

Table 1 Summary of my Expert Opinion

7. Declaration

In the time available to prepare this expert report, I have made all the enquiries that I believe are desirable and appropriate and no matters of significance, that I regard as relevant, have to my knowledge been withheld from this expert witness report.

The opinions that I have expressed in this report are based on my qualifications and experience and I am satisfied through my enquiries and that experience that the opinions I have expressed are reasonable in regard to the safety and efficiency of agricultural flying in the vicinity of wind turbines.



Signed:

Barry Foster

Dated:

4 February 2010

Appendices

Appendix A The Qualifications

The Qualifications

My qualifications and experience that are both relevant and appropriate in my providing this expert opinion are as follows.

- a) Airline Transport Pilot License
Chief Pilot approval ['CP']
Chief Flying Instructor approval ['CFI']
Grade 1 flight instructor rating endorsed with agricultural day/night – instrument and multi engine training approvals.
Command multi engine instrument rating
Class 1 Agricultural rating
CASA approved test officer [ATO] for the issue of pilot licenses and ratings
Aircraft maintenance engineer's license ['LAME']
Maintenance technical inspector
Aerodrome reporting officer, and
Operator, Director, CP and CFI of own company with AOC in successful aviation business over 38years; the activities of which include, among other things
 - i) Aerial agricultural operations
 - ii) Flying training including flight training of aerial agricultural pilots
 - iii) Charter
 - iv) Fire fighting and
 - v) Aircraft maintenance
- b) Commercial pilot since 1975
In excess of 22 000 flight hours experience
Endorsed to fly single, multi engine and turbine powered aircraft
LAME (Chief LAME for Dompter)
Engineering endorsements for airframes group 1-4 and engines group 1-21
- c) I am the owner, CP and CFI of Dompter Pty Ltd, which operates 12 aircraft and employs seven people, which holds and Air Operators' Certificate [AOC] issued by CASA pursuant to s27 *Civil Aviation Act 1998* in respect of charter, flight training, aerial agricultural operations and firebombing; and which also

holds a Certificate of approval issued by CASA for an aircraft maintenance workshop in respect of airframes and engines for general aviation aircraft.

- d) In my capacity as a Delegate of CASA as an ATO, I have flight tested in excess of 600 candidates.
- e) Both my company and I have an excellent safety and compliance record with CASA and its predecessors.

Barry Foster

4 February 2010