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## Stockyard Hill Wind Energy Facility Expert Witness Report

To whom it may concern-

I have been employed by Sarah and Philip Hawker to prepare an expert witness report and appear at the panel hearing in February 2017 regarding the impact of the proposed Stockyard Hill Wind Energy Facility (SHWEF) adjacent to their farming and aviation operations.

My qualifications and experience are as follows-

a) Air Transport Pilot Licence

Chief Pilot Approval (CP)

Chief Flying Instructor Approval (CFI)

Grade 1 flight instructor rating endorsed with agricultural day/night, instrument and multi engine ratings

Command multi engine instrument rating

Class 1 Agricultural rating

Civil Aviation Safety Authority (CASA Approved Test Officer (ATO) for the issue of pilot licences and ratings

Aircraft maintenance engineer's licence (LAME)

Maintenance technical inspector

Aerodrome reporting officer, and

Operator, Director, CP and CFI of own company with AOC in successful aviation business over 38 years, 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. Firefighting, 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 engine groups 1-21

c) I am the owner, CP and CFI of Dompter Pty Ltd, which operates 12 aircraft and employs seven people, which holds an 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) In my capacity as Chief LAME of Drompter Pty Ltd, I have conducted hundreds of periodic inspections, overhauls, heavy maintenance and rebuilds on light aircraft. This includes but not limited to,

1. Cessna- Single Engine and Twin Engine
2. Piper-Single Engine and Twin Engine

3. Beech-Single Engine and Twin Engine
4. Maules-Land and Float Planes
5. Cessna-Float Planes
6. Turbine Agricultural Aircraft
7. Helicopters
8. Large Radial Engine Aircraft

f) Both my company and I have an excellent safety and compliance record with CASA and its predecessors. I have successfully operated my aviation business for 36 years. I own a licensed aerodrome at Leongatha, Victoria and two unlicensed airfields, one at Inverloch, Victoria and one at Deniliquin NSW.

To meet the request of Philip and Sarah Hawker I have studied the map of the proposed windfarm and the Hawkwood Farm Maps supplied by Philip Hawker, in conjunction with detailed discussions with Philip Hawker regarding his crop application requirements and topography in the area.

The areas to be addressed are the impact of proposed turbines on,

1. Aerial and ground application of treatments to crops grown on the property
2. The ability to fight fires on surrounding land and on the property using aircraft
3. The safety of flight operations from the Beaufort (YBFT) Authorised Landing Area (ALA) located on the property

## **1. Aerial and ground application of treatments to crops grown on the property**

Philip Hawker has advised me that his paddocks are in a permanent crop rotation and they are required to be treated between 5 and 8 times per year and at last once using aircraft. They farm in a high rainfall area and paddocks are often too wet to use ground driven equipment making aircraft critical in allowing crops to be grown to their full potential.

A standard agricultural aircraft loaded to maximum capacity takes approximately 500m to complete a turn and a buffer zone of 500m beyond is required. Due to rising terrain and tree plantations to the North of the Hawker's home block agricultural aircraft can only operate in an East West direction.

A cylinder of disturbed air has the potential to extend out to 16 rotor diameter (2,270m, based on SHWEF proposed turbine diameter of 142m) in length and 2 rotor diameters (280m, based on SHWEF proposed turbine diameter of 142m) in diameter from operating wind turbines.

Turbines J3, J4, J5 and J6 have the potential to generate disturbed air in the turning area when wind is blowing in an arc from the North to the West. When agricultural aircraft are turning they are typically operating at lower airspeed and higher angle of attack and are more sensitive to the effects of disturbed air.

Turbine J5 is approximately 940m from the Western Edge of the Hawkers property, when operating in a Northern or Southern air flow allowing for the rotor diameter this distance is reduced to 870m, leaving an unacceptable margin of error for aircraft turning.

Turbines J5 and J6 have the potential to disturb air over the Hawker's land. It would be anticipated that the pattern of disturbance is spiral in nature and therefore would produce areas of updraft. This has the potential to lift crop treatments into the air to a height of two rotor diameters, 280m. The crop treatments would then be susceptible to drift and depositing onto adjoining land which is unacceptable (known as spray drift when occurs by ground driven equipment).

## **2. The ability to fight fires on surrounding land and on the property using aircraft**

The fire risk in the area where the Hawker's property is located is high due to a number of reasons; the location of forested areas and high fuel load to the North and West and the presence of high

volume crop stubbles. In discussion with Philip Hawker, he believes most likely direction of fire attack on his home is in Westerly arc from North to South.

Fixed wing and rotary aircraft are very important tools for firefighting. They have the ability to get to a fire quickly and they can access areas that a vehicle can't. It is critically important to control a fire before it becomes large and fast moving.

Turbines in the Stockyard Hill Wind Energy facility are closely located. Again, if the blade radius is added, this distance is as little as 460m under certain wind directions.

Owing to the moving nature of a fire, the close proximity of turbines and the blade rotation of turbines, it is not possible to fly between turbines in the Stockyard Hill Wind Energy Facility, due to risk of direct impact and the effect of turbulence. The optimal drop height of fire treatment products is approx. 24m and therefore it is not possible drop fire treatments over the top given the turbine height of 180m.

The presence of turbines to the West of the Hawkers property provide an area that a fire can start or build up in and not be able to be controlled by aircraft placing them at risk.

### **3. The safety of flight operations from the Beaufort (YBFT) Authorised Landing Area (ALA) on the Hawkers property.**

In relation to the YBFT ALA the Civil Aviation Safety Authority (CASA) sets down minimum standards for the use of an ALA. The standards can be found in CAAP 92.1.1.

The standard for this ALA, would be a climb gradient from the end of the runway of 3.3% extending out to a minimum of 1000 metres and a lateral splay angle of 5%. Even though turbines J5 and J6 are outside of this zone, they still create a significant risk especially at night or in operations in low or minimum visibility.

CAAP 91.1.1. makes no allowance for the creation of turbulence by wind turbines. Turbines J3, J4, J5 and J6 are likely to produce an area of disturbed air when the wind is blowing from the North through to the West that an aircraft departing on runway 29 or landing on runway 11 is likely to encounter.

Aircraft taking off and landing are in critical stages of flight due to operating at speeds closer to the aircraft stall speed. They are closer to the ground affording less margin for recovery from an upset

event. In the case of taking off, they are at a higher angle of attack where an upset event may increase the angle of attack and cause a stall.

The normal circuit procedure for this type of ALA is a height of 1000ft Above Ground Level (AGL). However, this height can be reduced to 500ft AGL due to weather considerations. Taking into account the height of the turbines themselves at approx. 180m/590ft turbines, J5 and J6 present an unacceptable risk.

Philip Hawker conducts day and night IFR operations in a BE36 Bonanza. His target speed for circling at night is 120kts placing the aircraft into Category B. A number of the proposed turbines located to the West of YBFT ALA within the Category B circling area are on ground that is up to approx. 30m/98ft higher. This presents an obstacle that is approx. 690ft above the level of YBFT ALA. The presence of turbines within the Category B circling area presents an unacceptable risk to night operations if not illuminated.

## **Recommendations**

In my opinion, to allow farm production to continue uninterrupted, to prevent increased fire risk on the Hawkers property and to allow for safe flight operations from YBFT ALA turbines J1-J6 should be removed from the facility. It would be advisable to remove the wind monitoring mast located near turbine J3 also.

As a minimum all turbines within the Category B circling area of the YBFT ALA should be illuminated. The preferred position would be for all turbines within a 5nm radius of the runway 11 threshold of YBFT ALA to be illuminated. The use of aircraft transponder activated lighting is also recommended.

Sincerely,

Barry Foster

Chief Pilot