

Wind Turbines and Aerial Firefighting

Background Brief

1. Wind project proponents universally discount the negative effect on aerial firefighting and quote AFAC (National Council for Fire and Emergency Services - how did they get the AFAC acronym?) or Aerial Agriculture Association of Australia (AAAA).
2. AFAC doctrine is detailed in https://www.afac.com.au/docs/default-source/doctrine/afac_doctrine_windfarmsbushfiresoperations_position_2019-08_04-v1-0.pdf and amongst the word salad is one example, not even a case study, of aerial firefighting near turbines. This is the Waterloo Wind plantation fire in January of 2017.
3. Waterloo Wind plantation consist of 43 3MW Vestas turbines for an installed capacity of 130MW. These turbines are about 125m (412ft) tall, so not very large compared to the latest projects planned of 250m-300m (825-990ft).
4. The Waterloo fire burned 60Ha, so relatively small fire compared to the Sir Ivan Fire near Uarbry in Feb 2017 which burned 55,000Ha, and the fires that followed in the 2019-2020 fire season.
5. Propitiously for the Waterloo fire the local CFS Captain was the one who started the fire upwind of the turbines, and coordination with the turbine operator and other agencies went smoothly and rapidly. There was a turbine ground crew nearby or onsite and could attend. Aerial assets were involved and the whole thing was over in a few hours.
6. This event seems almost too good to be true - a perfect deployment, and IMO most unlikely to ever occur in real life with extensive turbine projects all over the State. The fact that it did raises questions of a staged event to quash any claims of aerial firefighting being affected by turbines. For a description of the successful live exercise, the Clean Energy Council covers it here:

<https://www.cleanenergycouncil.org.au/news/in-case-of-fire-a-real-life-experience-at-a-wind-farm-site>
7. AFAC and this fire is cited in all proponent EIS-related literature to quash adverse points of view, no matter how well informed those adverse views are.
8. Liaising with local 'agencies' does not mean much on the ground. The local RFS is made up of mostly volunteer members who are usually farmers/landowners themselves, that in a high fire danger period would be worried about protecting their own land and assets, not a foreign-owned multi-billion dollar wind plantation. Of course, if any fire is upwind of a landowner they would be compelled to go fight it to protect their own property. RFS is not a mythical force that appears from the ether, it is us, and capacity to respond is limited.
9. Similarly, small towns like Coolah have a town Fire and Rescue Brigade, but it is wholly made up of volunteers - not a single permanent uniformed Fireman is employed there! This begs the question why residents pay a Fire Services Levy on their insurance bills?
10. Wind plantation owners should budget to permanently station firefighters and equipment in their projects to respond quickly to any threat from fire, and not sponge off limited local volunteers.

11. Excerpt from the AFAC doctrine document above:

Firefighting limitations in and around the wind farm facilities

Wind farms may result in aerial firefighting limitations due to aerial obstacles created by wind turbines and meteorological monitoring towers. The bushfire at the Waterloo wind farm demonstrated that if conditions are clear and wind turbines are turned off, wind turbines are clearly visible from aircraft and are not likely to constrain aerial firefighting operations (Clean Energy Council 2017). However, during this event transmission infrastructure, meteorological towers and guy-ropes were difficult to see (Clean Energy Council 2017); this infrastructure does have potential to limit the effectiveness of aerial firefighting operations. Access and egress challenges on the ground as well as water supply issues can also create firefighting limitations, if not planned for appropriately. Wind farms can also impact response operations by interfering with local and regional radio transmissions (Australian Wind Energy Association 2004a).

Hazards for emergency responders, including aerial personnel

Turbine towers, meteorological monitoring towers and power transmission infrastructure pose risks for aerial firefighting operations. Meteorological monitoring towers and power transmission infrastructure are generally difficult for aerial personnel to see, if they are not marked appropriately. If wind turbines were not shut down, moving blades and wake turbulence would create significant hazards for low flying aircraft, thus the shutting down of wind turbines, in an emergency situation, is defined in wind farm emergency procedures. A wind farm facility's power lines may pose electrocution risks, that are exacerbated due to smoke during a bushfire.

12. The Aerial Agriculture Association of Australia (AAAA) has documents relating to Tall Structures, Wind Farms and Powerlines. These were produced between 2011 and 2014. I have written to them asking if they have any amendments from experience gained over the last decade and given the much larger turbines now being installed.

13. Their policy in summary is:

AAAA Windfarm Policy

As a result of the overwhelming safety and economic impact of windfarms and supporting infrastructure on the sector, AAAA **opposes all windfarm developments** in areas of agricultural production or elevated bushfire risk.

In other areas, AAAA is also opposed to windfarm developments unless the developer is able to clearly demonstrate they have:

1. consulted honestly and in detail with local aerial application operators
2. sought and received an independent aerial application expert opinion on the safety and economic impacts of the proposed development
3. clearly and fairly identified that there will be no short or long term impact on the aerial application industry from either safety or economic perspectives and
4. if there is an identified impact on local aerial application operators, provided a legally binding agreement for compensation over a fair period of years for loss of income to the aerial operators affected.
5. Adequately marked any wind infrastructure and advised pilots of its presence .

AAAA believes that the above processes should also apply for all windfarms that have already been approved or erected, especially the establishment of long-term (for the life of the windfarm or until it is removed, whichever is the

and:

However, it is clearly unacceptable that one industry can impose significant safety threats on another, longer established industry with impunity.

14. Clearly the aerial agriculture body is not supportive of windfarms popping up everywhere and displacing other industries, and increasing the risks in their operations. You would never know this by reading the wind proponents' documents.

15. To conclude, the wind industry is aware of the extra risks to aviation posed by wind turbines and has taken steps to close any criticism in this area down. They are in denial about the real hazard that turbines are, as they are with every problem that should be a showstopper.

16. I will update this document when further responses are received from the AAAA and aerial firefighting organisations.

Author: Grant Piper

Bachelor of Engineering (Aeronautical) UNSW 1986

Member, Royal Aeronautical Society

Ex-RAAF Pilot, DFSM, AASM

1600hrs experience on the C130 Hercules transport (type used as LAT in 2017-2020 fire seasons).

1400 hrs experience as Forward Air Controller - operating at low level directing Close Air Support aircraft and artillery - similar to fire spotting.

Civil Low Level Endorsement to operate below 500ft.

Endorsed to fly aerobatics to ground level.

Authorised to train and issue Aerobatic Endorsements to ground level.

Twice Runner-up in Unlimited Category, Australian Aerobatic Championships.

NSW RFS Volunteer 20+ years with recent experience at Sir Ivan fire 2017 and Flaggs Road fire 2019 where use of RFS aerial assets was closely observed.

Thunderbolt Stage 1 Wind Project

SSD-10807896

Aviation Submission to IPC Meeting 14 March 2024

Grant Piper (Chair, National Rational Energy Network Inc.)

1.0 Low Flying due Stress of Weather: The Umwelt EIS states that aircraft under Visual Flight Rules (VFR) must remain above 500ft and clear of obstacles, but does not consider the higher risk situation of low cloud, poor weather or visibility.

1.1 Aircraft flying under the VFR are permitted to descend below 500ft if due stress of weather. Visibility is relaxed to 5km, aircraft must remain clear of cloud/smoke and in sight of ground or water (Ref: AIP ENR1.2). Further reduction in visibility is allowed to 1500m for fixed wing or 800m for helo, if below 140 knots airspeed.

1.2 The off-white colour of the turbines will not contrast with rain, cloud or smoke especially in low-light conditions. Obstacle lighting and high-visibility markings would be of benefit in these conditions. Only considering the fine weather situation in their risk analysis ignores the poor weather case which is when most terrain collision accidents occur. Doing a risk assessment matrix then failing to include the worst-case is deceptive and professionally negligent.

1.3 The local high-elevation (for Australia) hilly terrain increases the aviation hazard especially for low flying light aircraft with relatively low performance in poor weather. The fact that the highest turbine extends to 4436ft above mean sea level attests to this.

2.0 Aerial Firefighting: The RFS response is inadequate and contrary to its objectives of 'minimise the impact of fire and other emergencies by providing the highest standards of training, community education, prevention and operational capability' (Ref: RFS website). They appear not to want to make any negative assessment of this and all other wind projects.

2.1 Stating that routine aviation risk management strategies are used does not address the fundamental problem. Routine risk management will dictate that Large Air Tankers, and probably Small Air Tankers as well, stay clear of turbine areas when visibility is obscured by smoke and usually combined with high winds and turbulence.

2.2 Aerial firefighting will be restricted in and adjacent to the project area. The site is high terrain of hills and valleys making access, whether by ground or air, difficult. In smoke and with turbulence air tankers will have to stay outside of or well above turbine areas, thus making them aerial firefighting ineffective.

2.3 During the 2017 Sir Ivan bushfire aerial firefighting was used effectively, which I observed as an RFS volunteer. Large fixed-wing KC10, C130 as well as helicopters. All these aircraft dropped retardant from well below 850ft above ground level - the height of the Thunderbolt turbines. To lose the option of large fixed-wing in turbine areas will reduce firefighting effectiveness significantly. Helicopters are excellent at point-protection but not capable of suppressing a broad fire front.

2.4 There are no mitigation strategies that could rectify the situation. Dropping from a higher altitude is contrary to the objective of getting retardant on to the fire, as it must be effective or it is a waste of time and money, and puts people in greater danger than otherwise.

2.5 That leaves local landowners/neighbours who make up the bulk of the volunteer RFS compelled to fight the fires on the ground within the turbine areas, exposing them to greater risk. These same neighbouring non-host landowners probably opposed the project and voiced concerns about the fire risk and the detrimental impact on aerial firefighting.

2.6 *This is not equitable and cannot be discounted as inconsequential or an acceptable risk. Particularly so if those non-host farmers opposed the projects and identified the potential problem years prior to construction.*

3.0 Aerial Agriculture: As for fire fighting, aerial agriculture in close proximity or between turbines is going to be curtailed. No honest risk-assessment would send an employee pilot into that hazardous environment. Helicopter work is significantly more expensive than fixed wing and is a poor substitute, and still would be significantly restricted by where it could be safely operated.

4.0. Below are some excerpts from the Umwelt EIS. They glibly state that aircraft should navigate around the turbines - what if due stress of weather they cannot, or low fuel means they cannot, when endeavouring to get to Tamworth Airport?

4.1 Stopping the rotors in the 'rabbit ears' position is irrelevant to either aerial agriculture or firefighting operations. No pilot will plan to go that close to the turbines in smoke or poor weather, neither would a fixed wing ag pilot in fine weather.

4.2 The last paragraph is contradictory and non-sensical - '...generally not a safety concern...' while also '...the primary safety concern...'? Even Umwelt cannot reconcile the absurdity of unlit 850ft turbines posing no risk to pilots.

10.7. Aircraft operator characteristics

Aircraft will be required to navigate around the Project Area in low cloud conditions where aircraft need to fly at 500 ft AGL.

The Proponent has engaged with local aerial agricultural and aerial firefighting operators to develop procedures, which may include, for example, stopping the rotation of the WTG rotor blades prior to the commencement of the subject aircraft operations within the Project Area.

WTGs are generally not a safety concern to aerial agricultural operators. WMTs remain the primary safety concern to aerial agricultural operators, who have expressed a general desire for these towers to be more visible.

4.3 Umwelt and their contracted aviation consultant, Aviation Projects, have no authority to unilaterally decide that '...project will not require obstacle lighting...'. This is a decision for CASA to issue an Exemption to their own Regulations/MOS.

- Aviation Projects has assessed that the Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft.
- CASA has advised that it will only review assessments referred to it by a planning authority or agency.
- With respect to marking of turbines, a white colour will provide sufficient contrast with the surrounding environment to maintain an acceptable level of safety while lowering visual impact to the neighbouring residents.

4.4 If CASA will only assess and respond when referred by a Planning Authority, I strongly recommend that the IPC request CASA to examine in detail the effect on aviation safety of extensive wind projects and the need for aviation lighting. If it is determined after honest study that aviation hazard lighting is not required on wind turbines, then CASA should issue an Exemption immediately while Regulations are amended to remove this requirement. All other similar, and thus apparently unnecessary, obstacle lighting requirements should be removed also.

Marking of turbines

6. The rotor blades, nacelle and the supporting mast of the WTGs should be painted white, typical of most WTGs operational in Australia. No additional marking measures are required for WTGs.

Lighting of turbines

7. Aviation Projects has assessed that the Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft.

4.5 To reiterate, Umwelt self-assessed that lights not required - they have NO authority or expertise to do this.

4.6 Per CASA Regulations/Manual of Standards, which they quote in their Appendices:

6. *High-intensity obstacle lights:*
 - a. *must be used on objects or structures whose height exceeds 150 m; and*
 - b. *must be flashing white lights.*
7. *Despite paragraph (6) (b), a medium-intensity flashing red light may be used if necessary, to avoid an adverse environmental impact on the local community.*

Sections 9.31 (8) and (9) provide guidance on obstacle lighting specific to wind farms:

8. *Subject to subsection (9), for wind turbines in a wind farm, medium-intensity obstacle lights must:*
 - a. *mark the highest point reached by the rotating blades; and*
 - b. *be provided on a sufficient number of individual wind turbines to indicate the general definition and extent of the wind farm, but such that intervals between lit turbines do not exceed 900 m; and*
 - c. *all be synchronised to flash simultaneously; and*
 - d. *be seen from every angle in azimuth.*

Note: This is to prevent obstacle light shielding by the rotating blades of a wind turbine and may require more than 1 obstacle light to be fitted.

9. *If it is physically impossible to light the rotating blades of a wind turbine:*
 - a. *the obstacle lights must be placed on top of the generator housing; and*
 - b. *a note must be published in the AIP-ERSA indicating that the obstacle lights are not at the highest position on the wind turbines.*

5.0 Conclusion: The Umwelt EIS regarding impact on aviation is faulty in detail and does not consider, or ignores, the highest-risk impact on General Aviation in its risk assessments. Aerial agriculture and aerial firefighting will be curtailed in the vicinity of the project, this is the reality when a professional pilot or crew do their own risk-assessment of their planned operations. Umwelt does not have authority to declare that no lighting is required, CASA must be asked by the IPC to conduct an assessment.

Attachment: Firefighting Document

Author's CV:

Bachelor of Engineering (Aeronautical) UNSW.

Member, Royal Aeronautical Society

Ex-RAAF Pilot, DFSM, AASM

1600hrs experience on the C130 Hercules transport (type used as LAT in 2017-2020 fire seasons).

1400 hrs experience as Forward Air Controller - operating at low level directing Close Air Support aircraft and artillery - similar to fire spotting.

Civil Low Level Endorsement to operate below 500ft.

Endorsed to fly aerobatics to ground level.

Authorised to train and issue Aerobic Endorsements to ground level.

NSW RFS Volunteer 20+ years with recent experience at Sir Ivan fire 2017 and Flaggs Road fire 2019 where use of RFS aerial assets was closely observed.