12. HAZARDS AND RISKS

Director-General's Requirements

- the EA must include an assessment of the potential impacts on:

1. Aviation safety considering nearby aerodromes and aircraft landing areas;
2. Defined air traffic routes;
3. Radar interference;
4. Bushfires;
5. Subsidence;
6. Communication systems;
7. Electric and magnetic fields.

12.1 SUMMARY OF OBJECTIONS

Hazards and Risks: Flyers Creek Wind Turbine Awareness Group (FCWTAG) objects to the Flyers Creek Wind Farm proposal:

12.1.1 The FCWF will interfere with aerial agricultural operations.

12.1.2 The FCWF will interfere with local aviation businesses and clubs.

12.1.3 Consultation with CASA and the matter of obstacle lights has **not** been dealt with adequately in the EA.

12.1.4 The impact of the proposed extension to the Orange Aerodrome has **not** been addressed in the EA, and the resultant changes in the Obstacle Limitation Surface OLS).

12.1.5 The impact of the proposed extension of Orange Aerodrome and future local radar requirements has **not** been addressed in the EA.

12.1.6 The ability for aerial fire fighting close to the wind turbines, and probably also land based fire fighting, is compromised with dangerous consequences.

12.1.7 49 residences are within the safety 2 km limit to the closest wind turbine recommended for **blade failure**.

12.1.7 The fire management plan is not formulated and is not part of the EA for public comment. Despite a small list of management options in the event of a fire in one of the turbines there is the risk of catastrophic sequelae to such a fire in a bush fire prone area.

12.1.8 There is no evacuation plan for Errowanbang Public School in the EA in the event of a bush fire.

12.1.9 There is restricted fire fighting capabilities due to distance and availability of the Rural Fire Service.

12.1.10 There is no description of exactly what mitigating techniques will be used in the event of **digital television reception failure**, nor who will be responsible for any rectification.

12.1.11 Future geophysical exploration and mining is compromised.

12.1.12 Accident mitigation is not adequately described.

12.2 AVIATION SAFETY

12.2.1 The Aerial Agricultural Association of Australia, as a result of the overwhelming safety and economic impact of wind farms and supporting infrastructure, opposes all wind farm developments in areas of agricultural or elevated bushfire risk. See Appendix 4.

12.2.2 Personal contact by a member of FCWTAG with the following:

- Orange Ultraflight Centre (a flight training company)
- Thomas Aviation (a flight training company)
- Orange Helicopters (charter and joy flights)

All three aviation businesses stated that they had **not** been contacted by Infigen Energy. All knew nothing about the FCWF. Particular concern was expressed about the proposal as it would interfere with their businesses, especially in the case of ultralites which usually fly at about 500 feet (about 150 metres – the proposed height of the wind turbines). This is another example of poor consultation with the community and affected businesses.

12.2.3 Consultation with the Civil Aviation Safety Authority (CASA) appears to be minimal with no correspondence tabled. The EA makes the argument that safety lights will probably not be necessary, based on experience at another Infigen installation. There is no basis for this comparison given. For instance, what distance is the Capital wind farm from the nearest commercial aerodrome? There is an acceptance that, if required by CASA, obstacle lights (narrowly focused and on the nacelle) would be installed but this important aspect is given minimal consideration and is barely acknowledged.

12.2.4 Because of the lack of information in the Environmental Assessment it is appropriate to consider the effects of a representative style of light that is used routinely in Australia: a pair of red, 2000 candela medium intensity, intermittent synchronised light-emitting diodes (LEDs), on the top of the narcelles. The selected LED light source of medium intensity is 2000 candela. A candela is the unit of luminous intensity with one candela equal to the light emitted from a single wax flame. For argument's sake if all 44 turbines there would be a total of 88 lights which would equate to 176,000 intermittently flickering on and off, 365 nights per year. This has ramifications for light pollution, disturbed night sky and sleep disturbance, and interruptions of circadean rhythms. Of significant in agricultural industries such as sheep and horse breeding disrupted night lighting can affect hormonal and reproductive cycles. The Environmental Assessment intimates that not all turbines will require lights but no indication from CASA is presented and this seems to be an uncorroborated expectation.

12.3 DEFINED AIR TRAFFIC ROUTES

12.3.1 Two major airports were considered regarding interference by the wind farm on air traffic: Orange Aerodrome and Bathurst Aerodrome. Of the two, Orange Aerodrome is 13 kilometres from the nearest wind turbine and is presently considered to be outside the Obstacle Limitation Surface (OLS).

12.3.2 The situation with Orange Aerodrome seems likely to change. Plans are being considered to extend the aerodrome to accommodate larger aeroplanes, up to the size of a Boeing 737. This would have significant implications for the OLS which would require extending further towards the FCWF, and indeed may compromise the siting of several of the northern wind turbines. This has **not** been addressed in the Environmental Assessment.

12.3.3 Airservices Australia recently identified Turbines 3, 4, 19, 20 and 33 as affecting the current NDB-A (approach) procedure. Airservices Australia has indicated that they could possibly make the modifications necessary to the NDB-A approach plan to

accommodate the proposed wind turbine layout. They are apparently in the process of confirming this advice but this does not seem to be finalised. How does the extension of the Orange Aerodrome affect this premise? Will more turbines be involved? Will this then affect, or make more difficult, the modifications proposed to the NDB-A approach plan? The EA does **not** address these issues.

12.4 RADAR INTERFERENCE

12.4.1 It is accepted that wind turbines can pose a risk to air traffic control and safety by the generation of two adverse effects on radar:

- The tower and blades act as a reflector and present a **static target** to the radar system. This has the effect of swamping the receiver and making it blind to wanted targets in the immediate area beyond the turbine. It is thus not possible to see these targets. This effect is constant.

- The rotating blades of the turbine impart a **Doppler frequency shift** to the reflected radar pulse, which the radar displays as an aircraft. This effect depends on the orientation of the turbine to the radar, which varies with the wind direction.

The consequences of these effects are that, in the first instance, aircraft in the vicinity of the wind turbines may simply "disappear" off the radar screen. In the second instance, "false targets" may be generated on the radar screen, thus appearing as aircraft that may be in conflict with other real aircraft. Both of these radar distortion effects generate significant safety concerns.

12.4.2 The EA states that there are no radar sites listed within 50 kilometres of the FCWF and therefore radar interference is not a factor. This situation may change, or require to be changed, in the future especially with planned airport extensions and therefore necessary facility upgrades. With a life span of 20 to 25 years the wind turbines may have a significant influence on what may be possible over the next several decades. With the extension of Orange Aerodrome and the resultant accommodation of larger aeroplanes (Boeing 737, with possible pressure to allow larger aeroplanes in future years) radar may become a requirement. At the moment the carrier with the largest aeroplanes is Regional Express. Landings and take offs are visual only. There is already regular disruption of flight timetables due to weather and visibility constraints with planes sometimes returning to Sydney without landing. As bigger aeroplanes access the aerodrome, with larger economic and timetable considerations, radar assisted landings and take offs will undoubtedly become mandatory. The EA does **not** address this issue.

12.5 BUSH FIRES

12.5.1 The EA classifies the relative risk of bush fire damage is very low to moderate (p.16-11). Correspondence from the Rural Fire Service of NSW to Aurecon states that the FCWF area is bush fire prone. The EA further states that a bush fire management plan will be prepared by the project contractor with the local Rural Fire Service and the NSW Fire Brigade. It is not clear whether this is for the construction or the operation phase, or both. In any event the bush fire management plan is to be part of the project EMP.

12.5.2 The Environmental Management Plan (EMP) is **not** part of the EA. This is a failing of the EA that all the Management Plans cannot be viewed by the public as part of the EA process, and comment therefore is restricted. As it stands there is no discussion, except cursorily, in the EA as to how FCWF will manage the requirements of the NSW Rural Fire Service, viz:

- The plan to address fire management on a landscape scale;
- Specific requirements under *The Rural Fires Act 1997;*
- Water supply for fire fighting purposes, its location and use by/compatibility with NSW Rural Fire Service Tankers;
- Fire fighting capability and preparedness;
- Access to the infrastructure including alternate emergency access/egress;
- Location of fire trails – construction and maintenance;
- Prescribed burning for fuel reduction or ecological management;
- Details of liaison with the local bush fire mitigation officer and how the plan fits with the district bush fire risk plan.

12.5.3 From enquiries by FCWTAG is appears that Canobolas Rural Fire Service have **not** formulated any plans or guidelines for fighting fires within a wind farm precinct. As it currently stands it is the Brigade Captain's responsibility on the day.

12.5.4 Blayney Shire Council has **no fire plan** that includes a wind farm. It has referred the FCWTAG back to the EA for information.

12.5.5 The issue of aerial fire fighting capabilities has **not** been addressed in the EA. In the Australian context this is a common method of accessing fires, both accessible and inaccessible. The height of the wind turbines and the design of the array inhibit the ease of aerial fire fighting. Personal communication (D. Coleman) with a pilot experienced in aerial fire fighting stated that the decision whether to fly in to fight fires was currently up to the individual pilot. Wind turbines can also cause operational issues for the pilot due to the drop height (approximately 20 metres), as

well as wind speed and turbulence, and other factors including debris from blade throw.

12.5.6 Should a bush fire or operational fire involve a wind turbine there are other issues involving the structural make up of the turbine. The composition of the turbine blades in particular is complex and the gearbox in the nacelle contains many hundreds of litres of oil. A fire in this environment rapidly becomes a HAZCHEM fire with its own fire regulations. Locally brigades are apparently allowed in but have to get permission first to fight the fire close to the turbine due to **toxins** being emitted. The EA does **not** mention this aspect of fire danger.

12.5.7 Fire has been found to be the second most common cause of incidents with wind farms (Appendix 5). Fire can arise from a number of sources and some turbines seem more prone to fires than others. A total of 164 fire incidents were found internationally between 1990 and 2011 (September). It is noted that the biggest problem with turbine fires is that, because of the turbine height, the fire brigade can do little but watch itself burn out. While this may be acceptable in reasonably still conditions, in a storm it means burning debris being scattered over a wide area, with obvious consequences. In dry weather there is obviously a wider-area fire risk, especially for those constructed in or close to forest areas and/or close to housing. Classically Australia's worst fires are in hot ambient temperatures associated with strong, dry westerly winds. The FCWF area is very prone to these summer conditions.

12.5.8 This is amply borne out by fact that there have been turbine fires in Australia: Lake Bonney (2006), Cathedral Rocks (2009) and Waubra (2001). At Waubra it was reported that

> "Local fire fighters could do little but watch the blaze from half a kilometre away as the situation was deemed too dangerous to approach, according to a local report. On arrival, WorkSafe officers then ordered fire fighters a further 500 metres away as burning tips of the blades were flying off from the structure". (Appendix 5)

12.5.9 The scenario to be addressed is the proximity of homes to the wind farm (many in the < 1 km to 2 km range). If fire fighting in and around wind turbines is hampered or indeed becomes non existent, then these homes (including farm infrastructure, land, stock and machinery) are at increased danger. The proposed FCWF is a relatively densely populated rural area and property potentially in danger is significant. Are there insurance ramifications for properties adjacent or in close proximity to wind farms? There is **no** attempt in the EA to address these issues.

12.5.10 Special attention needs to be paid to Errowanbang Public School. This is situated in a valley with turbines placed on the ridgelines above it. Grass fires in particular move with great speed especially if there is a delay in their containment. There is no evacuation plan for these children. Historically Errowanbang Public School had small numbers of students (typically around 10). This has however increased in recent years to about 40. In 1985 there was a severe bush fire that raged in the area for several days. The fact that there were few pupils enrolled at the time and that it was January school holidays meant there was no cause for concern with school children harm at the time. This simply emphasises the fact that fires can be expected and the evacuation of 40 children, with limited staff, could be extremely problematic.

12.5.11 This problem of fire fighting capability is exacerbated by several factors:

- Unlike Cadia Valley Operations (Cadia Mine) close by where there is a large work force that could be deployed to fight fires, there will not be a large enough employee base at FCWF to be of any assistance. The EA mentions that there will only be 3 jobs in the operations phase.

- The closest Rural Fire Service is at Tallwood, near the northern end of the proposed area and operated by volunteers who require paging, and necessarily take some time to assemble. A similar situation exists at Carcoar and Mandurama, both 5 kilometres from the southern end of the FCWF. The Canobolas Rural Fire Service Headquarters is located on the southern outskirts of Orange and is even further away.

- The supply of water for fire fighting, particularly in the event of aerial helicopter water bombing being employed. This fire bombing helicopter can consume copious reserves of water – up to 9,000 litres of water in around 40 seconds.[1] Water supplies vary considerably throughout the area. While CVO and Orange have some significant water storage most water is stored in small agricultural dams which, in drought times especially, may be very low.

Figure 12.1 Wind turbine fire at nacelle. Caused by high wind conditions. Scotland, December 2011
Fires are difficult to extinguish due to the height of the turbine and the HazChem nature of the fire itself.

2.6 COMMUNICATION SYSTEMS

12.6.1 The EA states "Digital TV is not susceptible to visible ghosting degradation where the signal level is above a minimum threshold. The area surrounding the wind farm is expected to be a medium to high level signal area. However there may be a few individual houses located in shadow areas where other mitigating techniques may need to be applied." The EA does **not** address the issue of who will arrange and pay for these mitigating techniques, and how it will be legally enforced.

12.6.2 Further the EA states "It is recommended that operators of point to point radio systems that cross the wind farm site, PMP operators identified in section 9.9 above, the Commercial Television Station operators in the area, Broadcast Australia for the ABC and SBS and Air Services be advised of the wind farm project to enable these organizations to confirm that there are no potential interference issues seen to be relevant to their operations." There is **no** evidence, with the possible exception of Air Services Australia, that this has been done.

12.7 ELECTRIC AND MAGNETIC FIELDS

12.7.1 The EA states that the substation will be approximately 14 kilometres from the Mid Western Highway and on private land at about 500 metres from the Beneree-Errowanbang Road. Ground truthing by the FCWTAG has found that the substation

will actually be approximately 300 metres for residence #87. Apart from the visual impacts of this inappropriately located substation, the issue of possible health impacts by EMF at this distance has **not** been addressed.

12.8 GEOPHYSICAL EXPLORATION

12.8.1 The NSW Department of Primary Industries states that "There are significant concerns with the proposal with regards to its potential impacts on mineral resources as it is sited on highly prospective ground and has the potential to adversely impact on mineral exploration and any future mining within the area." The northern part of the proposal area is particularly important where a low grade mineral resource has been delineated. Electromagnetic geophysical methods, drilling and helimagnetics have been and will be used in this area.

12.8.2 The DPI requests that the EA acknowledge the potential impact of the wind farm upon the ability of mineral exploration companies to continue to conduct effective exploration of the area and any future mining that may take place and what measures will be taken to minimise the impact. Of chief importance is the potential impact of the location of the turbines and how they may become obstacles to airborne geophysical surveys and drilling rigs, or whether they may produce geophysical artefacts that could hamoer the interpretation of geophysical data. The precise location of the underground and overhead cables and any related infrastructure also needs to be considered and what effect they may have on geophysical surveys, particularly electromagnetic ones, and what can be done to minimise such effects.

12.8.3 The EA does little to address these requirements and states that the mineral exploration by aerial survey will be restricted in a similar fashio to agriculture aerial services. The EA further states that there is still a time frame before construction is complete for aerial surveys to continue. The matter of interference with electromagnetic surveys and the effect of the wind farm and infrastructure upon the accuracy of such surveys is ignored.

12.8.4 In view of the proximity of Cadia Valley Operations (1 km between closest boundaries) and the probable extension of CVO mining operations in the future, this is of significant importance. There is no evidence of any "memorandum of understanding" between Infigen/FCWF P/L and the two prospecting companies (Climax and Goldminco) who have prospecting rights over the wind farm development area that there will be restrictions to prospecting over the next 25 years. There is also no evidence of a "memorandum of understanding" between Infigen/FCWF P/L and Cadia Valley Operations that there will be restrictions on

mining operations for the next 25 years. The requirements of the Department of Primary Industries do not appear to have been satisfied.

12.9 ACCIDENTS

12.9.1 Caithness Windfarm Information Forum provides up to date international data on wind turbine accidents (Appendix 5). The most recent edition has data up to 30th September 2011. The overwhelming conclusion is that wind farms are actually **large wind turbine industrial projects** with the concomitant risk of significant accidents. This is borne out by the data collected and, as expected as expected the more turbines that are built and the larger they become, more accidents occur.

12.9.2 Within this data base are Australian accidents, although it is postulated that these are probably underreported. Many accidents, particularly if minor or undetected by the public, are not necessarily reported in the press. However there are at least 6 accidents to humans (2 fatal), 5 of blade failure, 3 of turbine fires (see 12.5.8), and a reported 22 total deaths of wedge-tailed eagles at Woolnorth in Tasmania. There was one report of excessive road damage while construction was taking place in SA. There have been at least two (probably more) occasions where wind turbines have exceeded their noise limits and been shut down: Waubra in Victoria and Hallett 2 in South Australia.

12.9.3 In the CWIF database it was found that the biggest number of incidents was due to **blade failure**. This is important because of the potential for either whole blades or pieces of blade being thrown from the turbine. Pieces of blade are documented as travelling 1300 metres. The CWIF believe for this safety reason alone there should be a minimum distance of at least 2 kilometres between turbines and occupied houses, in order to adequately address public safety. The EA has several tables giving the distances of residences to the nearest turbine; this shows that there are at least 49 residences located less than 2 km from a turbine, including 7 less than 1 km. **This major safety aspect has not been addressed in any way in the EA.**

12.9.4 The EA, other than stating that incidents such as fire, blade failure and noise exceedence is unlikely to occur, have ignored their express duty of care to the public on these vital safety issues.