

## Attachment 1:

### Response to Submissions received by An Bord Pleanála

Response by Graham Liddy to Paper, dated 19 July, submitted by Mr Mike Griew, in relation to the proposed Waste to Energy facility at Ringaskiddy.

#### **1. Background**

- 1.1. At the request of Indaver, I prepared and submitted a report dealing with the objections to the proposed waste-to-energy facility, as submitted by the Department of Defence (DOD) on 22 April 2016 and 11 May 2016. My paper dealt with the aviation aspects of the objections from DOD. My report was submitted to An Bord Pleanála by Indaver in May 2017 as part of a wider submission.
- 1.2. Mr Mike Griew submitted a paper, dated 19 July 2017, to An Bord Pleanála, in which:
  - 1.2.1. He disagreed with my report with regard to any additional threat to the safety of Air Corps helicopter from Haulbowline Naval Base.
  - 1.2.2. He stated that my report and that submitted by DBS Consultation/Jensen Marks Aviation Consultants (DBS/JM) contained misleading information and erroneously misinterpreted Dr Porter's report (Document 07 of "Further Information").

#### **2. My Response:**

- 2.1. I will deal with Mr Griew's first comment initially.
- 2.2. The Department of Defence (DOD) is responsible for the conduct of military flying operations conducted by the Air Corps. Technical issues with regard to the safe conduct of such operations lies with the General Officer Commanding (GOC) Air Corps, supported by his/her technical

advisors, particularly the Military Airworthiness Authority of the Air Corps.

- 2.3. By their letter of the response to An Bord Pleanála, dated 12 July 2017, the DOD and the Air Corps are satisfied that the proposed waste to energy plant will not have any impact on Air Corps operations at Haulbowline Naval Base subject to a specific statement from Indaver. I understand that Indaver will be able to supply the required statement. This means that the authorities responsible for the safe operations of Air Corps helicopters, and the regulation of such activities, are satisfied that the proposed plant does not present a threat to their flying activities at the Haulbowline base.
- 2.4. To me, this also indicates that after careful consideration of the points made by myself and DBS/JM in our previous submissions, their previous fears and objections to the proposed plant are now considered by DOD/Air Corps to be allayed.
- 2.5. Considering the considerable expertise of the Air Corps, and their decades of experience of helicopter operations, their conclusion that the proposed plant does not threaten the safety of their operations at Haulbowline must be given due and proper regard.
- 2.6. Consequently, I believe that An Bord Pleanála should accept the considered opinion of DOD/Air Corps with regard to the absence of an adverse effect of the proposed plant on Air Corps operations at the Naval Service base at Haulbowline. I would also point out that it is the carefully considered opinion of myself, DBS Consultation/Jensen Marks Aviation Consultants and now the Department of Defence and the Air Corps, that there are now no aviation safety reasons why permission for this proposed plant should be refused.
3. I will now address some specific points made by Mr Griew in his paper dated 19 July 2017. As there is not a consistent paragraph numbering system in his paper, I will reference paragraphs in the document using their place on each page (i.e. para 2 of page 3 etc).
- 3.1. Para 4 Page 1

3.1.1. I have checked Mr Griew's statement that the helipad at the football pitch is now closed due to health and safety reasons. I have not found any confirmation that this is correct. There appears to be an understanding to avoid operations in this area, due to the possibility of the helicopter downwash spreading dust containing toxic chemicals known to be in the ground in this area (a legacy for the steel production plant that was located in this area). However, the location remains available for operations when necessity requires. Furthermore such a formal closure would fly in the face of the statement in the DOD submission of 11 May 2016 (final page) that Haulbowline, and its aviation activities, is an important strategic location for the Irish Defence Forces, and that "restrictions on the Irish Air Corps ability to operate with the Naval Service at Haulbowline ..... carries strategic implication for the State". The military ethos is to respect health and safety concepts where possible, but not to allow such considerations to interfere with vital operations. It simply does not make sense that the Air Corps would forego the relative safety of operations from the football pitch, and limit operations to the significantly more hazardous Main Square location (more hazardous due to tall buildings, aeriels and other obstacles being located close to the Main Square), for health and safety reasons.

4. Para 2 and 3 Page 2

4.1. These paragraphs indicate a fundamental lack of knowledge and experience of Cat A performance take-offs. The figures given in my paper indicate the minimum height, as specified in the A139 Flight Manual for TDP (Take-off Decision Point) altitude. It is not a limiting maximum. If a pilot, during the initial rearwards climb, has concerns regarding obstacles in front of him, (such as a large wind turbine) he has the option to continue the initial rearward climb to a greater height. He can continue this climb, as required, to clear virtually obstacle of concern in his forward sector.

4.2. I would further point out that that the Flight manual of the A139 gives the pilot a range of contingency power options. In the calculation in my original submission, the performance figures are based on the minimum contingency power option. These figures were used to avoid the charge that the most optimistic data was used for these performance calculations. Therefore, in the event of an engine emergency, the probable outcome is that the A139 would be able climb out at a

considerably steeper departure angle than that indicated in my submission. The performance data used was what a prudent pilot would use (worst possible case), but with the knowledge that there was a significant margin of safety inherent, and extra power, factored into such calculations.

5. Para 1 Page 5

- 5.1. Air Corps Flying orders (in common with most responsible organisations) counsel helicopter pilots to avoid flying over build up areas when carrying an external load, except in cases where no other option is available and in emergency situations. Furthermore, if a pilot suffered an engine failure in the early stages of a southerly departure from the Main Square at the NS base, he has the option of jettisoning the load into the waters immediately south of Haulbowline Island. Such action would avoid a potential later requirement to jettison the load over a built-up area if the situation deteriorated further, with the consequent possibility of casualties on the ground. Jettisoning the load at such an early stage would also significantly lighten the helicopter and thereby restore a significant portion of the lost performance, thereby increasing the chances of a successful recovery for both the helicopter and its crew.

6. Para 2 Page 5

- 6.1. This para shows a lack of understanding of the nature of the hazard posed to helicopters by exhaust stacks. There are two principal hazards. The first is the effect of high temperature gases (50°C or higher) when ingested by the helicopter's engine, which may result in an engine failure. The second is a high concentration of oxygen depleted gas, which can close down the combustion process within the engine. Gas turbine helicopters such as the A139, are not so susceptible to this problem as they are designed to run on a weak fuel-air mixture, as the engine turbine blades cannot sustain the temperatures of a fully stoichiometric fuel air ratio. This means the gas turbines are not subject to shut-down unless the oxygen level in the intake air falls from the norm of approximately 20% to a value of 10%. While the exhaust within a stack may be higher than 50°C and/or less than 10% oxygen concentration, it rapidly falls to acceptable levels (less than 50°C and more than 10% oxygen, when it exits the stack and mixes with the ambient air. Any swirling action which increases the rate of mixing of

the stack exhaust gases with the ambient air, will actually accelerate the rate at which the exhaust plume will be diluted to safe levels. Thus, the effect of the swirling action downstream of a wind turbine will actually reduce the potential danger around the top of the stack. While the exhaust gases may in some cases be trapped within the wind turbine vortex, it will be entrapped within a much larger air mass, and the dilution rate within the vortex will rapidly reduce the exhaust gas concentration to safe levels.

7. Para 1 Page 7

7.1. I am aware of no evidence that modern FADEC (Full Authority Digital Engine Control) systems actually make gas turbine engines less reliable. National engine certifying authorities throughout the world would not certify the introductions of such systems if they were known to decrease aviation safety. The Pratt and Whitney PT6 engine fitted to the A139 is one of the most widely used helicopter engines in the world and is also fitted to many fixed wing aircraft. From experience, I can say that it is a very reliable and rugged engine, and damage tolerant. I am unaware of any grounds for Mr Griew's suggestions of doubt with regard to this engine and its reliability.

8. Para 2 Page 7 to Page 13

8.1. My analysis regarding the vertical plume was based on the data provided by an expert in this field, Dr Porter. I defer to his knowledge in this field. I agree that flying over an active exhaust stack 3.5 meters above it would not be prudent. 3.5 meters is obviously a risky clearance to apply to any obstacle in the path of an aircraft or helicopter. A great deal of time and effort can be put into debating the precise extent of a danger zone around the top of the stack. The salient point is that the Air Corps and DOD have stated that they have no objection to the proposed plant if Indaver can confirm that there is no risk when operating 150 meters from the stack, and that Indaver have no difficulty in confirming that this is the case.

9. Page 14 and first half of page 15

9.1. I reject Mr Griew's assertion in the third paragraph of page 15 that my standpoint is "naive, if not downright absurd". The implied concept of

Mr Griew's argument is that the proposed plant is simply an uncontrolled furnace, burning waste. This is incorrect. The principle of the proposed plant is to burn waste, and extract the maximum possible energy from the exhaust gas before it is released, so that this heat can be used to produce electrical energy. The plant is also designed to extract particles and toxins from the exhaust. To achieve this, the exhaust gases pass through heat exchangers to extract as much of the heat as possible, and the gases are also subject to post-combustion processing to clean the exhaust. The object of both marine diesel engine and the waste-to energy plant is to extract as much energy as possible from the combustion gases before they are released into the atmosphere. Thus, the process is quite similar to that of large marine diesel engines. Consequently, it is valid to make these comparisons.

- 9.2. Mr Griew's understanding of what constitutes a good infra-red-seeking missile target is erroneous and none of the NS ships, (or HMS Ocean) are steam-turbine powered.
- 9.3. The reason for my reference to operations of helicopters very close to naval ships was to demonstrate that:
  - 9.3.1. There is a hazard with such operations close to stacks and ships funnels,
  - 9.3.2. But, with prudent airmanship and knowledge of the hazard, operations can be conducted very close to such sources of emissions.
  - 9.3.3. Mr Griew has personal experience of operating helicopters onto oil/gas rigs and is aware of the hazard posed by the gas flares on such platforms. Helicopters operating onto such platform have developed procedures that allow the safe operation of helicopters very close to such flares, notwithstanding that the gas temperature of such flares far exceeds that which would be produced by the proposed plant at Ringaskiddy.
10. Page 15 Water Bombing
  - 10.1. The purpose of my inclusion of water bombing in my original report was to demonstrate that helicopters are capable of operation over very large fires, spread over a large area, where the combustion process is

entirely uncontrolled and neither the temperature over the fire nor the oxygen depletions levels are known before the helicopter enters the area or when operating in such areas. Furthermore, in fire-fighting operations, the helicopter is carrying a heavy underslung load, resulting in the helicopter operating very close to its maximum limits and with minimal reserve power. Yet helicopter pilots do operate successfully in such conditions. Operations in the general area of an exhaust stack, where the emissions source is static and the process combustion is controlled within tight limits, must surely present the helicopter pilot with a much safer and more manageable situation.

- 10.2. I note that Mr Griew's uses the "pprune" site as a reference source. The reader is invited to visit this web site, where he/she will find that the official title of the site is "Professional Pilots' Rumour Network". This organisation is largely UK-based, where experience of forest fire fighting is limited. I would refer the reader to a document issued by the well-respected Flight Safety Foundation, which looked at accidents to helicopters engaged in fire-fighting operations, in the USA where such fires are common. The document can be found at [https://www.flightsafety.org/hs/hs\\_nov\\_dec99.pdf](https://www.flightsafety.org/hs/hs_nov_dec99.pdf) .
- 10.3. The salient point here is that in the case of a stack, any potential hazard is well documented, any potential danger is located close to the top of the stack and directly downwind of it. This is in marked contrast to a burning forest or gorse area, where a vast area of combusted gases can be encountered, of indeterminable temperature and oxygen depletion levels, located in an ill-defined, but expansive, area.
11. Para 3 page 16 (re wind turbine visibility)
  - 11.1. Mr Griew refers to these obstacles as highly visible. DOD expressed concerns regarding night helicopter operations and requested that the exhaust stack on the waste-to-energy plant be lit at night. The large blades on wind turbines are not lit at night, the only light being located on the pylon. Consequently, at night these turbines cannot be considered to be highly visible, as argued by Mr Griew. Mr Griew has also not dealt with the obstacle problem posed by the wind turbine in question when helicopter departs the Naval Base in a southerly wind, in the event of the helicopter suffering an engine failure and performance loss. In this case the wind turbine is a much higher and, importantly, wider, obstacle than

the exhaust stack and its plume. Therefore, the present wind turbine, not the exhaust stack and its plume, is the significant obstacle threatening a helicopter taking off in a southerly direction from Haulbowline Main Square.

12. Para 4 Page 16

12.1. Mr Griew suggests that there may have been agreement between DOD and the various representative bodies within the Defence Forces regarding the original submissions. Such a suggestion demonstrates a fundamental misunderstanding of the relationship between DOD and these organisations. From personal experience, I suggest that any member of the Defence Forces would find Mr Griew's suggestion untenable.

13. Para 6 Page 16

13.1. In my report, I only made one reference to the Royal Naval Base at Devonport (in para 8.10, page 52). I made no reference to the landing site at Weston Mill Lake, as I was aware that this was closed, for unrelated reasons, prior to the construction the waste-to-energy plant. What I did refer to was the operation of helicopters from ships, particularly HMS Ocean, when the ships are moored alongside the quay which is only 525 meters from the plant. Such operations are scheduled to continue until at least 2018, when HMS Ocean is scheduled to be decommissioned. The frequency of such flight operations cannot be determined by Mr Griew or myself. However, the salient point is that they do occur from time to time, and the presence of the waste-to-energy plant has not resulted in a prohibition or cessation of such operations. Therefore, I reject Mr Griew's allegation that I supplied misinformation to an Bord Pleanála.

14. Para 2 Page 19

14.1. As noted in my original report, ex-Air Corps helicopter pilots, with considerable experience of operations at Haulbowline, have informed me that there are a number of "no-go" areas for Air Corps helicopter pilots in the Cork Harbour area, including the Marine College which is adjacent to the Indaver site. In spite of several attempts the link quoted by Mr Griew in this paragraph refuses to open, for both myself and

others. Therefore, I was unable to inspect its content. Mr Griew himself indicated that the helicopter in question was plausibly involved in gas pipeline inspection. This is not an Air Corps role, and being unable to view the footage, there is significant doubt that the helicopter in question was an Air Corps helicopter. Furthermore, as I know that this is a no-fly area for Air Corps helicopters, on the instructions of the Naval Service, leads me to further doubt if this is an Air Corps helicopter.

15. Point I Page 20

15.1. DOD has determined that the proposed plant at Ringaskiddy will not pose a threat to their helicopter operations at Haulbowline if Indaver can confirm that no danger is posed to such operations more than 150 m from the stack. I understand that Indaver will be able to give such confirmation.

16. Points 2 and 3 Page 20

16.1. These points are now not relevant in light of the revised position of DOD and the Air Corps.

17. Point 4 Page 20

17.1. I have already dealt with this point in reference Para 6 page 19 above.

**18. Conclusions**

18.1. The military authorities have now stipulated criteria, which if met, will allay their concerns regarding helicopter operation at Haulbowline, with regard to emissions from the proposed plant. Indaver has indicated that they can assure DOD that this criteria can be met. I can therefore see no justification for Mr Griew's concerns.

18.2. Mr Griew's assertions that I and DBS Consultation/Jensen Marks Aviation Consultants misled An Bord Pleanála or supplied incorrect information in our previous submissions, is without foundation.

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