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Head of inquiries- unit 3
European Ombudsman
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FR - 67001 Strasbourg Cedex
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6 April 2018

Re: Complaint 1802/2016/CEC

"Investigation of the quality level of the air inside the cabin of large transport aeroplanes and its health implication No MOVE/C2/2016-36 – FACTS cabin air study

Dear Mr Papadias,

In response to your letter of 8 February 2018, the Global Cabin Air Quality Executive (GCAQE) are very concerned that the European Ombudsman's office has taken over 14 months to decide to open a claim into our complaint. Given the serious nature of our complaint and the timeframe of the work being undertaken, we feel that this was very unfortunate and therefore a direct consequence, is that you believe the work is too far advanced to follow on with our initial 3 claims.

We do not agree this was a reasonable action undertaken by your office and we therefore require our complaint about the EU Commission/EASA tender to be given the utmost attention.

The science supporting our concerns about the scope of the work is extensive & we will give you a brief summary only.

1. The main scope of the work being undertaken as outlined in the initial tender document [1] states:

- P. 9 *"The general objective of this research study is to enable step-advances in the investigation on the quality of the air on board commercially operated large transport aeroplanes and its potential adverse consequences on crew/passenger health in light of the relevant European legislation on quality of indoor air and professional exposure limits."*

Indoor air quality and occupational exposure limits should not be applied to the aircraft cabin environment at all. This has been set out clearly in a very wide range of documentation that can be found in the attached summary document. [2] For example the American Conference of Governmental Industrial Hygienists (ACGIH), who set out the limitations of using exposure limits very clearly, advise under minimal oxygen content that these limits should not be used above 5000 feet. The ACGIH advise that threshold limits should not be used for non workers and that (Appx F) "no physiological effects due to oxygen deficiency are expected in healthy adults at oxygen partial pressures greater than 132 torr or at elevations less than 5000 feet..." [2,3] At oxygen partial pressures less than 120 torr (5000-7000 feet), symptoms in

unacclimatized workers include increased pulmonary ventilation and cardiac output, incoordination and impaired attention and thinking... all listed as being incompatible with safe performance of duties. Therefore ACGIH recommends that at partial pressures of oxygen less than 132 torr (5000 feet), additional work practices are required to ensure no adverse physiological effects, none of which are provided for aircrew working at altitude.

Exposure limits apply to individual substances in industrial ground based workplaces. The threshold limits cannot be applied to complex mixtures with many components, such as thermal decomposition products (Appx E. [3]). Winder et al. reports that workers at altitude may not be obtaining enough oxygen for their physiological requirements, the cabin environment is hypoxic and that altitude may cause changes in sensitivity to toxic exposures. [2,4,5] Winder very clearly identifies that exposure limits should not be applied to the unique cabin environment for a wider variety of reasons. [5,6]

Similar limitations should be applied for other types of professional exposure limits and in some cases are listed. However the EU study ignores all of this and uses exposure limits despite the guidelines and warnings.

2. While the tender very clearly says the studies will be addressing both acute incident exposures as well as low-dose exposure to contaminants in normal flight, we have been explicitly informed by the project oversight committee that the study will:

- Simulate leakage of oil at the maximum failure rate as well as at the manufacturer's permissible consumption rate as this will identify the worst case scenario.
- Will not look at chronic repeat lower level exposure, as there is no funding or time in the budget for this.

At a European standards meeting (CEN TC 436- Cabin air quality standards development – 20/3/18 - London), EASA and the EU "FACTS" (name of the EU study addressed in this letter) oversight committee attended the CEN meeting to give an update. While EASA stated once again that their simulated oil leakage tests would address low level leakage rates, the scientific oversight committee when asked on several occasions, acknowledged that the study would look at 4 levels of leakage (JC Balouet - oversight committee Chairman) - ranging from maximum leakage possible down to around 200gm/hour. (A Vahl - oversight committee spokesperson). This is a level around the permissible consumption leakage rate from the engine and has nothing to do with the low level leakage that enters the cabin air supply in normal engine operation. [7–10] Therefore the statements published by EASA are not correct and this supports our concerns that exposure to a one off high dose exposure on one occasion is very different to low-level chronic exposure. Their study, we are sure, will not address the concerns that we outline below.

We do not believe the FACTS study approach is correct at all. Our concerns about the inappropriate approach being undertaken were clearly set out in presentations given to the scientific oversight committee at EASA in Cologne on 29/11/17. [11,12] The research that the GCAQE has supported over many years clearly shows that there is a unique exposure pattern occurring that suggests that aircrew are a more susceptible population as they are chronically exposed to background levels of oil emissions in normal flight, combined with acute events occurring on top of the chronic low dose exposures. This finding has been recently reported in 3 publications including the World Health Organization European Journal , Panorama. [13,14,9] We have spent over 10 years looking directly at what is happening to aircrew exposed to air supply contaminants, specifically oil and hydraulic fluids and we believe our research is not being taken into account. The areas that specifically are being ignored apart from our research include:

- Repeat low dose exposure to organophosphates (OP) plays a very different role to the recognized acute cholinergic process. [15,16] Terry (ref15 and 26 in ref 13) reports that *"there is now substantial evidence that this canonical (cholinesterase-based)*

mechanism cannot alone account for the wide variety of adverse consequences of OP exposure that have been described, especially those associated with repeated exposures to levels that produce no overt signs of acute toxicity."

- Repeat exposure to low levels of OP mixtures leads to increased susceptibility/ a reduced toxicity threshold to further environmental substances. [17 and ref 28 in 13]
- The design factor of supplying aircraft breathing air directly from the compressor stage of the engine, guarantees low-level exposure to aircraft fugitive oil emissions as all seals leak by design. [14,7,10] This factor has virtually not been not been recognized by the present study, but is now undeniable in the published literature. [7–9,18] This supports that chronic pre-exposure over an extended period of time is necessary for any effective study as pointed out clearly directly upon request to the oversight committee of this EU study. [11,12]
- Exposure to Ultra Fine Particles (UFP) allowing increased adverse effects of organic compounds including OPs. [9,19,20] As stated in [9], *"A consideration of the toxicology of Nano-particles concludes that their continual presence over a typical working lifetime of up to 20,000 hours in aircrew will predispose them to chronic respiratory problems and will exacerbate the translocation of neurotoxic substances across the blood brain barrier."*
- UFPs (Less than 10nm -150nm): *"oil contamination in the compressor will result in a fog of very fine droplets in the bleed air under most operating conditions."* [21]

3. We additionally find it quite unacceptable that one of the study scientific oversight committee personnel (Dr. Sven Schuchardt), was the lead scientist in the recently completed EASA study, one of the two preliminary studies that led to this larger "FACTS" EU/EASA study. [22] As you will see in our letter of complaint [23] to DG MOVE of 22/12/17, we advised that we were very unhappy with this situation. The original tender stated:

- *"In order to guarantee that the work performed adheres to the highest scientific standards, a committee of reputed independent scientific experts will be set-up and funded by the Contracting Authority for purposes of providing assistance with the steering of the contract..."*

However, as you will see in section 4 of the letter to DG Move, Dr Schuchardt shows complete bias by way of the wording used in the original EASA 2017 cabin air quality study. [22] Statements made include:

- *"Taking into account the current data situation [7, 41, 42], which indicates a very low OPC incidence in aircraft, the still ongoing discussion about the so-called "aerotoxic syndrome" remains completely incomprehensible."* p109 OPC = OP compounds.
- *"A human exposure study is the long-needed tool to provide an unequivocal and sound data set to end the misguided discussion on cabin air quality once and for all. The idea of "neurotoxic TCAC-events" can create fear which occasionally can lead to people feeling or developing respective corresponding symptoms at the occurrence of smell-events. This, misdiagnosis as well as data misinterpretation fuel the on-going debate for which no agreement between the participating parties (pro and contra) is anticipated in the foreseeable future...Human exposure can be seen as an important contribution to the objectification of the currently misguided discussion on cabin air quality."* p111

While Dr. Schuchardt works for Fraunhofer ITEM, another Fraunhofer division (IBP) is a part of the current EASA/EU study consortium undertaking the work. We do not think this

entitles Dr. Schuchardt to be seen as independent and we believe he has a pre-determined view on the outcome. Our German aircrew unions would we are sure support our view that Dr. Schuchardt is not independent.

We trust you will take on board our serious concerns & please do not hesitate to ask for any additional information required.

Sincerely,



Captain Tristan Loraine BCAi
Spokesperson
Global Cabin Air Quality Executive

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