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Our Ref: 0041875

2 February 2016

Dear Mr Simpson

Request for Information under the Environmental Information Regulations (EIR) 2004

Your communication dated 5 January 2016 has been considered to be a request for information in accordance with the Environmental Information Regulations 2004.

You requested:

The emails sent to you by the Met Office in 2013, and a copy of the latest template information regarding contrails held by the Met Office enquiries team.

In your email dated 28 January 2016, you confirmed:

I am currently only seeking one email, as described by your weather desk advisor. It is one of the earliest communication with your organisation from me. It describes the conditions needed for contrail formation, and your advisor at the time states -57 Celsius as the temperature at which contrails can form.

The Met Office holds this information.

Please find attached the email sent to you dated 14 April 2013, and a copy of the latest template information regarding contrails held by the Met Office enquiries team.

Please note some personal data has been redacted from the attachments mentioned above in accordance with Regulation 13: personal information. Release of personal data to a member of the public otherwise than under the EIR would contravene the data protection principles. Among other things, disclosure of personal data would contravene the first principle set out in Schedule 1 to the Data Protection Act 1998 of fair and lawful processing.

To provide additional information, Ferris (1996) gives a useful account of the conditions for contrail formation and discusses, in particular, the role played by the ambient humidity. This is important, since contrail formation occurs when mixing between the engine exhaust and the environment leads to a mixture which is saturated with respect to liquid water. The exhaust consists of air (with the ambient level of water vapour) which has been heated (due to fuel-burning) and moistened (due the water vapour products of combustion) and so the ambient humidity is clearly important to both sides of the mixing process.

Ferris shows that at a given pressure, it is easily possible for the critical temperature for contrail formation to vary by 10 degC or more between a very dry atmosphere and one that is initially close to saturation. To that extent, quoting simple thresholds of

temperature and altitude is only useful to the extent that it demonstrates in very general terms that contrails form when the atmosphere is cold and the aircraft is high. The exact height and temperature remain strongly dependent on aircraft, engines and ambient humidity. It is well understood by both professional and amateur meteorologists that the humidity at high levels in the troposphere and lower stratosphere can vary a great deal. In particular, moisture can be confined to thin layers in the vertical as a result of air being lifted from lower levels and transported over long distances in weather systems. Hence, there is little justification for the sort of statements commonly seen in the "chemtrails literature" that such-and-such an aircraft could not have been producing a contrail unless you know with high precision both the aircraft altitude and the ambient temperature and humidity.

Reference:

Ferris, P.D. (1996), The formation and forecasting of condensation trails behind modern aircraft., Met.Apps., vol.3, #4, pp301-306, <http://dx.doi.org/10.1002/met.5060030402>

I hope this answers your enquiry.

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If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Internal review requests should be submitted within two months of the date of receipt of the response to your original letter and should be addressed to me in the first instance. Please remember to quote the reference number above in any future communications.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF <http://www.ico.gov.uk>.

Yours sincerely,
FOI Team