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Jules Kneepkens  
Rulemaking Director  
European Aviation Safety Agency  
Postfach 101253  
D-50452 Cologne  
Germany



Subject: Comments to EASA A-NPA 2009-10, "Cabin Air Quality Onboard Large Aeroplanes"

Dear Mr. Kneepkens:

Boeing Commercial Airplanes is pleased to provide a response to your inquiry regarding bleed air contamination events on aircraft. We have chosen to respond by letter to allow us to provide you with more useful information than the questionnaire format would permit, and to provide you with our perspective on the latest understanding and research on cabin air quality.

Currently, there are no data indicating that bleed air contamination is adversely affecting the health of aircraft crew or passengers. However, ongoing research continues to improve our understanding of the cabin environment and its relationship to passenger health and comfort.

Boeing is committed to providing a safe, healthy, and comfortable cabin environment for passengers and cabin crew. Air quality studies conducted over the years by government agencies, independent researchers, universities, and industry have shown that contaminant levels are generally low and consistently comply with applicable health and safety standards. However, we continue to work with scientists to improve our understanding of cabin environmental factors.

**FAA databases suggest that bleed air contamination incidents are very infrequent**

Current regulations and industry specification and design practices already seek to minimize potential sources of bleed air contamination. Boeing and the aviation industry as a whole have been quite successful in achieving that goal, as the FAA's review of the Accident/Incident Data System (AIDS) and the Service Difficulty Reporting System (SDRS) databases shows that the frequency of bleed air contamination incidents is very low. Using the AIDS database, the FAA has indicated that approximately 416 incidents involving cabin air contamination have occurred over a 20-year period (January 1978 – December 1999). The sources of contamination in these 416 incidents can be broken down as follows:



- in 33% of the events, the source was an electrical anomaly,
- in 23% the source was the ECS (Environmental Control Systems),
- in 17% the source was engine oil, hydraulic fluid, or jet fuel,
- in 4% the source was the MSC (miscellaneous)
- in 2% the source was Hazmat (hazardous material), and
- in 11% there was some "other" source.

For the 10-year period of 1987-1996, the FAA reported that approximately 222 "air quality" events occurred. This equates to approximately 2.2 "air quality" events per 1,000,000 flight hours. Only a small percentage of these events was attributable to bleed air contamination. Using the SDRS database over a 10-year period, the FAA estimates that 1,013 events occurred, 252 were in the category of bleed air contamination. The SDRS results indicate a likelihood of an event occurring at 2.7 events per 1,000,000 airplane departures. Incidents reported in the SDRS were dispositioned and found to be connected to faulty equipment and/or maintenance practices. With proper airplane maintenance, the frequency of such incidents is minimized.

The information provided in A-NPA 2009-10 suggests that two airplanes have had more frequent bleed air contamination events than other models: the British Aerospace BAe 146 and the Boeing 757 with Rolls Royce engines. Corrective measures have been taken for the BAe 146, with two inspection service bulletins mandated through Airworthiness Directives by the UK CAA. For the Boeing 757, the engine manufacturer, Rolls Royce, has identified engine overhaul improvements, and Boeing has updated the engine oil servicing procedure in the B757 Airplane Maintenance Manual to minimize the likelihood of oil reservoir over-servicing.

#### **Standardized data collection needed**

The FAA SDRS and AIDS databases rely on input from pilots, cabin crew, and the maintenance community. Currently, those providing input to these databases do not appear to employ standard or consistent terminology. It is our understanding that there is no generally accepted definition for the term "cabin air quality event," nor do airlines follow consistent practices in reporting cabin air quality events. Boeing believes it is important that standard terminology be developed for use in reporting cabin air quality events under SDRS or AIDS.

#### **More research is needed to investigate potential bleed air contamination**

Boeing participated in bleed air contamination research conducted by The American Society of Refrigeration and Air Conditioning Engineers (ASHRAE) and described in its Document 959 RP. We are supportive of the scientific research that is currently being conducted in the U.S. by the FAA Center of Excellence for Research in the Intermodal Transport Environment (RITE); and by ASHRAE in their in-flight 1262 RP project designed to characterize the cabin environment and relate to comfort and health symptoms. We are also supportive of the

current research in the United Kingdom by the Department for Transport, on behalf of the Aviation Health Working Group, that has sponsored efforts by Cranfield University to measure air quality and assess the potential for bleed air contamination. We support these efforts to increase understanding of the potential for bleed air contamination incidents and any potential health effects that might be associated with such incidents.

### **Summary**

FAA SDRS data suggest that bleed air contamination incidents are infrequent and are generally traced to a root cause for mitigating action. Future research and data collection would be improved with standard definitions and terminology for reporting, and standardized methods for data collection. We recognize that government efforts will need to be coordinated around such definitions and methods. We support the ongoing research, and trust that a thorough review of the data will be conducted before conclusions are reached.

Thank you for the opportunity to comment on this topic of mutual interest.

Sincerely,



Douglas M. Lane  
Director, Airplane Certification & Regulatory Affairs

