



**AIR SAFETY AND CABIN AIR QUALITY
IN THE BAe 146 AIRCRAFT**

**GOVERNMENT RESPONSE TO THE RECOMMENDATIONS
OF THE SENATE RURAL AND REGIONAL AFFAIRS
AND TRANSPORT REFERENCES COMMITTEE REPORT**

JUNE 2002

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In October 2000 the Senate Rural and Regional Affairs and Transport References Committee tabled its report on Air Safety and Cabin Air Quality in the BAe 146 Aircraft to Parliament with eight recommendations.

The issue of air safety and cabin air quality in the BAe 146 aircraft has received considerable attention, particularly following an incident in July 1997. In response to a recommendation made by the then Bureau of Air Safety Investigation (BASI) following its investigation into the incident in 1999, the Civil Aviation Safety Authority (CASA) undertook an extensive review of the certification of the BAe 146 aircraft and concluded that the aircraft continues to meet the design standards applicable at the time of introduction of the aircraft into Australian service.

Nevertheless, concerns continue to be raised about cabin air quality and as a result, various national and international organisations are undertaking major studies into air quality in passenger aircraft. There are currently two major studies being conducted worldwide and one that has recently been completed:

- the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) have tasked a committee to draft ASHRAE Standard 161, Air Quality Within Commercial Aircraft;
- the United Kingdom (UK) Department of Transport, Local Government and the Regions has initiated research into air travel and health, prompted by the UK House of Lords Select Committee on Science and Technology Report on Air Travel and Health; and
- the USA National Academy of Sciences (NAS) reported in December 2001 on its study of air quality in passenger cabins of commercial aircraft.

The House of Lords report contains a number of recommendations in relation to ventilation, air quality, filtration and the importance of further research, and this Government has taken its findings into account in developing its response to the Senate Committee's recommendations. The UK Government's response to the House of Lords' recommendations was released in February 2001, and further research is now being conducted.

The study undertaken by NAS was sponsored by the Federal Aviation Administration (FAA) and was established to assess air quality conditions, associated health effects and contributing factors in passenger cabins of commercial aircraft. Its report strongly emphasised that available air quality data is not adequate to address specific questions regarding aircraft cabin air quality and its possible effects on cabin occupant health. To address important unresolved questions, the NAS Committee recommended a surveillance program that includes a health component to determine the incidence of health effects in cabin crew and passengers and to identify possible associations between air quality and health effects. The NAS report is now being considered by the FAA.

The Government takes very seriously the issues relating to air safety and cabin air quality in the BAe 146 and other passenger jet aircraft. The Government is therefore committed to addressing the matter by implementing the following two measures to address the issues raised in the Senate Committee's report. These measures involve:

- the establishment of a 'Reference Group' (comprising Government agencies, key industry representatives and a passenger/consumer representative coordinated by CASA) responsible for following the progress and analysing the outcomes of international research and developments and working cooperatively with other countries, major regulatory bodies and those conducting related research to develop a harmonised view of the cabin air environment; and
- CASA mandating an Inspection Service Bulletin (ISB) distributed by BAE Systems by issuing an Australian Airworthiness Directive (AD), which follows recommendations from the UK. The AD, which was effective on 3 April 2001, requires all operators to undertake inspections of oil contamination at intervals not to exceed 500 flights.

The issue of cabin air quality is clearly a global issue, and the Government therefore believes it would be inappropriate for CASA to initiate Australian unique regulatory action while international studies that are likely to lead to a globally accepted approach to this issue are currently under way or in the process of being reviewed. Working cooperatively with other countries will allow for a more timely and effective response into cabin air quality and the introduction in Australia of suitable standards that are internationally harmonised.

I would also like to thank all agencies and industry representatives involved in this response, including the advice from those stakeholders that are not specifically named in the recommendations.

A response to each of the Senate Committee's recommendations is attached.

The Government also acknowledges the work carried out by the Senate Committee and the important contribution it has made to world-wide consideration of these issues.

Response to Recommendation 1

(a)
The Committee recommends that CASA should reassess matters recommended for further action by the BASI/ATSB incident report (No. 199702276) concerning the incident on 10 July 1997 involving Captain Kolver.

(a)
Since the Senate Committee released its report, Australian airlines have progressively installed modifications designed to improve the cabin air environment of the BAe 146 fleet, developed in conjunction with the aircraft manufacturer.

The matters recommended for further action have been reassessed by the Civil Aviation Safety Authority (CASA) and the Government is satisfied that the aircraft meets the design standards applicable at the time of the introduction of the aircraft into Australian service.

The Government believes that the review of the certification status of the aircraft, conducted in conjunction with the aircraft manufacturer and the United Kingdom Civil Aviation Authority (UK CAA), together with the modifications subsequently introduced by the aircraft manufacturer that have been incorporated by the airlines, satisfies the requirements of the BASI/ATSB recommendations. In addition, one of the more significant actions taken by CASA involves mandating a mandatory Inspection Service Bulletin (ISB) distributed by BAE Systems by issuing an Australian Airworthiness Directive (AD) (see Recommendation 2), which follows recommendations from the UK. The AD, which was effective on 3 April 2001, requires all operators to undertake inspections of oil contamination at intervals not to exceed 500 flights.

(b)
The Committee also recommends that CASA reassess its requirements for monitoring the operations and cabin and cockpit air quality of the BAe 146 aircraft operating in Australia and, where necessary, introduce regulations under the *Civil Aviation Act 1988* specifying:

(i)
a specific national standard for checking and monitoring the engine seals and air quality in all passenger commercial jet aircraft;

(i)
The issue of cabin air quality is clearly a global issue that requires further research and consideration, and the Government will reassess current cabin air quality requirements with a view to improving the health of the travelling public. It would be premature, however, to develop unique Australian cabin air quality standards at this stage. Rather, the Government proposes to further consider air quality issues following consideration of the international studies currently being undertaken that are likely to lead to a globally accepted approach to this issue.

It would also be inefficient of CASA to develop a specific national standard for checking and monitoring the engine seals and air quality in all passenger commercial jet aircraft, in the absence of an agreed global approach to the matter. Such actions may result in an Australian response that is not harmonised with a future globally accepted approach, which could impose unnecessarily high costs on Australian aviation.

A number of major aviation countries are conducting wide ranging reviews of the linkage between cabin air quality and adverse health impacts that are likely to lead to a globally accepted approach to this issue. Recommendations from UK and US reviews are likely to emerge in late 2002. The 'Reference Group' established in response to this report will analyse the potential application of the outcomes of these reviews within the Australian aviation industry, and will work cooperatively with other countries, major regulatory bodies and those conducting related research to develop an appropriate Australian response. This task will be included in the Terms of Reference for the Reference Group.

The Government also notes that:

(a) In accordance with the obligations established by the International Civil Aviation Organization (ICAO) (Annex 8 to the Convention on International Civil Aviation), the States of Registry and the State of Design, aircraft and engine manufacturers have developed procedures and standards for the checking and monitoring of aircraft seals on BAe 146 aircraft.

(b) The National Airworthiness Authorities that certificated the aircraft (the UK CAA and the United States Federal Aviation Administration (US FAA)) have approved these procedures and standards, which also apply to BAe 146 aircraft operating in Australia.

(ii) maintenance procedures (including specific maintenance procedures for ageing aircraft);

(iii) specific, appropriate maintenance and operational procedures for the BAe 146 which pay particular attention to the need to ensure aircraft are withdrawn from operational flying and serviced to ensure any operating faults resulting in oil leaks, fumes or smoke are immediately repaired;

(ii) CASA already requires additional maintenance for ageing aircraft where routine maintenance may not be sufficient to detect all potential problems.

All areas of the BAe 146 aircraft systems impacting upon the cabin air environment have a complete maintenance program to ensure that appropriate aircraft standards are maintained throughout the life of the aircraft. For example, the air conditioning packs are subject to regular overhaul, the engine seals are replaced at frequent intervals and the air conditioning ducts are thoroughly cleaned or replaced at each servicing. These requirements are set out in the aircraft maintenance manual.

The Government considers that maintenance procedures currently performed on the BAe 146 aircraft are appropriate. However, CASA will continue to liaise with the manufacturer to ensure the adequacy of these procedures. An ISB distributed by BAE Systems has also been mandated by CASA. The Authority issued an Australian AD (see Recommendation 2), effective 3 April 2001, which requires all operators to undertake inspections of oil contamination at intervals not to exceed 500 flights. At this time, the Authority does not propose to introduce additional maintenance requirements for the BAe 146 aircraft.

(iii) BAE Systems has issued a number of changes to the BAe 146's Aircraft Flight Manuals (AFM) that provide for improved procedures for the isolation of any source of fumes into the aircraft. This process allows faulty components, such as leaky engine seals, to be isolated and the problem corrected at an appropriate time and location.

The aircraft manufacturer and the regulatory authority (UK CAA) that issued the Type Certificate approved a Master Minimum Equipment List (MMEL), which specifies the equipment to be included on that list and stipulates the period of time and the circumstances in which the aircraft can be operated with unserviceable equipment. This procedure is part of the day-to-day operations of all operators worldwide.

The Government is satisfied that this internationally accepted practice would ensure that aircraft are withdrawn from service in the event that a threat to safety was identified.

(iv)
that incident reports should now be specifically designed so as to reflect the history of the cabin air problem that has been encountered on the BAe 146;

(v)
sources of contamination in the cabin and cockpit environment in the BAe 146 be identified and further evaluated using appropriate sampling and analytical technology for the contaminants which, for example, might result from the burning of lubricating oil used in the BAe 146 engines;

(vi)
companies operating BAe 146 and other passenger commercial jet aircraft in Australia provide CASA with specific reports on the results of monitoring these matters within an appropriate timeframe, whether quarterly or six-monthly, in order that CASA can assess the operations of the aircraft; and

(vii)
air quality monitoring and compulsory reporting guidelines for all passenger jet aircraft operators.

(iv)
A specific reporting mechanism for cabin air complaints is not considered necessary at this time. There are already several types of incident reporting systems in place, including the ATSB's Confidential Aviation Incident Report (CAIR), CASA's Major Defect Report (MDR) and the operator's own internal reporting procedures. However, the Government has asked CASA to establish a 'Reference Group' (comprising Government agencies and key industry and passenger/consumer representatives) that could monitor the appropriateness of these reporting arrangements in light of overseas developments.

(v)
This issue has been addressed in the international fora. The US National Academy of Sciences (NAS) has researched the sources of contamination and the affect of contaminants on the quality of cabin air. However, no causal link between contamination and health effects could be substantiated using available data.

The Reference Group, to be established by CASA, will be tasked to address these issues more closely once further international studies have been completed. Working cooperatively with other countries will allow for a more effective response to cabin air quality and the possible introduction in Australia of suitable standards that are internationally harmonised.

(vi)
In light of modifications made to BAe 146 aircraft to address cabin air issues, the 'Reference Group' will consider whether the provision of these additional reports is necessary once international studies have been completed (see Recommendation 1(b)(v) above).

(vii)
As mentioned above, the 'Reference Group' will consider whether a specific reporting mechanism needs to be introduced based on research currently under way.

Response to Recommendation 2

The Committee recommends that CASA adopt the modification to aircraft air circulation systems proposal for the BAe 146 aircraft by the aircraft's manufacturer as compulsory for all BAe 146 operating in Australia and that this be achieved by preparation and issue by CASA of an appropriate form of maintenance direction under the Civil Aviation Regulations.

The Committee also recommends that registration of BAe 146 aircraft operating in Australia be reviewed, and that renewal of Air Operating Certificates and registration of the BAe 146 be subject to completion of those recommended modifications as a condition for continued registration of the aircraft.

Major Australian operators have already completed air circulation modifications that are designed to improve the cabin air environment of the BAe 146 aircraft. CASA advises that prior to Ansett Australia being placed under administration it had completed modifications to all its aircraft, and that National Jet Systems has also completed modifications to its aircraft. The modifications were accomplished in conjunction with major servicing of the aircraft. The modifications are intended to raise an already acceptable cabin air quality to a standard that is higher than the original certification basis of the aircraft. CASA anticipates that all BAe 146 aircraft imported into Australia in the future will have the modifications incorporated prior to operation in Regular Public Transport services.

The available modifications are well publicised in the BAe 146/RJ Service Information Leaflet (SIL), '*Cabin Air Quality Troubleshooting Advice and Relevant Modifications*', issued by BAE Systems in November 2000.

Furthermore, air conditioning testing was conducted on aircraft VH-NJY during a one hour twelve minute test flight on 20 February 2001 from Bournemouth International Airport, England. The objective was to prove the effectiveness of BAE Systems Modifications HCM40424Q (additional air into headspace between cabin overhead lockers) and HCM60174A (addition of electrically powered air extraction in forward vestibule). The test results confirmed that the modifications provide an improved airflow at the seat positions along with improved air extraction in the vestibule areas.

On 3 April 2001, CASA issued an AD, AD/BAe 146 / 86 for all British Aerospace BAe 146-100, -200 and -300 series aircraft, requiring the following:

1. At any time cabin air contamination is suspected to be associated with engine oil, carry out the inspections specified in British Aerospace Inspection Service Bulletin ISB.21-150, Paragraph 2A and 2B and the associated flow chart.

If defective components are found during these inspections, either rectify such defects before further flight or isolate the defective component/s and operate the aircraft in accordance with the limitations specified in the approved MEL.

2. Carry out the inspections specified in the British Aerospace Inspection Service Bulletin ISB.21-150, Paragraph 2A and the associated flow chart.

The provision of Requirement 1 to invoke to MEL may be applied to this requirement if required.

3. Report defects to British Aerospace in accordance with British Aerospace Inspection Bulletin ISB.21-150, Paragraph 2J.1 using the forms provided in the service Bulletin. Additionally whenever oil contamination of the cabin air system is confirmed, forward a copy of the associated report to CASA addressed to the Section Head, Systems.

4. Ensure operating procedures include provision for required action in the event of a suspected cabin air contamination and for reporting such defects for maintenance action and that all flight crew are aware of those provisions.

Note 2: BAe146/RJ Service Information Leaflet NO21-45 and BAE 146/RJ Operational Notice OP 16 contains information with respect to required aircrew action in the event of a suspected cabin air contamination event. Such action includes specific provisions for oxygen usage by the flight crew.

Compliance with the AD is required:

*1. Either before further flight, **or** within 10 flying hours **provided** the source of the contamination is identified and isolated from the cabin air environment before further flight, using either flight operations procedures to maintenance procedures.*

2. Initially at the next A Check after the effective date of this Airworthiness Directive, and thereafter repeat the inspection at intervals not to exceed 500 flights.

3. As of the date of this Airworthiness Directive.

4. Unless previously accomplished, no later than 3 May 2001.

This AD, which mandates the requirement contained in the SIL to perform inspections when oil contamination is suspected, reflects action by the CAA (UK) and effectively mandates action already enacted by local operators to address cabin air contamination events. This includes incorporating various modifications to the cabin air system, APU and engines. Local operators have also introduced improved maintenance procedures to further address this issue. These actions have resulted in a significant reduction in the number of cabin contamination incidents reported to CASA

and the ATSB. In addition, the operators have changed the oil used in their respective fleets to Mobil 291; a fourth generation turbine oil (see Recommendation 7).

The UK CAA and CASA did not issue the SIL in full as an AD as it contained information regarding the cabin environment, which was not related to the airworthiness of the aircraft. CASA has advised that to mandate all aspects of the SIL would establish a precedent where the Authority is involved with mandating various aspects of customer comfort, such as number of toilets, colour scheme, quality of food, etc. Through mandating the requirements of the SIL in an Australian AD, CASA has taken action consistent with the UK CAA, the National Airworthiness Authority that originally certificated the aircraft.

Whilst modifications have been completed, the Government supports CASA's view that mandatory introduction of the modifications for all BAe 146 aircraft operating in Australia would impose unique requirements, an action taken only where there is an unacceptable risk to safety and not to mandate aspects of customer comfort.

Response to Recommendation 3

The Committee believes that development of an appropriate and accurate test for the presence of any chemical fumes in aircraft cabins is essential. The Committee accordingly recommends that CASA liaise with operators to develop a standardised, compulsory monitoring program which provides for testing cabin aircraft air during fume events.

Given the ongoing work described above, both domestically and internationally, the Government does not consider this action as necessary. Preliminary work by BAE Systems in the form of the SIL has been initiated as well as the testing of oils at temperatures and pressures that are representative of the conditions to which they are exposed during engine operations with an oil seal failure in an attempt to determine what chemicals might be produced. Furthermore, a mandatory ISB distributed by BAE Systems has been mandated by CASA. The Authority issued an AD (see Recommendation 2), effective 3 April 2001, directing that inspections for identifying oil contamination be carried out at intervals not to exceed 500 flights.

The developments in regard to this issue may be examined by the 'Reference Group'.

Response to Recommendation 4

That the issue of cabin air quality be reviewed by the National Occupational Health and Safety Commission with a view to including aerotoxic syndrome in appropriate codes as a matter of reference for future Workers Compensation and other insurance cases.

Several of the ingredients used in the fuel of BAe 146 of Mobil jet Oil II are already listed on the National Occupational Health and Safety Commission (NOHSC) Designated List of Hazardous Substances. The NOHSC Designated List of Hazardous Substances is generally reflected in the regulatory framework of all Australian occupational health and safety jurisdictions. The Government therefore believes it is not necessary to develop new codes covering fuel substances used by these aircraft.

The issue of identification of a new injury or illness type such as aerotoxic syndrome as a compensable illness or injury is a matter for the respective workers' compensation jurisdictions. States and Territories have primary responsibility for workers' compensation arrangements in Australia, while the Federal Government has responsibilities in respect of its own employees. Beyond these circumstances, it is for States and Territories to determine a compensable injury or illness.

The Minister for Employment and Workplace Relations will advise his State/Territory counterparts on the Workplace Relations Ministers' Council (WRMC) of the Senate Committee recommendation, and refer this matter to it for consideration.

Response to Recommendation 5

The Committee recommends that the Minister for Transport request the Strategic Research Development Committee of the National Health and Medical Research Council to set up and undertake an appropriate research program on the effect of exposure to aircraft cabin air on air crew and passengers. The Committee also recommends that the Minister advise the Parliament on the form and duration of, such a program as part of the Government response to this report.

The National Health and Medical Research Council (NHMRC) makes recommendations to the Minister for Health on the awarding of research grants, based on scientific quality. The Strategic Research and Development Committee (SRDC) provides a complementary research funding mechanism.

The NHMRC has advised that the issue of aircraft cabin air does not meet the criteria against which urgent requests are assessed. These criteria are: there must be a medium/high risk of threat to public health, its potential to spread, the population at risk, the unfamiliarity with the disease or issue, and the extent of the morbidity and mortality as a consequence of the disease to be deemed in urgent need of research through the NHMRC. Therefore, it would not be appropriate for SRDC to set up and undertake such a research program. The NHMRC relies on researchers themselves to determine the topics for investigation. Applications for health and medical research are then assessed in the annual grant process on the basis of significance, approach and feasibility of the proposed research and on the track record of applicants.

The House of Lords Select Committee Report on Air Travel and Health, which was published on 23 November 2000, canvassed many recommendations similar to those of this Senate Committee. The main theme is that the Government, regulators and industry are responsible for ensuring that the risks are properly identified, managed and communicated so that intending passengers can make properly informed choices. Specific attention should be drawn to paragraphs 1.59-1.73, 3.33-3.41 and 4.16-4.43 where the UK Committee concluded that tri ortho cresyl phosphate and volatile organic compounds, which have been cited as potential causes of the symptoms complained of by cabin crew, have been found in such low levels that concerns about significant health risks are not substantiated. The Committee found no substance in any of the extreme claims about health risks from air travel.

Response to Recommendation 6

While the Committee is aware that the cases referred to are a matter of state jurisdiction, the Committee recommends that the Minister for Transport, in co-operation with appropriate State Ministers, appoint an experienced, retired judicial officer or eminent person who is appropriately qualified to conduct a review of unsuccessful or inordinately delayed employees' compensation cases, pilots' loss of license insurance, personal income protection, and withheld superannuation/other insurance claims made for personal injury and loss of employment as a result of ill health claimed to result from exposure to fumes on the BAe 146 and other aircraft. That person should be asked to report to the Minister on any conclusions they reach and whether those cases were dealt with according to requirements and appropriate standards of procedural fairness.

The Committee also recommends that the Minister table the conclusions and any recommendations it makes in the Parliament.

There are existing State-based mechanisms in place to deal with occupational health incidents. The Commonwealth Government does not have the power to review decisions of State tribunals nor to enforce any findings it may make in the process suggested by the Senate Committee. Accordingly, the Government believes that implementing this recommendation would not be fruitful and would constitute an unwarranted intrusion into State responsibilities.

Response to Recommendation 7

The Committee recommends that the Minister for Employment, Workplace Relations and Small Business, as the Minister responsible for national issues affecting occupational health and safety authorise a review of the use of Mobil Jet Oil II and that the National Industrial Chemicals Notification and Assessment Scheme be requested to conduct this review.

The Committee also recommends that the potentially hazardous chemical components of Mobil Jet Oil II be referred to NICNAS as a priority for review and assessment.

The Administrative Arrangements Order dated 26 November 2001 prescribed the transfer of portfolio responsibilities in relation to the notification and assessment of industrial chemicals from the Minister for Employment and Workplace Relations to the Minister for Health and Ageing.

The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is a Commonwealth assessment scheme that assesses new chemicals introduced into Australia and available data on existing industrial chemicals of concern, and provides assessment findings to regulatory bodies for decision-making. While NICNAS has not assessed any ingredients of Mobil Jet Oil II as new or existing chemicals (the ingredients of Mobil Jet Oil II pre-date the scheme and were accepted onto the Australian Inventory of Chemical Substances without further testing), a significant body of information has been compiled internationally and is already available on the hazards of the constituents of Mobil Jet Oil II. However, there appears to be no adequate monitoring data indicating exposure to the substance or its by-products under current conditions in aircraft.

NICNAS will retain Mobil Jet Oil II on the list of candidate chemicals for the Priority Existing Chemicals program, and will review its priority in light of any further information becoming available. NICNAS is also reviewing the findings from the review of Cabin Air Quality by the UK House of Lords Subcommittee.

BAE Systems has approved the use of some fourth generation engine oils (eg. Mobile 291) for use in the BAe 146 and recommends that airlines use these modern oils that are essentially a significant improvement in this regard.

Since the Senate Committee released its report, CASA confirms that operators of BAe 146 aircraft in Australia now use Mobil 291 oil. An examination of Mobil Jet II is therefore of interest in regard to other aircraft, but will not be relevant to future operations of the BAe 146 aircraft in Australia.

Response to Recommendation 8

The Committee recommends that CASA assess how quickly fitting appropriate high-grade air filters can be made mandatory for all commercial airliners flying in Australia to minimise any deleterious health effects arising from poor aircraft cabin air on crew and passengers. In view of proposed standards currently under consideration in the United States of America and elsewhere, such a system should ideally be designed to remove at least 99% of particles 0.3 micron or larger from recirculated cabin air.

CASA advises that, prior to being placed under administration, Ansett Australia had introduced filtering for the BAe 146 aircraft air supply. The filters are made of carbon-impregnated material designed to remove undesirable odours. The filters were introduced at the same time as many other changes were made to the BAe 146 cabin air-conditioning system. Accordingly, taking these changes into account, the filters fitted by Ansett were designed to remove the presence of odours in the cabin air environment, but did not remove at least 99% of particles 0.3 micron or larger from recirculated cabin air as recommended by the Senate Committee. National Jet Systems currently do not have filters fitted to their fleet, however, they completed a modification program which incorporates modifications to improve galley air extraction and to increase air flow in the aisle and vestibule areas.

CASA also continues to communicate with the FAA, the UK CAA, the Joint Aviation Authority and the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) in regard to potential changes in international standards relating to filtering of re-circulated air. The Government believes that it would not be appropriate for CASA to initiate Australian unique regulatory action while the overseas organisations in a number of major aviation countries are conducting wide ranging reviews that are likely to lead to a globally accepted approach to this issue.

There are currently two major studies being conducted worldwide and one that has recently been completed:

- ASHRAE has tasked a committee to draft ASHRAE Standard 161, Air Quality Within Commercial Aircraft;
- the UK Department of Transport, Local Government and the Regions has initiated research into air travel and health, prompted by the UK House of Lords report into Air Travel and Health; and
- the USA NAS reported in December 2001 on its study of air quality in passenger cabins of commercial aircraft.

The NAS Committee report and the UK Government response both acknowledge the need for additional research into aircraft cabin air quality and its possible effects on cabin occupant health. In particular, the NAS Committee recommended that the FAA investigate installing air-cleaning equipment for removing particles and vapours from the air supplied by the Environmental Control Systems (ECS) on all aircraft. More generally, it recommended a surveillance program that includes a health component to determine the incidence of health effects in cabin crew and passengers and to identify possible associations between air quality and health effects. The UK Government recommended research into real time monitoring of air quality and other aspects of the cabin environment with a view to establishing clear regulatory standards for passenger cabin ventilation.

The US FAA is proposing two Aviation Rulemaking Advisory Committee activities, one of which is the Occupational Safety Issues Group to address issues associated with "Cabin Air Quality". CASA will participate in the public discussion, and intends to significantly contribute to these reviews.

The 'Reference Group' as outlined in this response also provides a forum for the continued monitoring of cabin air quality issues.