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STATEMENT OF

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U.S. ENVIRONMENTAL PROTECTION AGENCY**

BEFORE THE

**SUBCOMMITTEE ON AVIATION
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION**

U.S. HOUSE OF REPRESENTATIVES

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Mr. Chairman and members of the Subcommittee, I am Eileen Claussen, Director of the Office of Atmospheric and Indoor Air Programs of the Environmental Protection Agency. It is a pleasure to appear before you today to discuss the problem of environmental tobacco smoke (ETS) on aircraft.

For many years, cigarette smoking in public places was primarily an issue of annoyance and discomfort. However, as all of you are aware, in the past several years, a significant body of evidence has developed which concludes that environmental tobacco smoke -- a combination of smoke which is exhaled by smokers and smoke which is given off by the burning end of cigarettes -- poses serious health risks to exposed non-smokers. The Surgeon General concluded in 1986 that ETS is a source of lung cancer in healthy non-smokers and is probably responsible for a substantial number

of the lung cancer deaths that occur among non-smokers. The Surgeon General also concluded that ETS is a source of respiratory disease in children. These findings were echoed by a study requested by EPA and carried out by the National Research Council (NRC) of the National Academy of Science. EPA has reviewed these reports and concurs with their conclusions.

Although many of the health effects associated with environmental tobacco smoke, such as respiratory and mucous membrane irritation, lung cancer, and respiratory symptoms in children, have been well documented, additional research is needed in areas such as ETS' possible relationship to heart disease. In addition, both the Surgeon General and the NRC reports discussed the need for additional research on ETS exposure, uptake by humans, and ultimate tissue dose in order to develop accurate relationships between exposures and risk and to provide data for quantitative risk assessment.

EPA has been conducting research on ETS, as well as other indoor air pollutants, for several years under the authority of Title IV of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and much of this research has been geared toward filling some of these important research needs. EPA's research effort has been primarily designed to characterize the components of ETS and predict their emission rates, to analyze its mutagenic components, to develop techniques to measure exposure, and to develop the data needed to model human exposure and dose.

EPA has done considerable work on the development of reliable biological markers of exposure to ETS. Urinary cotinine, a breakdown product of nicotine, is providing reliable exposure data on ETS. Nicotine and cotinine have been found in the blood plasma, saliva, and urine of nonsmokers. In a study of 27 children participating in a research day care program and who were not exposed to ETS during the day, a strong correlation was found between air nicotine levels in the homes of children whose parents smoke and the children's urinary cotinine levels.

In a recent study of passive smoking on commercial airline flights jointly conducted by the National Cancer Institute (NCI) and EPA's Office of Research & Development, in-flight exposures to nicotine, urinary levels of its metabolite, cotinine, as well as symptomatic effects, were assessed on four commercial passenger flights. The study found that flight attendants assigned to the nonsmoking section and nonsmoking passengers in that section were not protected from smoke exposure by the separation of the aircraft into smoking and nonsmoking sections. Some nonsmoking areas attained air nicotine levels comparable to those in smoking sections. NCI measured changes in eye and nasal symptoms, as well as subjects' perceptions of annoyance and smokiness in the airplane cabin, and found they were significantly related to both nicotine exposure during the flight and to the subsequent urinary excretion of cotinine.

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The 1986 Surgeon General's Report concludes in part that "simple separation of smokers and nonsmokers within the same airspace may reduce, but does not eliminate, exposures of nonsmokers to environmental tobacco smoke." The NCI study extends this result to the airliner cabin and confirms that separation of smokers into separate areas does not achieve an ETS-free or genuine nonsmoking area. As discussed in detail in the National Research Council's 1986 report on Airliner Cabin Air Quality, the need for non-smokers to pass through smoking areas to use lavatories on many aircraft also reduces the effectiveness of non-smoking areas and the placement of aircraft galleys often results in increased exposure to ETS by aircraft crew. This report also found that many aircraft do not meet minimum ventilation guidelines recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) for other enclosed spaces.

EPA's ETS research also identifies ETS emission factors for certain constituents of ETS which are either known or potential carcinogens (e.g. carcinogenic tar particles and benzene). Other toxic compounds measured in ETS include carbon monoxide and nitrogen oxides, which are regulated by EPA in the outdoor air. Mutagenicity studies of ETS compared to fireplaces, gas appliances, cooking, and woodstoves showed that ETS results in

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human exposure to mutagens which is significantly higher than from the other indoor sources studied.

A report summarizing this research effort has recently been compiled by EPA's Office of Research and Development. Taken as a whole, the studies detailed in this report confirm that ETS is a major source of indoor air pollution. It also finds that ETS is the major combustion source contributing to total human exposure to mutagens and carcinogens.

EPA's ETS indoor air research is being used to support the policy objectives of EPA's indoor air program, including the dissemination of information to the public on indoor air issues. Information provided by this research has been used in the preparation of a fact sheet on environmental tobacco smoke which has just been printed and released to the public. In addition, it is being used in the development of a more detailed handbook on mitigation of ETS exposures. Finally, the data from this research is supporting a formal EPA lung cancer risk assessment of environmental tobacco smoke.

In conclusion, EPA has found that exposure of non-smokers to environmental tobacco smoke is widespread and that the potential health impacts, although not fully quantified, are significant. As such, the Agency recommends that exposure to environmental tobacco smoke be minimized to the greatest extent practicable. While physical separation of smokers and non-smokers on the same ventilation system may reduce exposures, the most effective way to

minimize non-smokers exposure is to restrict smoking indoors to areas which are separately ventilated with direct exhaust to the outside or to prohibit smoking in that space entirely.