STATEMENT OF LANGHORNE M. BOND, FEDERAL AVIATION ADMINISTRATOR, BEFORE THE HOUSE PUBLIC WORKS AND TRANSPORTATION COMMITTEE, SUBCOMMITTEE ON OVERSIGHT AND REVIEW, CONCERNING REVIEW OF SAFER COMMITTEE RECOMMENDATIONS. SEPTEMBER 10, 1980

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to appear before you today to discuss the recommendations of the Special Aviation Fire and Explosion Reduction Advisory Committee, referred to as the SAFER Committee. The SAFER Committee report, which was provided to the FAA last week, is the culmination of 13 months of study of aircraft fires by the Committee and its supporting groups. Before getting into the recommendations made by the SAFER Committee, I would like to sketch briefly for you the history of SAFER - how it came about and what it was designed to do.

Events leading to the establishment of the SAFER Advisory Committee began with two FAA public hearings in 1977. The first, in June, considered fire and explosion hazard reduction. The second, in November, dealt with the fireworthiness of compartment interior materials. As a consequence of the information developed at those hearings, the FAA concluded that pending rulemaking actions on fuel tank explosion protection and on flammability, toxicity and smoke production concerning cabin materials were premature and subsequently withdrew them in favor of a careful re-examination of the technologies involved in reducing those hazards.

To focus advice from all interested segments of the community at large for this re-examination, FAA established the SAFER Advisory Committee on June 26, 1978, for a term of 2 years. The charter of the Committee stated that it was to, "examine the factors affecting the ability of the aircraft cabin occupant to survive in the post-crash environment and the range of solutions available."

In addition to the chairman and executive director, the SAFER Committee membership consisted of 24 representatives spanning the spectrum of international aviation interests. Airlines, manufacturers, universities, public and private sector research establishments, flight and cabin crews, and a consumer organization were represented.

To provide the detailed information needed by the broadly-constituted SAFER Committee, two technical working groups were organized, one on compartment interior materials and the other on post-crash fuel system fire hazard reduction.

These working groups employed additional specialist sub-groups to examine short-term rulemaking possibilities in materials, material systems, toxicology, materials evaluation and testing, cabin fire safety, and evacuation slide integrity; to review and identify research and development needs; to review the

accident statistics data base; to review fuel tank inerting and explosion suppression concepts; to review crash-resistant fuel tank technology; and to examine the potential of anti-misting kerosene concepts.

The Committee met for the first time on May 10th and 11th, 1979, at FAA Headquarters in Washington, D.C. The scope of the Committee's activities was limited to transport category aircraft and to design aspects of the aircraft relating to fire and explosion reduction. Furthermore, the Committee agreed to concentrate its attention on impact survivable accidents where control of fire and explosions might enhance occupant survival. I asked the Committee to report by October 1, 1979, in an interim fashion, on what rulemaking actions could be undertaken immediately to improve fire and explosion safety, and also on what additional actions the FAA should undertake for the improvement of fire safety.

The technical working groups met on June 26th and 27th, 1979, at FAA's Technical Center. Many smaller meetings of the specialists followed in July, August, and September. The Technical Groups met from September 24th through the 26th, 1979, at NASA Ames Research Center to consolidate the sub-group information and prepare their reports to the parent SAFER Committee on September 27th and 28th. Out of this week-long

meeting emerged the interim recommendations presented to the FAA.

Those recommendations were considered by the FAA in preparation for the meeting in Los Angeles, March 4th through 6th, 1980, where formal responses to those recommendations were presented by the FAA. Positive action plans for all the recommendations were outlined by the FAA. As I mentioned, the final report of the Committee was submitted to me last week.

In general the SAFER Committee report indicates that the FAA is doing the right things in the area of post-crash fire and explosion reduction. There are no dramatic breakthroughs or innovations proposed in the Committee's report. This may be a disappointment to those who expected such phenomona, but it supports our belief that careful preliminary research must be done before changes are made in the regulatory structure, and that there are no quick and easy solutions to the problem. These were the independent conclusions of a group that had substantial technical resources available to it. In fact, considering the totality of the Committee, its technical support groups, and the additional people who were brought into the process of examining all of the data available, approximately 150 of the world's top experts in fire research, operations, accident investigation, materials development,

systems design and aircraft fire and occupant safety were involved. It should be noted, Mr. Chairman, that the SAFER Committee included representatives from pilots' and flight attendants' unions as well as a consumer organization, groups that have in the past been critical of the FAA's efforts in this area. In that respect, it is significant that the final report was unanimously adopted by the Committee, with no dissenting or minority reports filed.

The fact that many of the Committee's recommendations take the form of supporting the FAA's efforts should not be misconstrued as an indication that the Committee was merely parrotting the FAA's positions. What it does mean is that the FAA was moving ahead with its programs in these areas while SAFER was deliberating, and that we took into account the concerns of the Committee as they were raised, instead of waiting for them to be consolidated into the final report. Therefore, by the time the final report came out, the FAA had already begun to implement most of the suggestions contained in it.

The most important recommendation, in the view of the Committee, concerns the investigation and validation of anti-misting kerosene (AMK). The Committee noted, Mr. Chairman, that successfully developing the AMK technology could prove to be the single most significant safety improvement to

reduce the post-crash fire hazard. With this in mind the FAA has formulated, and recently approved, an Engineering and Development Program Plan for Anti-Misting Fuel. Our target date for establishing a data base for initiating rulemaking in this area is 1984. This has been specifically endorsed by SAFER as an appropriate timetable for the work to be done.

We have developed and recently approved two other Program Plans relating to post-crash fires and explosions. The first is the Engineering and Development Program Plan for Aircraft Cabin Fire Safety. This program emphasizes the development of test methods and criteria for cabin interior materials that relate to flammability, smoke, and toxicity under post-crash fire conditions. A major activity will be the correlation of small-scale and large-scale tests to determine which ones best relate to actual post-crash cabin fire hazards.

The program plan includes development and/or evaluation of cabin fire evacuation aids, including heat resistant evacuation slides, emergency lighting for a smoke filled cabin, protective breathing devices, and fire management and suppression systems. Cooperative efforts with NASA include the possible replacement of current urethane seat cushions and acrylic windows with advanced materials and the development of an interior materials data bank and cost/performance model.

The other program plan is the Engineering and Development Program Plan for Aircraft Crashworthiness. A major issue that has been identified for study and analysis under this program is fuel system protection--the ability of fuel tanks to resist rupture regardless of the degree of failure of the surrounding structure. This is one of the specific recommendations of the SAFER Committee.

The other recommendations of the SAFER Committee, including those relating to fuel tank vent protection, engine fuel supply shut-off, reduced flash point kerosene fuels, cabin interior materials, fire-blocking layer for seats, development of the Ohio State University test, modification of the bunsen burner test, inflatable evacuation slides, cabin windows, and defining post-crash fire scenarios and developing full scale tests and other models to approximate those scenarios have already been included in the programs undertaken at the FAA's initiative or are being acted upon in response to SAFER's recommendations.

In your closing statement at the June 5 hearing, Mr. Chairman, you raised a number of areas in which possible interim actions might improve cabin safety for passengers. The development of a fire-blocking layer for seat cushions, which was sponsored by the government, is one potential innovation. This is designed to prevent or delay ignition of the underlying polyurethane

material, thus increasing the time available for evacuation. The blocking material being investigated is neoprene, which has been tested with low-level heat intensities by McDonnell Douglas. It has not been tested under full-scale conditions, nor has it been tested to determine the optimum thickness of the blocking layer. These tests are incorporated in our program plans and should be completed by June 1981. The seat cushions to be tested in the full-scale facility at the FAA Technical Center are now being fabricated by NASA.

Another possible innovation is the use of aluminum panels in cabin interiors. The question is whether aluminum panels provide greater protection to occupants than other materials under the extreme circumstances of direct exposure to flame within the cabin and as the result of burn-through from outside the cabin. On the one hand, aluminum fails at 900 to 1200 degrees Fahrenheit depending upon the time of exposure, and aircraft fires have been known to reach as high as 2000 degrees. On the other hand, it is known to have low smoke and toxicity characteristics. Epoxy glass or phenolic-type surface materials on Nomex honeycomb have been tested by industry to temperatures as high as 1700 degrees and have exhibited significantly more resistance to burn-through than aluminum.. This material is in wide use in widebody aircraft today. The trade-offs between these materials are exactly those which

could be measured using the test methodologies now being developed and validated by full-scale testing. Our program plans will be amended to incorporate tests to be completed in June 1981. Until that time, regulatory action would be premature.

The issue of seat strength was also raised at the last hearing. Our overall crashworthiness plan incorporates an investigation into seat design which will advance the technology of dynamic seat testing. We told you in June that the key to resolving the issues involving seat strength and design is to develop a total crash scenario, so that measurable correlations can be devised to evaluate test efforts. The crash scenario is being developed in a joint program with NASA, using data supplied by industry sources. Beginning this month the FAA, in cooperation with the Navy, will investigate new seat design concepts by conducting dynamic tests of energy absorbing transport type seats at CAMI. In addition, under our ongoing transport crashworthiness program, we will conduct dynamic tests of transport seats in January. The results will be correlated with the crash scenario, and consideration of regulatory change will be made at that time. We are confident that these efforts will either produce change or substantiate existing designs within a short time frame.

You also mentioned radiant panel testing. The question is whether reasonable standards can be imposed by regulation concerning these devices. The state of the art has not progressed to the point where it can be said that one material is better than another using these test methods, because the real world correlation has not been established. We know that the heat flux produced by an actual fuel fire is at least several times that which is produced by the test devices. We also know that the hazards which are associated with the burning of these materials vary with the degree of heat flux. It is therefore very difficult to establish performance standards for materials, and industry has recognized this. Our current efforts include determination of the elements of ease of ignition, flame spread, smoke density, and toxic gas limits, and determination of the appropriate accident scenarios to be correlated with full-scale tests. This work, according to our program plans, should be completed in June of 1981. At that time we expect to be able to evaluate the results and determene standards which are more objective and which may be utilized either in interim regulatory measures or in the development of small-scale measurement techniques.

One of the areas in which we expect to initiate regulatory action next year involves slide improvements, which grew out of our investigation of slide failures in the Continental accident

at Los Angeles in March 1978. We devised a radiant panel test for fabric strength which has resulted in the development of a new, improved material for slide construction, as well as a coating material for upgrading existing slides. The test equipment has been constructed and provided to the aircraft and slide manufacturers. The test criteria have been confirmed in full-scale burn tests of existing modified slides, and full-scale validation of the new material will take place in the near future. At least one manufacturer has already used the test equipment to develop a new slide design for early certification, in anticipation of the new standard.

Finally, we are completing our studies on improved emergency lighting. This lighting, in its final adaptation, will provide egress information even under conditions of dense smoke. We are confident that we will be prepared to initiate rulemaking in this area in the near future. We are also addressing the incorporation in design requirements of fire resistant windows, having recently completed testing in this area.

That concludes my prepared statement, Mr. Chairman. At this time I would be pleased to answer any questions you might have.