

**NATIONAL TRANSPORTATION
SAFETY BOARD
WASHINGTON, D.C. 20594**

REPORT ON PROCEEDINGS

AVIATION ACCIDENT INVESTIGATION SYMPOSIUM

**VOLUME I: INDUSTRY RECOMMENDATIONS
AND SAFETY BOARD RESPONSES**

**MARCH 29 - 31, 1994
TYSONS CORNER, VIRGINIA**

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Abstract: Volume I contains the Safety Board's responses to a number of recommendations made by the aviation industry during the Safety Board's Aviation Accident Investigation Symposium held at Tysons Corner, Virginia, from March 29 through 31, 1994. Volume II contains presentations made by symposium participants. The symposium provided a forum for the aviation industry to discuss and critique Safety Board programs and practices, as well as procedures used during aviation accident investigations. Participants included representatives from U.S. air carriers, airframe and engine manufacturers, aviation associations and unions, government officials and interested parties, as well as foreign investigative authorities and manufacturers.

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NATIONAL TRANSPORTATION SAFETY BOARD AVIATION ACCIDENT INVESTIGATION SYMPOSIUM

VOLUME I

The National Transportation Safety Board was created by Congress as an independent agency with the mission to investigate aviation, highway, railroad, pipeline, and marine accidents and to publicly report on the facts, conditions and circumstances, and the probable causes of such accidents. The Safety Board's origins can be traced to the Air Commerce Act of 1926, in which Congress charged the Department of Commerce with the investigation of the causes of aircraft accidents. In 1966, Congress consolidated all transportation agencies into the Department of Transportation (DOT) and established the Safety Board as an independent agency within the Department. In 1974, Congress made the Safety Board completely separate and independent of the DOT.

The Federal Aviation Act of 1958 and the Independent Safety Board Act of 1974 placed the responsibility for the investigation and determination of the probable causes of all civil aviation accidents with the Safety Board. Additionally, the Safety Board is charged with carrying out studies, special investigations, evaluations, and assessments on issues that are aviation related. The Safety Board is also responsible for fulfilling the U.S. obligations for international aviation accident investigations, as established by the Chicago Convention on International Civil Aviation. The international nature of the aviation industry and the leading role of the United States in aviation technologies makes the Safety Board's investigation of domestic accidents and participation in international accidents essential to the enhancement of worldwide aviation safety.

Within the Safety Board, the Office of Aviation Safety (OAS) is responsible for fulfilling the Safety Board's aviation mandate. OAS investigates all civil aviation accidents, including those involving air carriers, air taxis and commuters, and general aviation accidents. OAS receives technical assistance from the Office of Research and Engineering (ORE). Although some of the investigations of accidents involving agricultural, home-built, and experimental aircraft are delegated to the Federal Aviation Administration (FAA), the Safety Board maintains oversight and is responsible for determining the probable causes of these accidents. OAS conducts special emphasis investigations of incidents or accidents that present a potential for safety improvements in air traffic control and aircraft operation. Senior

investigators from the OAS serve as the accredited representatives for the United States during overseas accident investigations involving U.S. airlines and U.S.-manufactured aircraft and engines.

ORE provides the technical services support to aviation accident investigations in the areas of metallurgy, flight data recorder and cockpit voice recorder readout and analysis, hazardous materials, and aircraft performance studies. Additionally, ORE maintains the U.S. aviation accident data base and conducts special studies of aviation safety issues and accident statistics to detect trends and patterns in aviation accidents.

The Safety Board has recognized the important role that industry and government agencies play as participants and technical contributors to its accident investigations. Working under the management and guidance of the Safety Board's specialists, technical experts from industry and other government agencies assist in the collection of the facts, conditions, and circumstances of the accidents. The participation of the parties in the investigations effectively multiplies the Safety Board's resources and provides quick access to technical information needed for the investigation. The "party system" also allows the operator, manufacturer, or regulatory agency first-hand access to the facts of investigations so that corrective actions may be taken as quickly as possible. The support of industry and government has provided immediate and invaluable assistance to accident investigations that would otherwise not be available because of limited resources. The Safety Board believes in cooperation with other government agencies and industry. The Safety Board also believes that the use of the party system has created the most comprehensive and successful aviation accident investigation program in the world.

Since its creation, the Safety Board has maintained close working relationships with the aviation community. These relationships provide Safety Board investigators with up-to-date information on operational and technical developments, and provide industry representatives with timely and accurate information concerning recent accidents or safety information. The majority of the Safety Board's contact with industry or other government agencies is conducted on an informal basis. Periodically, more formal, but small, meetings are held to discuss specific areas of investigation or to resolve problems that have developed during an investigation. However, the Safety Board recognized that there was a need for a meeting in a larger forum in which the aviation community could discuss the Safety Board's accident investigation process in depth. Such a forum would allow the

open presentation of "critiques" and discussion of the Safety Board's policies and procedures, while the Safety Board Members and staff listened.

The first such forum was the Bureau of Aviation Safety/Industry Meeting held in Downingtown, Pennsylvania, on September 29 through October 2, 1975. About 155 persons attended the meeting. Areas of discussion were Air Carrier Investigations, General Aviation Investigations, Public Hearings and Accident Reports, and International Investigations. As a result of the meeting, the Safety Board received 25 recommendations from the four working groups.

From April 26 to 28, 1983, the Safety Board held an Aviation Accident Investigation Symposium in Springfield, Virginia. The purpose of the symposium was to discuss Safety Board programs and to receive industry and other government agency views on Safety Board accident investigation procedures and policies. The symposium was attended by more than 280 participants. Topics of discussion at the symposium were Washington "Go-Team" Major Aircraft Investigations, General Aviation Accident Investigation, Use of Recorders and Aircraft Performance Studies in Aviation Accident Investigation, and Human Performance/Human Factors in Aircraft Accident Investigation. As a result of the symposium, the Safety Board received 68 recommendations from the participants.

On March 29 through 31, 1994, the National Transportation Safety Board held an Aviation Accident Investigation Symposium at Tysons Corner, Virginia. The purpose of the symposium was to provide a forum for meaningful discussions and critiques by the various segments of the aviation community concerning Safety Board programs, practices, and procedures used in aviation accident investigations. The symposium program was developed with suggestions from industry and government groups with a view toward maximum input and participation by persons attending the symposium. Additionally, attendees and members of the discussion panels were informed that the symposium was not designed to discuss what is working well, but to focus on how things could be improved.

The 1994 symposium was attended by more than 490 persons. Participants included representatives from airframe and engine manufacturers, airlines, aviation associations and unions, government officials, and interested parties. Also in attendance were representatives from 24 foreign investigative authorities and manufacturers.

The symposium commenced on the morning of March 29 with presentations by the Safety Board's staff on current programs and accident investigation procedures. The remaining afternoon of March 29 and all of March 30 were dedicated to panel and open floor discussions of specific topics. These topics were Regional Office Delegated "Major" Investigations, Washington "Go-Team" Major Aircraft Investigations, General Aviation Accident Investigations, The News Media in Aviation Accident Investigations, and International Accident Investigations. Copies of the Safety Board's staff presentations and panelist papers were provided to each attendee prior to the start of the symposium. Additionally, copies of that information is contained in Volume II of this report.

On the morning of March 31, working groups met to discuss and formulate comments and recommendations to the Safety Board in each of the areas of panel discussion. On the afternoon of March 31, industry representatives presented the working groups' recommendations to the Safety Board. The recommendations were directed at how the Safety Board could improve its investigation policies and procedures. The attendees provided 179 recommendations to the Safety Board. After combining some duplicate recommendations, a final list of 169 recommendations was developed.

Following the symposium, the recommendations were evaluated by Safety Board staff and draft responses were prepared. As agreed to during the symposium, the members of the discussion panels were provided the opportunity to review the draft responses to ensure that the recommendations had been understood and that the responses were understandable. The recommendations and the Safety Board's responses follow this section.

The Safety Board, and specifically the OAS, has implemented many of the recommendations presented at the Symposium. In a few cases, the Safety Board had already recognized an area where an improvement in the investigative process was necessary, and it was in the process of taking action at the time of the symposium. In other cases, the Safety Board recognized the value of the critique, and it took immediate action to implement the recommendations. The following are the actions that the Safety Board has taken on specific issues:

- The Safety Board's Office of Public Affairs will issue a general announcement on the wire services 48 hours before the opening of a public docket.

- The OAS has established an electronic bulletin board that is available to interested parties to obtain information on domestic and foreign investigations. Information on domestic accidents will include notification and the preliminary facts of the accident, the location of the command post, the names of Board Member, media contact, the investigator-in-charge (IIC) on scene, and other pertinent information. Information concerning foreign accidents may be more limited depending on the information released by the country of occurrence.
- The Office of Public Affairs will provide a statement in the factual reports provided to the media that the material is factual and that no conclusions are contained in the reports.
- In order to standardize the investigative process, the OAS has developed and instituted a training program whereby investigators from the regional and field offices are trained in "major investigation" techniques. It is anticipated that all regional investigators who are participating in this program will have completed this training by the end of 1995. It is the Safety Board's intent to standardize the investigative process so that there will be essentially no apparent difference between an investigation conducted by a regional office or a headquarters managed investigation. Additionally, OAS has commenced training for investigators to standardize general aviation accident investigations.
- OAS has contracted to develop a Witness Interviewing Course for Safety Board investigators. The course is being specially designed for the unique situations and circumstances encountered in aviation accident investigations.
- The Safety Board no longer microfiches reports and has implemented a "paperless" report in which all reports are entered electronically or optically scanned and stored in a digital format. This process improves the readability and visual quality of copies of the Safety Board reports.

- The narrative section on the general aviation brief reports has been expanded to provide more information.
- OAS now provides factual reports within 6 to 9 months after the accident. OAS has a goal of releasing general aviation factual reports on an average of 6 months, and the brief of accident within 9 months, of the accident.
- OAS is actively formulating a training plan with the Experimental Aircraft Association (EAA) to provide training to Safety Board investigators on amateur-built aircraft, their construction, and the problems associated with various models. The training is scheduled to begin in 1995.
- OAS has provided random factual reports and accident briefs to the Aircraft Owners and Pilots Association, the EAA, and the Flight Safety Foundation for their review and comment. These comments will be provided to managers and investigators for training and quality control purposes. Depending on this initial test, further outside evaluations may be conducted.
- OAS has established a policy that IICs will provide parties to the investigation with copies of any recommendations that result from an investigation in which they participate as soon as they are adopted by the Safety Board.
- OAS has implemented a training plan for 1995 in which Headquarters and Regional offices investigators will receive specific training of ICAO ANNEX 13 standards. This training includes briefing the technical advisors on their role and the function of the U.S. Accredited Representative in the investigation.
- The Major Investigations Division has established a policy that a point of contact will be identified whenever the "go-team" will be en route to the accident scene for an extended period of time.

- A new Major Team Investigations manual was developed just prior to the symposium and made available to all interested parties, either in computer diskette format or hard copy.
- OAS has committed the resources necessary to expand the types and amount of training provided to its investigators. Additionally, the Office has established a 5-year training plan. During 1995, training will be offered in the following areas: "glass cockpits" technology, airline operations familiarization, Aircrew Integrated Management training, airport familiarization training, hot air balloons, soaring/sailplane familiarization, airline management familiarization, and jet engine mishaps.
- The Safety Board provided information to all symposium attendees on the OSHA requirements for training and protection regarding bloodborne pathogens. OAS's Survival Factors Division continues to provide all interested parties with information on the OSHA requirements and the Safety Board's policy on on-scene safety.
- OAS has established a policy that the FAA Principal Operations Inspector, Principal Maintenance Inspector, Principal Avionics Inspector, or Cabin Safety Specialist will not participate in the investigation of accidents or incidents involving an air carrier for which they are responsible.
- The depth of Human Performance investigations has been increased with additional emphasis placed on "corporate culture" and management issues.
- The Safety Board is in the process of evaluating its telephone needs in order to improve answering calls, directing calls to the proper office, and taking messages.

Additionally, many of the Safety Board's responses were clarifications of existing Safety Board policy and procedures. In some cases, it was noted that the recommended action addressed extant Safety Board policy that had not been uniformly followed by Safety Board investigators. In these cases, the investigative staff has been advised to follow the policies and procedures contained in the Major

Investigations and General Aviation Investigations Manuals. The Safety Board believes that a few of the recommendations were the result of unique occurrences that had been corrected on an individual level. Finally, a few recommendations addressed remedies to an issue in which the Safety Board is constrained by its enabling legislation and policy from taking action.

In all three symposiums, recommendations were presented to the Safety Board concerning allowing parties to comment on investigators' analysis reports or assisting in the development of the analysis section of the final report. There also were recommendations about the restructuring of the probable cause statement. The Safety Board is aware that investigative agencies in other countries allow participants to the investigations to assist in the develop of the accident analysis or to solicit comments about the draft analysis and that such a practice is recommended by ICAO procedures.

However, the legislation that created the Safety Board provides for a completely independent investigative authority. The Safety Board believes that allowing outside participation in the analysis phase of the investigation would seriously diminish the independent mandate established by Congress. Such a practice could imply that the aviation community is analyzing and providing conclusions on areas in which it is directly affected. A concern is that the draft analysis would become available to the public and not necessarily agree with the final Safety Board's analysis. Such a situation could be misleading and confusing to the general public. Additionally, the Safety Board is concerned that if staff analysis reports and draft analyses were made available to the parties for comment, these reports could then be made available during litigation proceedings. 49 CFR Section 835.3 provides that "Board employees may only testify as to the factual information," and that "they shall not give any expert or opinion testimony." To provide party access to draft analysis reports would in effect make the staffs' opinions available for discovery. Such an event could result in a significant administrative burden to the Safety Board as staff could be called to provide expert opinion testimony during litigation proceedings. The U.S. has taken an exception to ICAO Annex 13 on this issue.

The Safety Board believes that current practices allow parties to make their positions fully known to the Safety Board and its staff. The party system provides every participant with all of the available factual information regarding the accident. The Safety Board does not hold back factual information from any party, and trusts that the parties are equally candid with the Safety Board. Therefore, all analyses are

based upon the same data. During the progress meetings and technical review meeting, parties have ample opportunity to provide their comments about the accuracy and completeness of the data. Finally, each party is asked to provide a submission to the Safety Board that contains its findings, analysis, conclusions, recommendations, and a statement of probable cause. These submissions, which are provided to the Board Members, the senior management staff, and the IIC, are used in deliberating on and developing the Safety Board's analysis. The submissions are also placed in the public docket. While the parties may not directly participate in the Safety Board's analysis process, the analyses provided by the parties are most certainly considered and used in analyzing the facts of the accident.

The probable cause statement is an area of continuing discussion among the Safety Board members and staff. Recent probable cause statements have included multiple causes and factors, though possibly not listed chronologically as recommended by some symposium participants. The Safety Board believes that within the confines of the Safety Board enabling legislation, it is possible to restructure the probable cause statement. However, the Safety Board does not believe that a fixed format is necessarily the best solution. There are cases where a chronological list of the events of the accident would dilute the impact of the probable cause statement and diminish the impact of key occurrences in the accident, and, therefore, reduce the safety potential of the investigation. However, the Safety Board will consider the wording of the probable cause statement on a case by case basis to determine the best presentation of the cause(s) in order to maximize the value of the investigation.

**INDUSTRY RECOMMENDATIONS
AND
SAFETY BOARD RESPONSES**

NEWS MEDIA INTEREST GROUP RECOMMENDATIONS

- 1. Develop a system or procedure that will provide 48 hours notification to the press, public, and pertinent trade associations regarding the opening of a public docket.**

The Safety Board agrees with this recommendation. The Office to Government and Public Affairs (GAPA) will issue an announcement on the wire services 48 hours before the opening of the public docket. The release covers the date and time the public docket will be opened and where copies of the material entered in the public docket may be obtained on a first-come, first-served basis. GAPA makes copies of the public docket material for distribution to the media and, when that supply is exhausted, refers interested individuals to the Public Inquiries Office.

- 2. Whenever an investigative team is sent to an accident or a U.S. accredited representative is sent to a foreign accident, issue a general notice containing the available facts of the occurrence, the Safety Board Member sent (or accredited representative in a foreign accident), the press officer assigned, and appropriate telephone contact number(s).**

The Safety Board agrees with this recommendation. The Office of Government and Public Affairs will consider the development of a more formalized procedure to provide such information. In domestic accident investigations, general information on the Safety Board Member on duty, the press officer assigned, and appropriate telephone contact number(s) is always available through our office. A similar process has not been formulated in the case of foreign accidents, nor has the office received requests for such information in the past. Under ICAO procedures, the Safety Board is constrained from releasing information on foreign accidents. A general notice might only mention the Safety Board representative assigned and consequently would be of limited benefit.

- 3. Provide electronic bulletin board accessibility by which the Safety Board's various publics can obtain information they require. This would include, but not be limited to: recommendations, blue cover reports, statistics, press releases and general notifications.**

The (U.S. Department of Commerce's) National Technical Information Service (NTIS) operates an on-line service called FedWorld. This service, accessible by modem or via the Internet, is intended to make it easier for government agencies to go on-line with their information products. As staff time becomes available, the Safety Board will explore this and other possibilities for making its products more accessible through FedWorld.

It should be noted that electronic access is currently provided to the computerized safety recommendations data base. The Safety Board is aware that commercial organizations such as Boeing Computer Services, Inc., provide users with access to the Safety Board's safety recommendations and accident information data bases. The safety recommendation data base includes the safety recommendation, the recipient's response, and the Safety Board's evaluation of the response. The Safety Board is continuing to examine additional means to broaden access of its data bases and to make them available to other users.

- 4. When the group chairman factual reports are issued, they should be accompanied by a statement that these reports are not conclusions of the Safety Board, and that they contain no determination of accident causation.**

When preparing copies of the public docket material provided by the Office of Aviation Safety for release to the public, a statement that the material is factual and that no conclusions are made will be added to the packet by the public affairs staff.

- 5. The Safety Board public affairs officer should meet with airline, airport and any other party public relations officials as soon as he/she arrives on site to coordinate the activities.**

With the development of the more formalized public affairs notification system described previously, airline, airport and other party public relations officials will be able to contact the Safety Board public affairs officer. The

individuals will know where to contact the Safety Board public affairs officers so that a coordination meeting or conference can be held. Additionally, the Office of Aviation Safety will include this issue in its annual standardization training so that IICs will be aware of the needs of the party public relations officials.

6. **Develop internally, or with industry assistance, a brief publication to assist reporters covering aviation accidents. Such a publication should be made available at the accident site.**

Safety Board media publications are available and will be carried by public affairs officers to accident scenes for distribution. Copies are also available from the Major Investigations Division. Staff is researching other publication resources as well.

7. **Conduct formalized media training for Board Members, Investigators in Charge (IICs) and regional investigators.**

This subject is addressed in the Safety Board's basic aviation accident investigation training. However, we agree that more detailed training is necessary. The public affairs staff plans to design a media training program for the Safety Board's advanced accident investigation courses. Board Members will be invited to attend this training. Role playing and a mock press conference will be incorporated into the training curriculum. The Office of Aviation Safety is exploring the availability of specific training courses to improve the Board Members' and the IICs' ability to effectively communicate with the media.

8. **Conduct seminars for public relations officials of potential parties to accident investigations that will educate them on the workings of the Board and on their responsibilities during accident investigations.**

The Safety Board's Public Affairs Office always willingly sets up meetings for public relations officials, when requested, on Safety Board investigations and public affairs procedures.

9. Establish specific criteria to determine whether a public hearing should be held.

Board Orders already outline Safety Board policies and criteria with respect to the convening of a public hearing. In the case of a major accident, the IIC, the Board Member who was on scene, the division chief, and the Office Director are consulted and jointly make a recommendation on convening a public hearing. That recommendation is subject to Safety Board office directors' approval and is subsequently voted on by the Board Members.

10. Inform the press in advance that a public hearing is technical in nature and that no conclusions of cause will be reached by the Board of Inquiry.

The Safety Board believes that its public affairs personnel are currently informing the media of the technical nature of a public hearing and that there will be no analysis or determination of probable cause at the conclusion of the hearing. It should be noted that the Chairman of the Board of Inquiry stresses this issue in the opening and closing statements at the public hearing. However, the Safety Board's public affairs officers will continue to stress this issue at future public hearings.

11. In the absence of a public hearing, the factual report should not be released outside of the parties to the investigation until the day of the open Safety Board Sunshine meeting.

The Safety Board disagrees with this recommendation. Safety Board policy provides that all group chairman factual reports will be placed into the public docket at the opening of a public hearing. In the event that a public hearing is not held, the group chairman factual reports are placed into the public docket when the majority of the reports have been completed. The Safety Board believes that there would be no benefit to the public to hold the release of the group chairman factual reports until the Sunshine meeting. As a public agency, the Safety Board is obligated to provide factual information to the public as soon as possible. The Safety Board believes that it would serve no purpose for the parties to the investigation to receive the facts of the investigation to the exclusion of other interested parties and the general public. Section 49 Code of Federal Regulations 845.50 states that all factual information be placed in the public docket and made available to the public. Also, if there is no public hearing, Title 49 USC 1905 states that cockpit

voice recorder (CVR) transcripts must be made public at the time when a majority of the factual reports are entered into the docket.

12. **The Safety Board should change its statement of probable cause, to better reflect the many elements that play a role in any aviation accident, by listing chronologically all of the factors in the accident without any distinction between "probable" and "contributing" cause.**

The Safety Board agrees in principal with this recommendation and will endeavor to list critical factors, chronologically when appropriate, that led to the accident. The Safety Board believes that in some instances the role of one factor in the accident so outweighs the others that it is necessary to list it first, in order not to effectively lessen the impact. Additionally, the Safety Board's enabling legislation requires the determination of probable cause. The Safety Board will in determining the probable cause of an accident review each accident case and determine when a listing of probable cause factors would be appropriate. In most cases, the Safety Board will issue safety recommendations that are a result of elements of the probable cause. However, the Safety Board may go beyond the factors or elements in the probable cause to issue recommendations based on other safety concerns disclosed during the investigation.

MAJOR "REGIONAL" ACCIDENT INVESTIGATION RECOMMENDATIONS

- 13. Establish a standardized investigative process that is applicable to all levels of investigation and require all investigators to adhere to that process. This should include areas such as: levels of investigation, recognition of parties, timing of the investigation, and the notification process.**

The Safety Board agrees with this recommendation. In response to aviation community comments, the Office of Aviation Safety has developed a training program whereby investigators from the regional and field offices will be trained in the procedures and practices used in investigations conducted by the Major Investigations Division. The intent of this program is to standardize the investigative process so that there will be no essential difference between an investigation that is conducted by a Washington-based "Go-Team" and one carried out by a regional IIC with assistance from Washington and regional office group chairmen. The Safety Board's Major Team Investigators training was conducted during July 1994, and encompassed in-depth training for regional air safety investigators who were selected to participate in major accident investigations. It is anticipated that by the end of 1995, all regional investigators will have participated in this training. Additionally, a standardized investigative process has been developed for general aviation accident investigations, and investigator training is being conducted. The Safety Board believes that by utilizing regional accident investigators as group chairmen on major accident investigations, the standardization of the Safety Board's investigations will be greatly improved.

- 14. Establish criteria for assigning investigative assets and for modifying initial assignments so that the level of the investigative assets can be increased or decreased as needed.**

It is the Safety Board's intent to tailor the initial assignment of investigators to a given accident based upon the nature of the accident and the preliminary information received. As more information becomes available, the type and level of effort will be changed as required. Obviously, this is not a perfect system and occasionally the initial team must be supplemented in order to meet the demands of the investigation. While there are no specific criteria for

the assignment of investigative resources, the Safety Board relies on the experience and judgment of its managers and IICs to ensure that necessary and appropriate resources are always available to an investigation.

15. Solicit industry input and critiques prior to formal action.

The Safety Board concurs with this recommendation. The Safety Board is always interested in aviation community's comments and input to investigations and the process by which the Safety Board conducts investigations. The Safety Board's policy of requesting submissions from parties to the investigations and willingness to openly discuss investigations are examples of the Safety Board's desire to solicit comments. It may not be possible for all parties to agree on every issue, and the Safety Board's independence must be maintained. Nonetheless, the Safety Board will continue to solicit input on the factual portion of the reports prior to taking formal action.

16. Use the best facility available for evaluating components based upon timeliness and the facility's qualifications to do the job.

The Safety Board has excellent facilities and staff to perform material failure analysis. It is the policy of the Board to evaluate components and to conduct metallurgical examinations in-house. On a case-by-case basis and when necessary, the Safety Board may, in the event of a lack of facilities or staff, use an appropriate outside facility to accomplish timely testing of components with appropriate party participation. The Safety Board's regional offices often utilize outside facilities for teardown and examination of components with appropriate party participation.

17. Conduct all interviews in accordance with preestablished and published procedures.

All interviews will be conducted in accordance with the provisions of 49 Code of Federal Regulations (CFR) 831 and the Safety Board's Aviation Accident Investigation Manual. The Office of Aviation Safety is in the process of developing a Witness Interviewing class which will be held both at the Washington Headquarters and also at the regional level. It was found that most of the interview courses currently offered were developed for the interrogation of witnesses for criminal investigations. These interview

techniques are unsuitable for the Safety Board's mission, and, therefore, the Safety Board needed to contract to develop an appropriate training curriculum.

18. Conduct preliminary analyses by the parties during the field phase of investigations.

The field phase of an investigation is a fact-gathering activity. While it is normal to begin an informal analytical thinking process during the field phase, a formal analytical process will not be conducted until the field phase has been completed. At that point, in accordance with 49 CFR 831.14, parties to the investigation are authorized and encouraged to submit proposed findings, safety recommendations, and probable cause(s) statements to the Board for consideration.

19. Provide a copy of the draft formal report to the parties for review and comment prior to the Sunshine meeting.

When a field report is being prepared for submission to the Safety Board at a "Sunshine" meeting, the same review and comment processes that are used for a major report will be followed. The Safety Board is concerned about the possibility of a draft final report becoming available to the public. In many cases, the Safety Board's final report contains different conclusions, findings, and a probable cause statement than contained in the draft version. Such a situation could result in considerable confusion to the public as to which version contains the Safety Board's final position on the accident.

The Safety Board believes that the parties have ample opportunity to comment on factual information, attend technical review meetings, and to provide submissions containing their findings, analysis, safety recommendations, and probable cause statements for the Safety Board's consideration. These submissions are made part of the public docket. The Safety Board believes that it would be inappropriate for the parties to review the staff's analysis prior to the Sunshine meeting because such a review would seriously compromise the independence of the Safety Board. This could also lead to Safety Board investigators being deposed regarding their draft analysis reports.

20. When necessary, conduct a technical review.

It is the Safety Board's policy to hold a formal technical review meeting or to distribute copies of the factual section of the draft final report to the parties following the completion of the fact-finding phase of a major investigation. Formal technical reviews of field cases will be conducted on an as-needed basis, and with the concurrence of the parties to the investigation. The requirements for such reviews will be emphasized in our training of field investigators.

GENERAL AVIATION GROUP RECOMMENDATIONS

21. **Implement a system of party review of draft factual reports on general aviation accidents.**

A draft copy of field factual reports will be available to parties for review and comment, to ensure that information is accurate and complete.

22. **Standardize in the regional offices procedures for notifying parties about accidents involving general aviation aircraft.**
23. **The Safety Board should review/improve timely notification procedures concerning standardization, security, information passed, and parties notified for both domestic and foreign accidents.**
24. **Regarding both domestic and foreign accidents, the Safety Board should strengthen its notification procedures with the manufacturers/vendors and revisit/evaluate its requirements for the notification of owner/operators.**

The Safety Board has always tried to ensure that potential parties to an investigation receive timely notification of accidents and serious incidents. In order to improve this process, the Safety Board has established an electronic bulletin board that will provide all interested parties with up-to-date information concerning major investigations and selected general aviation investigations. The Safety Board will continue to review past problem areas and explore new procedures or means to improve the initial notification process.

In a few cases, certain manufacturers have not received timely notification because the Safety Board was unaware that the manufacturer's products were on the airplane. Additionally, there have been instances in which an accident occurred after normal working hours or on a weekend, and the Safety Board was unable to contact the manufacturer. The Safety Board agrees with these recommendations and will attempt to improve its notification procedures, including obtaining 24-hour contact numbers for as many manufacturers and vendors as possible.

25. **The Safety Board should review the depth, scope, accuracy, and resources allocated in general aviation aircraft accident investigations in order to improve the content, quality, and thoroughness of many general aviation accident reports.**

The Safety Board agrees with the intent of this recommendation. The quality of our investigations is a continuing subject of discussion with Safety Board supervisors. The Safety Board continually tries to improve our general aviation products through training at all levels and will strive for further improvements.

26. **The current party system may be too restrictive on the investigation process. The Safety Board should liberalize the party rules to include qualified investigators (including technical advisors) who are available to the IIC. However, litigation limitations would need to be placed on these parties.**

27. **Establish a list of qualified people that the Safety Board could use as technical advisors and use organizations such as the International Society of Air Safety Investigators (ISASI) to qualify these individuals. Require the burden of proof to rest with the individual attempting to qualify.**

The Safety Board IICs are authorized to utilize, if needed, any technically qualified resource to determine the facts of an accident. Moreover, the current system has served, and continues to serve, the purpose of improving the quality of investigations while maintaining impartiality. The Safety Board's rules prohibit the inclusion as a party to the investigation any person who does not have a direct involvement in the accident. Since there are procedures in place to obtain any additional expertise needed for an investigation, the Safety Board believes that further action is unnecessary.

28. **Use the manufacturer's laboratory resources first before the Safety Board's laboratory to expedite the problem identification.**

As previously mentioned, it is the policy of the Safety Board to use its well-equipped and staffed laboratories to conduct failure analysis of components involved in accidents. When necessary, because of the lack of facilities or

staff, the Safety Board will use manufacturers' or other facilities to assist its laboratory, with the participation of party representatives.

29. IICs should ensure the readability of enclosures to the public docket.

Since the Safety Board's paperless report process has been implemented, the reports are no longer microfiched. The data forms and other investigative information are entered electronically, and the attachments are optically scanned and stored in digital format. Therefore, each reprint will be digitally produced. The photographic negatives will continue to be retained so that photographic originals may be reproduced. This process has improved the quality of reprints of factual reports.

30. Develop an alternative system for the distribution of the Safety Board data base information, such as by computer disk, electronic transfer, or CD ROM.

We have recently used diskettes to transfer limited data base information to customers. Additionally, three DOT offices have installed copies of our data base and obtain weekly updates on-line. There is no reason why any other organization could not also obtain these updated files. Of course each user would first have to obtain and install a master file to update.

The Safety Board is also investigating the possibility of distributing data on CD-ROM (through the National Technical Information Service), and through direct electronic transfer over a bulletin board service. The Safety Board is investigating the possibility of providing access to the its data base through the Internet or CompuServe systems. However, the data base as it exists today is not easy to use. Efforts are currently underway to develop a publicly accessible version of the aviation accident data base that is compatible with popular personal computer-based data base software.

We understand that copies of the Safety Board data base are available commercially on CD ROM, but we do not know how current or accurate they are.

- 31. A "Human Factors" topic heading should be used in the narrative if it is involved in any way.**

The Safety Board follows the format recommended by the International Civil Aviation Organization (ICAO) in its accident investigation reports. The Safety Board believes that this format, which has served us well in the past, continues to provide the flexibility needed to address topics unique to each investigation. As human factors issues arise, we will address them in the reports, either under the general topic of "human factors," or under more specific headings, such as "fatigue," "decision making," "automation," or "corporate culture," as appropriate.

- 32. Make the airframe serial number the primary reference versus the present N number.**

For the foreseeable future, the Safety Board will continue to use the N number as the primary aircraft reference. In every accident report, the serial number has been and will continue to be collected, and it can be used as a search criterion in the data base. However, the Safety Board's South Central Regional Office has been tasked to conduct a special evaluation of this issue.

- 33. Improve the quality control of the brief narratives and provide more detail.**

The brief narrative is being revised from its current 200 word limitation to a larger format. Headquarters supervisory personnel will review all of the briefs, and their quality will be emphasized in investigator training.

- 34. Have the Safety Board take control over "destroyed" aircraft data plates and recommend to the FAA that the specific serial number be removed from the type certification sheet.**

The Safety Board is bound by the provisions of 49 CFR 831.12(b), which state that the Board "shall" release the wreckage when the Board has no further need for it. The Board has neither the authority nor the need to retain any part of the wreckage beyond that time. Retention of any part of the wreckage beyond the bounds of our mandate is outside the scope of accident investigation. The Safety Board understands the manufacturer's concerns,

and therefore has tasked the South Central Regional Office to conduct a special study of this issue.

- 35. Periodically, investigate representative accidents/incidents, such as inadvertent visual flight rules (VFR) into instrument meteorological conditions (IMC), and prepare special studies of these classic accidents/incidents.**

The Safety Board has accomplished special investigations or studies of specific accident types such as VFR into IMC, alcohol involvement in general aviation accidents, and, most recently, a special study in commuter airline operations. In the last few months, the Safety Board has accomplished a special investigation of accidents involving Robinson R-22 helicopters, and aviation maintenance practices. It has also begun a study of commuter airline safety, and initiated a study of aerial sightseeing operations. The Safety Board plans to continue to conduct investigations of special emphasis areas as time and resources permit.

- 36. Shorten the time from the release of the preliminary report to the availability of factual reports, and strive to improve the timeliness of reports.**

This has been implemented. Factual reports are now released between 6 and 9 months after the accident. Our goal is to release the factual report an average of 6 months after the accident, and to release the brief of accident within 9 months of the accident.

- 37. Take advantage of the Experimental Aircraft Association's offer to train Safety Board investigators on accidents involving amateur-built aircraft and to provide a list of qualified individuals that could assist in such amateur-built aircraft investigations.**

The Safety Board is actively formulating a training plan with the EAA to have air safety investigators participate in training on amateur-built aircraft, construction, and problems associated with the various model aircraft. The Safety Board plans to begin this training in 1995. Participation in Safety Board investigations is restricted by 49 CFR 831.11. The Safety Board believes that any list of individuals qualified in the investigation of accidents

involving amateur-built aircraft should be maintained outside the Safety Board.

38. Provide more information on the preliminary reports.

The preliminary reports are issued within 5 days of an accident, and the investigators must depend on often unreliable initial information to complete the preliminary report. The preliminary reports are only designed to provide basic information on the accident and are not to be used in lieu of the factual report. The Safety Board believes that the content of preliminary reports meets the need to provide basic information within a few days of the accident. The Safety Board plans to issue the factual reports in a more timely manner, which will address the intent of this recommendation.

39. Recommend to the FAA that Air Traffic Control (ATC) materials be kept longer than the currently required time period.

The Safety Board agrees with this recommendation and will work with the FAA to increase the time that ATC tapes and data are retained following a serious incident or an accident. The Safety Board will address this issue in accident reports whenever data are not available because the time for holding a recording or radar tape has expired. Additionally, many FAA personnel were at the symposium and are aware of this recommendation. Therefore, the FAA is now aware of the aviation community concerns on this issue.

40. Expand the Safety Board's mandate to include the investigation of "public use" aircraft accidents.

Recently, legislation was passed by Congress and signed by the President that will require the Safety Board to investigate incidents and accidents involving "public use" aircraft with the exception of aircraft operated by the armed services and those used by U.S. intelligence agencies. This legislation will expand the Safety Board's investigation mandate to include the investigation of accidents involving public use aircraft. The Safety Board has many existing memorandums of understanding with other government agencies regarding our investigation of public use aircraft. Additionally, the Safety Board coordinates closely with the aviation offices of organizations and agencies that operate aircraft. The Safety Board has, by request, investigated numerous public use aircraft accidents.

41. Provide the potential parties to an investigation with a list of the other government agencies with which the Safety Board has letters of agreement regarding accident investigations.

As mentioned above, recent legislation will require the Safety Board to investigate incidents and accidents involving public use aircraft with the exception of aircraft operated by the armed services and those used by U.S. intelligence agencies. This legislation will supersede most if not all existing letters of agreement that the Safety Board has with other government agencies. However, in reply to the question, currently the Safety Board has letters of agreement with the following government agencies: Illinois Department of Transportation, Florida Marine Patrol, Alaska Department of Military Affairs, National Oceanic and Atmospheric Administration, Federal Bureau of Investigation, U.S. Department of Agriculture, U.S. Forest Service, U.S. Coast Guard, U.S. Department of Justice, Office of the Chief Medical Examiner of the Armed Forces Institute of Pathology, U.S. Army's Biodynamics Laboratory of the Aviation Research Laboratory, U.S. Bureau of Narcotics/Dangerous Drugs, U.S. Customs Service, Federal Aviation Administration, U.S. Department of Transportation, U.S. Office of Commercial Space Transportation, U.S. Department of Interior, U.S. Department of Energy, U.S. Department of the Navy, Immigration and Naturalization Service, U.S. Marshals Service, Florida Department of Law Enforcement, U.S. Border Patrol, Tennessee Valley Authority, State of Nebraska, and Civil Air Patrol.

42. Accept supplemental investigation assistance available from military and designated aviation accident investigators.

The Safety Board has on several occasions requested and received the services of the military or other sources. In several recent cases, the Safety Board has requested and received specific technical support from both the Air Force and the Navy. Additionally, Safety Board investigators have the authority to utilize any technically suitable source to accomplish an investigation. The Safety Board will continue to utilize all available resources, as needed, in accomplishing its mission.

- 43. Establish a list of manufacturers' representatives who are available to be designated as advisors to the accredited representative (Safety Board IIC) to allow the timely dispatch to foreign investigations.**

The Safety Board encourages manufacturers to provide a list of the names and specialties of their employees who could be designated as technical advisors to the U.S. Accredited Representative. Additionally, upon notification of an accident, the Safety Board will request the place and date of birth, passport number, and availability to travel of the technical advisor(s) needed for the investigation. This information is required so that the arrival of the team can be coordinated with the Department of State and the country of occurrence. The Safety Board currently maintains a list of basic information on persons who have participated in foreign investigations. However, experience has shown that such lists are usually out of date almost as quickly as they are created. Since some of this information contains home telephone numbers, pager numbers, etc., the Safety Board will not provide this list to anyone outside of the Safety Board. It is incumbent upon parties to provide to the Safety Board up-to-date lists of persons who could be designated as technical advisors.

- 44. Develop standard guidance for manufacturers' representatives when the accredited representative does not travel.**

The Safety Board concurs with this recommendation and will develop guidance for manufacturers concerning their involvement in foreign accident investigations. Up-to-date information is always available from the Major Investigations Division or the Regional Directors, should questions arise.

- 45. Develop a procedure for outside quality review of random accident reports.**

The Safety Board will provide a random selection of factual reports and briefs of accidents to the Aircraft Owners and Pilots Association, the Experimental Aircraft Association, and the Flight Safety Foundation for their review and comment. The comments will be reviewed by the Director of the Office of Aviation Safety, the Chief of the Regional Operations and General Aviation Division, and the Regional Directors to determine where improvements can be made and if there is benefit in continuing such outside evaluations.

Additionally, the comments will be disseminated to our investigators and used in training.

46. Standardize the party participation system within regional offices, as provided by current law.

The Safety Board believes that guidance currently exists that provides for a standardized party participation system. The problem exists that the guidance is not applied uniformly by all IICs. Training to be provided by the end of 1995 to all major investigation IICs will include specific information on this topic. All investigators are informed that participation is not automatically granted to interested parties and that the parties to the investigation must provide technical assistance that is needed for the investigation. They are also authorized to exclude those individuals whose interests are not for accident prevention. Additionally, IICs are provided guidance on the removal of parties that are disruptive to the investigation or are unwilling to provide technical information needed for the investigation.

47. Provide alternative theories of probable cause in general aviation accident reports, similar to the major accident reports, and include them in the general aviation reports analysis information.

The Safety Board agrees that the general aviation accident "brief" report format has limitations. The brief narrative is the vehicle to analyze facts and to develop the probable cause, and, as such, it also directly supports the probable cause. The Safety Board believes that providing the most pertinent facts, conclusions, and probable cause in a concise format provides the reader with a clear representation of the circumstances of the accident.

48. Avoid extensive disassembly of aircraft components on site.

This is, and will continue to be, a subject in the Safety Board's accident investigator training. However, it is the Safety Board's policy that the ultimate decision on the extent of on-site disassembly of components should be made by the individual IIC rather than based on a blanket policy. It is difficult to draft such a policy given the broad range of circumstances that can be encountered during an investigation. As always, the IICs will consider the recommendations of the parties to the investigation prior to the disassembly of any component.

49. Establish a procedure for automatic distribution of recommendations to all affected entities.

The Safety Board agrees that any recommendation that results from an investigation should be placed into the public docket for that investigation. It is the Office of Aviation Safety's policy for the IIC to send a copy of any recommendations that result from the investigation to the party coordinators. It would be impractical to attempt to go beyond this to distribute a recommendation to all parties who might be affected by a given recommendation. Additionally, parties may contact the Safety Board's Public Inquiries Office in order to be placed on the list for automatic distribution of the Safety Board reports and recommendations.

50. For all investigations conducted by the Safety Board regional offices, parties to the investigation should have an opportunity to comment on the reports, and such comments should become part of the reports.

All party comments are currently solicited during field and follow-up phases of an investigation. Comments are included in the public record; however, the submissions and correspondence may not be included in the docket separately. All submissions and pertinent correspondence made pursuant to 49 CFR 831.14 will become part of the public docket.

51. Allow party participation in the analysis phase.

Any party may submit proposed findings, analysis, and probable cause pursuant to 49 CFR 831.14 for the Safety Board's consideration at a specified date before the adoption of the final report. The Safety Board does not agree with this recommendation because the parties might have an understandable bias in analyzing areas that could affect them. Additionally, this practice could seriously jeopardize the independence of the Safety Board as provided by Congress.

52. Encourage the use of multiple causation statements as to cause or do not issue a probable cause. Issue only factors/findings or conclusions.

As previously mentioned in response to a similar question, the Safety Board will consider the viability of this recommendation, but its implementation may

require a change in the Code of Federal Regulations and the Board's enabling legislation.

53. Establish a glossary that distinguishes between facts, analysis, findings, conclusions, or cause(s).

The Safety Board realizes that there is a degree of subjectivity in selecting terms used in the various sections of the report. The Safety Board tries to follow conventional usage of terms and headings in order to distinguish between the elements of the report.

54. Do not rush the end of the "on-site" portion of the investigation.

Determining the appropriate time to terminate an "on-site" investigation is a judgment call, based upon many factors. Parties to the investigation are encouraged to provide their views as to when all of the available facts have been collected. The Safety Board does not delay the beginning or termination of the field phase of the investigation nor will it terminate the field phase of the investigation before all necessary information has been gathered. Additionally, the Safety Board IICs will not delay or extend the on-scene investigation because of the late arrival of a party.

55. Preserve evidence that is pertinent to the probable cause.

The Safety Board policy has been to preserve evidence, but some metallurgical examinations may require destructive testing of a part. Once completed, the law requires the Safety Board to return the evidence to the owner.

56. The Safety Board needs to enter into the docket file supplemental information that is not necessarily related to the cause.

Regarding general aviation accidents, the Safety Board does not normally include data in the docket that is not related to probable cause. The exceptions are information necessary to support a safety recommendation or safety study and formal submissions to the Safety Board by the parties. Our mission is safety related only, and, except as noted above, the docket will not become a repository for information that is not pertinent to the determination

of probable cause. To do so would place an unnecessary burden on the Safety Board's staff that is beyond the scope of our mission.

57. The Safety Board should establish an advisory committee that includes people from independent sources.

The Safety Board does not agree with this recommendation. As previously stated, the Safety Board believes that current practices allow considerable opportunity for industry to provide its comments and opinions to the Safety Board. The establishment of an advisory committee would, in effect, diminish the independent status of the Safety Board. The "Party System" allows parties to the investigation to fully critique Safety Board policies and procedures and, through the submission process, to provide advice to the Board Members.

58. Allow more time in future symposia or meetings for specific discussion of topics versus papers. More frequent meetings are needed, and specifically those for general aviation investigations.

The Safety Board agrees with the thrust of this recommendation. The Safety Board plans to hold future meetings to discuss specific areas of the investigative process. Currently, the Safety Board Members, managers, and staff meet with various members of the aviation industry on a regular basis to discuss general accident information and investigation procedures. Informal meetings on specific topics are encouraged and can be arranged on request. Recently, the South Central Regional Office held a meeting to discuss helicopter accident investigations. The meeting was attended by manufacturers, operators, FAA investigation and certification personnel, and Safety Board managers and IICs.

59. Develop air safety investigation codes of ethics similar to ISASI codes.

The Safety Board has reviewed the Code of Federal Regulations concerning ethics for Government Employees and determined that there is no need to develop a separate code, or an expanded code, of ethics for Safety Board employees.

60. Within the law, time-critical interviews should be conducted before individuals are exposed to outside influences.

This recommendation addresses the conflicting responsibility of the Safety Board when conducting interviews. The Safety Board needs to obtain information from crewmembers and others with potentially valuable information as quickly as practical after an accident. However, when those individuals have been in accidents, the Safety Board investigators must also recognize their needs, both physical and psychological, and schedule the interviews, if necessary, in accordance with those needs. As a result, the Safety Board investigators generally attempt to conduct postaccident interviews quickly, but not so quickly as to infringe on the rights and needs of the interviewees. As previously mentioned, the Safety Board is actively working with several contractors to develop and hold witness interview classes both at Headquarters and the Field level. The contractor will hold in-depth sessions with Safety Board personnel to address interviewing techniques and various sensitive areas that investigators need to be aware of and potentially address to the prospective interviewees.

The Safety Board's current policy, which we believe provides an appropriate balance between these two needs, has been to interview surviving crewmembers within 48 hours after an accident. If they, or other potential interviewees, are considered by appropriate authorities to be medically and/or psychologically unable to be interviewed, we will delay the interviews until they are deemed to be sufficiently recovered.

INTERNATIONAL ACCIDENT INVESTIGATIONS

- 61. Hold reviews of Annex 13 to the International Convention on Civil Aviation, which is administered by the International Civil Aviation Organization (ICAO), on a periodic basis not to exceed 5-year intervals.**

The Safety Board agrees with the intent of this recommendation. The Safety Board has a continuing relationship with the representatives of ICAO and the U.S. Mission to ICAO. Many of the recent changes to Annex 13 were the result of the Safety Board's experiences and insights gained during foreign investigations. The Safety Board plans to continue working with the other States to update Annex 13 as required and will formally encourage more frequent reviews of the annex.

- 62. Reallocate Safety Board internal resources to allow Safety Board accredited representatives to travel to the site of each major and selected foreign incidents.**

The Safety Board is sympathetic to this recommendation's intent. However, the Safety Board must continually evaluate the best use of investigator time. When a U.S. Accredited Representative does not travel to the scene, he or she will work with the IIC of the State of Occurrence to gain factual information on the accident. Although it would be preferable to have a representative at the scene, considerable useful information can be gathered via telephone calls and facsimile messages. The Safety Board will continue to evaluate each foreign accident and incident to determine whether to send an accredited representative to the scene.

- 63. Establish a formal program in cooperation with other international investigative agencies to facilitate the timely and accurate dissemination of safety information to all aviation government and industry users, including statements of "improbable" cause.**

The Safety Board agrees with this recommendation. The installation of the Safety Board's electronic bulletin board will facilitate government and industry's ability to obtain the latest and most reliable information concerning a major accident. The Safety Board will work with the manufacturers and foreign governments to ensure that operator alert information is disseminated as quickly as possible. In a very limited way, the Safety Board's electronic

bulletin board may be used to provide the aviation industry with recommended operational or engineering changes found necessary as a result of an on-going investigation. Additionally, the Safety Board will continue to work with foreign investigative authorities to develop procedures to ensure the timely and accurate dissemination of safety information.

64. **The Safety Board should pursue with ICAO more clarification on participation in international accidents or incidents regardless of current rights.**

Recent changes to ICAO Annex 13 provide more detail on the recommended participation of States of Manufacture, Registration, Design, and Occurrence. Although a State may be a member of ICAO, it may not necessarily follow all of the recommended practices. The Safety Board will continue to pursue its rights to represent U.S. interests in foreign accidents.

65. **Establish and publicize a method to contact the Safety Board on a 24 hour per day basis and ensure that the Safety Board informs other parties and other states of this method.**

The Safety Board will amend its listing in the ICAO Member State Directory to include a 24-hour contact number. After normal working hours, the Safety Board's Aviation Duty Officer can be contacted through the Federal Aviation Administration Communications Center, 202-863-5100.

66. **Conduct periodic or yearly industry/party coordinator reviews on policies, procedure problem areas, and resolutions, and include other government counterparts.**

The Safety Board's staff meet with FAA staff and the Airline Transport Association (ATA) Safety Committee on a quarterly basis to discuss ongoing investigations, problem areas, and proposed changes in procedures. The Safety Board agrees that such a program can be developed for industry party coordinators. Given the large number of potential parties to an investigation, a periodic or yearly meeting could be difficult to arrange. However, as previously mentioned, the Safety Board staff is available to meet with any group or representatives of a potential party to an investigation to discuss Safety Board policies and procedures.

- 67. An industry advisory committee should be established to review the recommendations made as a result of this symposium, and it should work with the Safety Board to identify ways that those recommendations can be implemented.**

The Safety Board believes that industry should establish an aviation industry advisory committee to review and comment on the Safety Board's reply to the recommendations from the symposium. Additionally, the Safety Board staff solicited comments from symposium industry panelists before the draft recommendation responses were presented to the Safety Board.

- 68. The Safety Board should gain statutory exemption from the Freedom of Information Act (FOIA) for accident information made available during the investigation of a foreign accident when such exclusion is requested by the country of occurrence. Enlist the support of ISASI members, among others, in such an effort. Such information will be held until the release of the final report or the authorization of the investigating authority.**

This is a sensible idea and one with which we are in sympathy. But there are two problems that need to be noted. First, the Safety Board has asked for this type of exemption previously; indeed, more than once. It has been denied, and there is little reason to expect a change in the Congressional position. Second, a FOIA exemption, even if the Safety Board had one, would not necessarily solve the problem, since discovery in litigation is also a source of potential forced release of information. Hence, to be fully protected, the Board might need a statutory shield against judicial inquiry, and this is at least as problematical as protection from FOIA.

Despite these problems, the Safety Board will continue to explore the possibility of a statutory premise for safeguarding compliance with the disclosure-by-country-of-occurrence provisions of Annex 13.

69. **The Safety Board and FAA should develop a process whereby an FAA representative can be delegated as the U.S. Accredited Representative when the NTSB decides not to send a representative. However, the Safety Board must ensure that there is no conflict of interest during the tear down.**

There are no impediments to an FAA representative being delegated as the U.S. Accredited Representative to a foreign accident. The Safety Board practice is to assign an FAA representative as the technical advisor to the Safety Board's U.S. Accredited Representative who does not travel to the accident scene. Normally, if an accident is deemed significant enough for the FAA to send a representative, the Safety Board also will send an Accredited Representative. However, the Safety Board will consider any alternative means to accomplish its goal of improving aviation safety.

70. **The U.S. Accredited Representative should provide a briefing to his technical advisors regarding Annex 13 standards in advance to ensure that the U.S. team complies with the provisions and acts as a team.**

It is the Safety Board's procedure that the U.S. Accredited Representative provides a briefing to his technical advisors prior to going to the accident site or meeting with the foreign authorities. Problems in the past have resulted from technical advisors arriving prior to the U.S. Accredited Representative and then proceeding directly to the accident scene or meeting with the foreign authorities rather than waiting for the U.S. Accredited Representative to arrive. Additional problems have developed when technical advisors have tried to conduct their own independent investigation. The Safety Board will continue to provide briefings to all technical representatives and will ensure that the U.S. contingent acts as a coordinated team. During the training conducted at our Headquarters and at each Regional Office at various times during fiscal year 1995, the Safety Board will ensure that each investigator is aware of the ICAO Annex 13 standards and reviews the contents of the briefing that each representative is expected to give to the technical advisors.

74. Clarify authority of Board Member versus the IIC during the investigation.

The IIC is in charge of and responsible for the management, technical accuracy, and thoroughness of the investigation. The IIC is responsible for selecting parties to the investigation and ensuring that they provide the technical expertise needed by the appropriate investigative group. The Board Member on-scene is the Safety Board's spokesperson for all contact with the media and represents the public's interest in fulfilling the Safety Board's mandate to ensure that timely and accurate information is provided. The Safety Board's public affairs officers are always careful to say that the Board Member is accompanying the team, not leading it.

75. Establish a process to assess the evidence and direction of the investigation on an on-going basis with the involvement of the parties.

The Safety Board's investigation procedures for both domestic and foreign accidents contain numerous opportunities for parties to be involved in assessing the facts and direction of the investigation. During the on-scene phase of the investigation, daily progress meetings are specifically tailored to allow all parties to hear the evidence and provide comment on additional areas to be investigated. The parties have the opportunity to participate in all phases of the investigation, review and comment on group chairmen factual reports, participate in public hearings, attend technical review meetings, and then provide submissions to the Safety Board. Therefore, we believe current procedures adequately address this recommendation.

76. Address the relationship between the Safety Board and FAA IICs at the working group level for both domestic and international accidents.

Concerning a domestic accident, the Safety Board IIC is the leader of the investigation. By statute, the FAA is always given party status to an investigation. Technically, the FAA IIC is not an IIC but is the party coordinator for the FAA. In this regard, he or she has the same rights and privileges as any other party coordinator. During overseas investigations, the Safety Board IIC becomes the U.S. Accredited Representative and the FAA representative serves as a technical advisor. Accordingly, the FAA technical advisor has the same privileges as any other technical advisor to the U.S. Accredited Representative.

77. Ensure that Safety Board accredited representatives are trained and qualified according to established standards.

All U.S. Accredited Representatives are senior Safety Board IICs that are well experienced in accident investigations. Obviously, there are individual differences among IICs as to the extent of their foreign investigative training and experience. Therefore, the Safety Board will continue to evaluate the training and the performance of each U.S. Accredited Representative. As previously mentioned, during the training that will be conducted at Headquarters and each Regional Office in fiscal year 1995, the Safety Board will ensure that each investigator is aware of the ICAO Annex 13 standards.

78. Make critical CVR/FDR information available to the groups that need it on a timely basis. Establish better communications links between operations, cockpit voice recorder, and flight data recorder groups.

79. Make CVR and FDR information directly available to the field investigation teams.

The CVR information represents a unique issue and the release of this information is protected by legislation. The release of CVR information and who may actually listen to the tape is tightly controlled by Safety Board rules in order to comply with Congress's intent to prevent premature release of the information. However, all critical CVR and FDR information is relayed to the IIC as soon as it is developed. The IIC, in turn, determines what information is to be provided to investigators in the field, and to the various parties to the investigation. Pertinent information is provided to the operations and performance groups as soon as possible.

Safety Board procedures require an initial audition of the CVR recording by the Directors of the Office of Aviation Safety and the Office of Research and Engineering, or their designees. The initial audition of the CVR recording usually provides much useful information. However, the data is preliminary in nature until a CVR group has the opportunity to make a detailed transcript and adequately access all of the information on the recording. There is an additional concern that the media could focus too much attention on the CVR information or the FDR data prior to its being verified or put into the proper context.

The current Safety Board policy provides immediate feedback to the IIC, and safety issues identified during this audition of the CVR recording are brought to the attention of the pertinent parties (e.g., the aircraft manufacturer will be advised of apparent airworthiness issues; and the FAA will be alerted to apparent regulatory issues). Further, the members of the CVR and FDR groups provide the organizations they represent with access to this information. The CVR group is usually formed within 24 to 48 hours of the accident.

- 80. Arrange for the Safety Board to be the focal point or be aware of all questions and responses between the U.S. parties and the foreign IIC.**

This is the standard procedure for all foreign investigations. The U.S. Accredited Representative is the focal point for all communications between the U.S. team and the investigative authority. All requests from the foreign IIC to a U.S. technical advisor must be directed through the U.S. Accredited Representative, and all replies will be directed to the U.S. Accredited Representative and then sent to the foreign IIC. With approval of the U.S. Accredited Representative, copies of all correspondence may be provided to the Safety Board at the same time the original is sent to the foreign IIC. There have been isolated problems in the past in which U.S. companies worked directly with the foreign authorities without informing the Safety Board.

- 81. Ensure that the Safety Board is advised about all progress reports issued by the foreign IIC, and circulate the reports among the U.S. parties.**
- 82. Be the focal point for reviews of draft final reports and circulate comments among the U.S. parties.**
- 83. Formalize a program to ensure periodic progress meetings or conference calls among the U.S. parties to review and discuss activities.**
- 84. Ensure that the Safety Board is notified of all progress meetings and that U.S. parties are notified of such meetings.**

85. Increase the Safety Board's commitment to follow up activities in foreign investigations.

The issues addressed by these recommendations are standard Safety Board operating procedures regarding foreign investigations. The Safety Board's U.S. Accredited Representatives work closely with foreign authorities to ensure that copies of all available material pertaining to the investigation are made available to the U.S. investigative team and that team members are informed of all investigative meetings. In many foreign accidents, the Safety Board's Major Investigations Division has instituted regular progress meetings or conference calls with the team member organizations. On all major foreign accidents, it is the Safety Board's policy to keep all U.S. team members informed as to the events of the investigation.

86. Establish within the Safety Board's Major Investigations Division a procedure whereby either by telephone or electronic (E) mail major manufacturers can, on a daily basis, obtain information on major occurrences to (1) determine the accident potential of the occurrence, and, (2) if occurrence has safety implications ensure, that operators of similar equipment are immediately notified.

As previously mentioned, the Safety Board has established an electronic bulletin board that will provide up-to-date information on major occurrences. This information will be made available to all interested parties. Additionally, it is the Safety Board's policy to notify promptly manufacturers and operators of the safety implications discovered during an investigation.

87. The Safety Board should distribute ICAO (ADREP) reports to industry.

ADREP reports are available from the Safety Board on request. Currently, only one manufacturer has requested and is receiving copies of the ADREP reports. The automatic distribution of ADREP reports to all possible interested parties would not be an appropriate use of Safety Board funds. Therefore, interested parties should contact the Safety Board's Major Investigations Division to arrange for copies of the reports.

- 88. The date for written comments and recommendations should not be set until after all final group chairmen reports are distributed to the parties. This applies to all investigations, but is particularly important if foreign manufacturers and airlines are involved, because of distances involved. The date should be the same for all parties.**

The Safety Board agrees with the intent of this recommendation and believes it would be best to hold the date for submissions until all factual reports are completed. Occasionally, in the interest of time, it is not possible to have all reports completed, and an additional submission must be provided at a later date. However, in the majority of cases all of the group reports will be completed prior to the date for submissions from the parties.

- 89. When a party's written comments are sent to the Safety Board, they should be sent by the submitter at the same time to all party coordinators rather than leaving it to the Safety Board to reproduce and then circulate the comments to the other parties.**

This recommendation is existing Safety Board policy for all correspondence and submissions from parties to the investigation. In the event of a Public Hearing, 49 CFR Part 845 requires the parties to provide copies of any material that they wish to present at the Public Hearing to the other parties. Additionally, all IICs are to inform the party coordinators during the field phase of the investigation that each party is responsible for sending copies of its reports, comments, or submissions to the other parties. The Safety Board's IICs will continue to stress this matter in future accident organizational meetings.

- 90. The final Safety Board report of the accident should address the written comments of the parties.**

In many cases, the Safety Board's report does address the comments provided by the parties, but the name of the party that submitted the comment is not provided. The Safety Board also considers all of the comments provided in party submissions, and the submissions are made part of the public docket. However, the Safety Board does not believe that it is necessary to address every comment in the final report.

- 91. Submissions that are not adopted should be made an appendix to the report.**

The Safety Board believes that this recommendation is unnecessary since all formal party submissions to the Safety Board are made part of the public docket.

- 92. In the case of foreign accidents, assign an experienced IIC or single point of contact as soon as possible so that everyone understands who is in charge and who the primary point of contact is for supplying information to the investigators from the country of occurrence, even if the IIC never leaves the United States to visit the scene.**

The Safety Board agrees with this recommendation, and an IIC will be assigned as the U.S. Accredited Representative to be the primary point of contact even if he/she does not travel to the scene.

- 93. If the IIC is traveling to a foreign accident site, then an available primary U.S. contact should be established to coordinate information during the travel time of the IIC. A great deal can happen in the 14 to 24 hours of travel time at locations in the Pacific.**

While the team is en route, additional factual and logistical information on the accident and other data are provided to the Chief of the Major Investigations Division or to another senior IIC. This information is provided to the U.S. Accredited Representative, the technical advisors, and manufacturers' representatives. As with domestic accidents, the point of contact is the Chief of the Major Investigations Division or his designated representative while the team is en route.

- 94. When an engineer or other staff member is the only Safety Board representative sent to assist the country of occurrence, his role and relationship with the operator and manufacturers should be as clearly determined as soon as possible before the arrival at the site. Is he an IIC for the Safety Board side of the investigation? If so, he should be trained to organize the advisors and properly coordinate their activity.**

This is an unusual event, and, in most cases a U.S. Accredited Representative will travel if the occurrence is considered serious enough to send a Safety

Board technical specialist. Whenever a Safety Board engineer or other specialist is the sole Safety Board representative to a foreign investigation, he/she is there solely as a member of a specific investigative group, such as operations, systems, and powerplants. He/she is to report to the IIC for the country of occurrence and will serve as a technical advisor with the same status as a technical advisor from the manufacturers or operator. In such a situation, the U.S. Accredited Representative for the investigation will be at Safety Board headquarters and will communicate with the foreign IIC by telephone or facsimile message. The Safety Board is aware of the instance that resulted in this recommendation and has taken appropriate action to prevent another occurrence.

- 95. If the country of occurrence delegates the investigation to the Safety Board, an IIC should be assigned immediately, and conventional party system rules should be established to eliminate misunderstandings before they occur.**

This is standard Safety Board policy. When an accident is delegated to the Safety Board, and the Safety Board agrees to complete the investigation, an IIC is assigned to the investigation. Once the Safety Board assumes responsibility for the investigation, all standard Safety Board party system rules apply.

- 96. Procedural norms should be established as soon as possible. How will records and documentation be delivered to the representatives of the country of occurrence, through the Safety Board or delivered directly? Who will receive the copies? What advisory committees will be allowed? How will field notes be handled? What will constitute official release of our flightcrew and aircraft for return to service.**

Procedural norms vary greatly from country to country. Most investigative agencies allow full participation, similar to the Safety Board's procedures. However, some country's regulations do not allow for participation of the operator, manufacturer, or unions, and, in some cases, field notes are not allowed to be removed from the country. Additionally, laws and procedures can change quite dramatically in some countries in a short time. Therefore, each case must be evaluated as it occurs. Since the Safety Board has the only official status through the U.S. Accredited Representative, all records and documentation should be delivered to the IIC unless he/she and the foreign

reopens the investigation. The Safety Board believes that the primary purpose of the investigation is to determine the cause of the accident and to prevent future occurrences. Returning the airplane and flightcrew to the United States are understandably important; however, they should be subordinate to the needs of the investigation.

99. Make every effort to secure lodging accommodations for investigators arriving from overseas.

The Safety Board tries to arrange lodgings with the assistance of the Department of State for the entire U.S. team on foreign investigations. Therefore, it is imperative that the Safety Board be informed as soon as possible of the names, affiliations, and arrival times of all persons participating in the investigation. Additionally, the Safety Board has found that in many cases the manufacturers' in-country technical representatives are very helpful in coordinating accommodations and local travel needs.

100. The IIC must ensure the guidance to parties is fully understood by those joining the team.

The Safety Board created a new information package for all party members for domestic accident investigations. A copy of this guidance is provided in the symposium proceedings and also is available from the Safety Board's Major Investigations Division. Copies of the Major Team Investigations manual is available to all interested parties, either in computer diskette format or hard copy. As previously mentioned, the Safety Board is in the process of developing an information package for all technical advisors for foreign accident investigations.

101. Develop a system that will provide immediate notification to international authorities of all (large and small aircraft) accident and incident occurrence information.

The Safety Board's electronic bulletin board, which is accessible by modem, allows any interested party to access the latest information available to the Safety Board concerning significant domestic or foreign accidents or incidents. However, information on foreign accidents may be limited by the provisions of ICAO if the country of occurrence's regulatory requirements restrict the release of information. It is not the Safety Board's intent to

MAJOR INVESTIGATION RECOMMENDATIONS

102. Create an accident/incident data system that would be accessible by modem on a 24-hour electronic bulletin board.

As stated above, the Safety Board has established an accident/incident information electronic bulletin board that will provide preliminary information on recent major or significant accidents/incidents 24-hours a day.

The Safety Board's full accident data base, in its current form, is not as user-friendly as required for unassisted access by casual users. For this reason, almost all users (Safety Board personnel included) obtain only indirect access to the data. Typically, the user states his needs to one of the Safety Board's data specialists who then conducts the search.

Although this arrangement works well for most users, a growing population of more sophisticated users could benefit from direct access to the data. While some organizations and individuals now obtain data extracted from the Safety Board data base, the procedures to provide these data are currently somewhat cumbersome. If the user has not worked with Safety Board accident data previously, he/she will probably find it difficult to understand some of the data (software documentation is scanty, at best), and worse, the user will not know about the intricacies of the data and the interrelationships among some fields, and could obtain erroneous answers to his/her queries without realizing it.

The Safety Board is currently defining and developing a well-documented and publicly accessible data base, which will be a subset of the full aviation accident data system currently maintained by the Safety Board. It is intended that users will be provided with direct electronic access to this system.

103. Maintain a listing of 24-hour contacts for manufacturers' representatives to be called in the event of an accident.

The Safety Board has a list of the 24-hour contact numbers for most of the U.S. manufacturers. However, we are always trying to update and improve this list and therefore request that each manufacturer provide the Major Investigations Division with a 24-hour contact number. By its very nature this list is subject to change and contains home telephone numbers, pager

number, cellular phone numbers, etc. The Safety Board uses this list for its own purposes and will not publish a copy of the list for interested parties.

104. Establish and keep updated the "focus" of the investigation after the on site phase.

Safety Board procedures provide that the IIC will keep the party coordinators informed of the status of the investigation and areas where additional investigation is necessary. Often, there are several focus points in the investigation as the several investigative groups develop new information. The Safety Board reports often provide information on areas that did not contribute to the cause of the accident but have significant safety issues. As the investigation develops, the key issues become clear, and more specific areas of investigation are determined. The draft factual reports, the technical review meeting or comments provided by the parties to the factual section of the draft final report provide input on maintaining the focus of the investigation. The IICs and Division Chiefs will continue to monitor the dissemination of information after the on-site phase of the investigation.

105. Ensure Safety Board management review of changes to the scope or focus of the investigation to preclude premature conclusions.

It is the Safety Board's policy to coordinate all investigative information with the functional managers and upper management. The Safety Board managers oversee the status of investigations through status reports, issue reports, work planning and report planning meetings, issue-specific meetings, review of group chairman reports, review of proposed recommendations, contact with representatives of the parties to the investigation, and internal memoranda. Although there may have been isolated instances whereby management was unaware of the significance of a particular issue, the Safety Board believes that adequate controls are in place to preclude premature conclusions.

106. Train specialists and provide procedures for proper and timely handling, testing, and shipping of evidence.

The Safety Board's recently revised Major Team and General Aviation Investigation manuals provide guidance on the proper handling, shipping, and testing of evidence. This subject is addressed in the Safety Board's accident investigation school. The Safety Board is in the process of finalizing training

on "Glass Cockpits," which will include a section on the recognition, preservation, handling, and shipping of evidence within the cockpit area. Additionally, this course will discuss volatile and nonvolatile memory and working with composite materials.

107. Establish an investigator performance evaluation process.

The Safety Board has in place an investigator performance evaluation process. The performance of each investigator is formally evaluated twice a year. The Safety Board takes seriously the quality of its investigators and uses feedback on investigator performance from parties to the investigation and other Safety Board staff to evaluate investigator performance and identify where additional training is needed. The Safety Board believes that there are adequate procedures in place to evaluate investigator performance.

108. Improve and upgrade investigator training.

The Safety Board agrees with this recommendation. The Safety Board has made a concerted effort to expand the investigator training in a variety of specialty areas. The Safety Board has a familiarization course with an all-cargo airline that began in August 1994. The Safety Board also plans to offer an in-depth training session on Aircrew Integrated Management at its Washington Headquarters during fiscal year 1995. Additionally, plans are underway to include a rotorcraft safety and accident investigation course in fiscal year 1995. In conjunction with the Philadelphia International Airport, the Safety Board has sent and will continue to send investigators to a course on airport operations. The Safety Board has initiated a "Glass Cockpit" technology course; a hot air balloon familiarization course; a soaring/sailplane familiarization course; a major airline management familiarization course; and a jet engine mishap course. The Safety Board utilizes a 5-year training plan to effectively ensure investigator training and will continue to seek additional training opportunities for its investigators.

- 109. Allow party participation in the development and review of Safety Board analysis and recommendations to ensure technical accuracy. To accomplish this goal, the Safety Board should: (A) allow the parties to review the group chairmen analysis, (B) follow the ICAO Annex 13 requirements in party review of draft final reports, and (C) allow parties to present their oral views at Board meetings.**

This issue has been addressed previously. The Safety Board does not believe that parties should be allowed to have analytical input to a product that may very likely affect them. Additionally, such a practice would seriously undermine the independence of the Safety Board and open group chairmen analysis reports to possible availability under the Freedom of Information Act. The Safety Board procedures allows parties to make submissions to the Safety Board regarding findings, conclusions, and proposed probable cause statements. The Safety Board reviews and considers these submissions in its deliberations on the final accident report and the determination of probable cause.

- 110. Resolve upper level management conflict between the FAA and the Safety Board.**

Managers from the Safety Board's Office of Aviation Safety meet each quarter with FAA managers to discuss such varied topics as timely responses to safety recommendations, foreign investigations, implementation of new ICAO Annex 13 procedures, and notification of foreign and domestic accidents. These meetings and other formal meetings have been successful in identifying issues that represent institutional points of view that could sometimes be viewed as "management conflicts." Without additional information or specific examples, the Safety Board is unable to respond more fully to this recommendation.

- 111. Do not limit participation in survival factors groups.**

Investigative groups, including the Survival Factors Group, limit participation to persons who have knowledge that will benefit the investigation. Experience indicates that groups that are too large cannot be managed effectively. With regard to the Survival Factors Group, often several people are needed to conduct interviews, while fewer people are needed to examine the cabin and evacuation systems. Procedures for compliance with the

Occupational Health and Safety Administration (OSHA) will further limit the number of persons who will be permitted inside the cabin and cockpit and will also minimize the exposure to bloodborne pathogens.

112. Develop and use a comprehensive question list for survival factors investigations. Keep the survival factors investigation focused.

Postaccident interviews, by their very nature, cannot always follow standardized lists of questions to be asked. The Survival Factors Checklist contains comprehensive information that can be adapted to each investigation with additions as the situation warrants. Also, the Passenger Questionnaire is provided to each passenger. Finally, the Survival Factors Group develops certain questions (as the accident dictates) to be asked of passengers and crewmembers. Every attempt is made to contact passengers in person or by telephone. Unfortunately, passengers do not always complete their statement forms and questionnaires.

113. Use tape recordings only to produce statements of witnesses.

This procedure has been used and will continue to be used as the situation warrants. Recording every interview is not always necessary. Also, because of the labor intensive job of either transcribing or summarizing recordings, the recording of every passenger interview is not practical.

114. Allow survival factors participation in the investigation of cabin emergency equipment and exits.

Such a procedure is already in place for go-team investigations. Depending upon the circumstances, there may not be a Survival Factors Group for some investigations that are led by a regional IIC. However, the regional IICs can be assisted at any time by survival factors investigators on site or from their Washington, D.C., offices.

115. Provide OSHA 'safety requirements and safety procedures to all potential parties.

Refer to the paper presented at the Symposium entitled "Bloodborne Pathogens and the Aviation Accident Investigator." As pointed out at the Symposium, it is the employer's responsibility to supply inoculations, training,

and personal protective equipment to protect their employees from exposure to bloodborne pathogens. Neither the Safety Board nor the FAA will supply equipment to the parties. The IIC will brief the parties regarding the on-site hazards, including bloodborne pathogens.

116. Encourage airport authorities to videotape and otherwise document all evacuations, including exits and interiors, as soon as possible.

The Safety Board is aware that some airport rescue and fire-fighting services (ARFF) routinely videotape emergency responses. However, in many cases, the evacuation is completed by the time the ARFF personnel arrive. The Safety Board will work through its contacts at airports, airport associations, and ARFF associations to encourage the videotaping of emergency responses. It must be recognized that the primary purpose of an ARFF service is to respond to aircraft emergencies to extinguish fires and to protect occupants as they escape from the airplane. The ARFF's secondary role is to rescue persons who may be inside the airplane and remove others from the vicinity of the fire. ARFF services are typically staffed at minimal levels since most fire-fighting vehicles can be operated and can attack fires using one operator. Typically, ARFF personnel are interviewed, their radio transmissions are reviewed to establish the approximate times of significant events, and photographs and videotapes are examined to establish the location of the wreckage and victims. Some ARFF services routinely videotape accident sites for use as training aids; these videotapes are made when it is safe to be near the airplane and inside the wreckage which will be well after an evacuation.

117. Weigh all baggage and cargo.

In cases where the weight and loading of such items may be an issue in the investigation, all baggage and cargo will be weighed.

118. Computer model evacuation details.

For nearly 20 years, several attempts have been made to develop high fidelity computer simulations of evacuations. The Survival Factors Division routinely provides access to its accident files, historical data, and studies to assist researchers in identifying the many complex variables that can be factored

into computer simulations. The Safety Board believes that this support is more appropriate than conducting computer modeling.

119. Perform a survival factors investigation of all evacuation incidents.

The Survival Factors Division's staff of four is available to assist Regional IICs as needed in their investigations of accidents or serious incidents. For most of the past year, the division has been notified of each evacuation, and, depending upon the circumstances, has assisted IICs in developing evacuation-related information.

120. Keep parties informed of prospective recommendations during their development.

The Safety Board agrees with this recommendation and has directed all IICs and writers of proposed safety recommendations to keep parties to the investigation informed of recommendations being developed. However, it is not the Safety Board's intent to have the parties collaborate in writing the recommendations. It is the Safety Board's policy to provide the parties with an advance copy of the recommendations prior to releasing them to the general public.

121. Avoid nonquantifiable terms in recommendations such as "expedite" or "improve."

The Safety Board agrees with the intent of this recommendation and will review all future recommendations for nonquantifiable terms.

122. Provide regular reports to Congress on any "Open--Unacceptable" recommendations.

The Safety Board provides annual reports to Congress that include the status of significant safety recommendations. The Safety Board routinely provides this information on specific issues during testimony before Congress. Additionally, 49 U.S.C. Section 1135(d) requires the Secretary of the Department of Transportation to "submit to Congress on January 1 of each year a report containing each recommendation on transportation safety made by the Board to the Secretary during the prior year and a copy of the Secretary's response to each recommendation."

123. Include all passenger questionnaires (written statements) in the public docket.

Written passenger statements and questionnaires are currently included in the accident docket. Typically, 30 to 40 percent of statement forms and questionnaires sent to surviving passengers are completed and returned to the Safety Board.

124. Provide more flight training, line training, and systems training to Safety Board investigators through the use of Air Transport Association (ATA) and airline training capabilities.

The Safety Board agrees with this recommendation and will seek additional training for all of its investigators. The Safety Board has organized system training at two major air carriers and plans to continue this training for several years. Additionally, the Safety Board has begun airline operations and systems training at an all-cargo airline. The "Glass Cockpit" course will offer flight and system training and simulator training concentrating on the interrelationship between and sophistication of advanced flight and navigational equipment. Currently, the Safety Board offers flight proficiency training at two locations that allows its investigators to remain technically proficient and to stay abreast of the latest changes in today's aircraft and operating regime.

125. Ask for a larger budget to increase Safety Board staffing and training.

Current projections indicate that there will be reductions in the Safety Board's budget for the next few years because of the general reduction in Federal spending. The Safety Board will continue to request the budget it needs to accomplish its mission. The Safety Board plans to continue emphasizing training and the quality of Safety Board staff.

126. Safety Board management should allow Safety Board specialists sufficient time to investigate an accident/incident thoroughly and should not allow unrealistic time limits to affect report quality.

It is the Safety Board's policy that time limits for the completion of the final report will not affect the thoroughness or quality of an investigation. If additional work is necessary, the report completion date can be extended

accordingly. For example, the investigation of the United Airlines B-737 accident at Colorado Springs, Colorado, required about 2 years while additional testing and examinations were conducted. However, the timetable for the completion of a report cannot be open-ended. Also, the public rightfully expects that the cause of an accident be determined within a reasonable time so that remedial action can be identified. The Office of Aviation Safety has recently reorganized the go-team duties to provide investigators with less time on go-team duty. This will provide more time and fewer people working concurrently on multiple accidents so that reports can be completed sooner. Safety Board management continues to evaluate means to improve the timeliness and quality of our reports.

127. Investigate serious incidents with the same procedures as go-team accidents.

The Safety Board agrees that serious incidents should be investigated using the same procedures as major accidents. The Safety Board has developed guidance and procedures for all IICs that will better standardize the investigative process. Several IICs from the regional field offices have attended training on go-team procedures and will act as group chairman on major incident investigations. This training and experience will provide greater uniformity in the investigations of serious incidents.

128. Provide "use-immunity" to surviving flight and cabin crewmembers.

Statements made to Safety Board investigators are not now protected, and the possibility of their use in certificate proceedings, criminal actions, and actions for damages, is a fact of accident investigation life. Despite this, cooperation is generally quite high because most individuals understand the importance of accident prevention and wish to do their part. The Safety Board once had, but is now relieved of, authority to provide immunity from criminal prosecution. The likelihood that it will be restored is quite low, and the Department of Justice has not indicated any intent to extend its authority to provide immunity. However, the Board can cooperate, and has, in an appropriate case, cooperated with the Department of Justice in "use-immunity" from criminal prosecution.

- 129. Ask FAA to defer any potential certificate action until the conclusion of the crew interview process or field phase of the investigation, whichever occurs later.**

The existing memorandum of understanding (MOU) with DOT indicates (1) that the FAA will withdraw from any Safety Board interview in which a witness is concerned about enforcement action, and that (2) the FAA may decide to withdraw from the Safety Board's investigation to conduct a separate inquiry to avoid jeopardizing its enforcement process. As a practical matter, these arrangements can work to ensure that enforcement activity takes a chronological back seat to accident investigation, although it is necessary for individuals to challenge FAA participation when they have an apprehension about subsequent enforcement activity. Nevertheless, accident investigations and enforcement are both aimed at the same goal--accident prevention--and it is unrealistic to expect that enforcement officials will not take action if the preliminary circumstances indicate serious violations. The Safety Board does not actively support such investigations and, by its rules, limits the availability of its investigators as adverse witnesses in subsequent actions. We think that this distancing is appropriate and normally productive; on the other hand, a call for outright suspension of enforcement activity would be presumptuous and would place the Safety Board in the position of assuming prerogatives in an area in which it would bear little of the responsibility or criticism that might attach to the consequences of delay.

- 130. Apply pressures to avoid outside influences (such as requirements to return to work) on investigation participants by their employers.**

The Safety Board believes that this matter is best handled during the party selection process when all party coordinators and participants are informed that if they accept party status, they must be available for the entire investigation. The Safety Board has no authority to force employers to make employees available to participate in an investigation.

- 131. Resist interference from outside law enforcement (and other) organizations.**

Like the issue of FAA enforcement activity, the issue of law enforcement investigations is a complicated mix of institutional responsibilities and potentially divergent priorities. The Safety Board has traditionally attempted

to convince all government entities that it has the authority to proceed on a priority basis, but there is no clear jurisdictional line when local police functions come into conflict with the Safety Board's work. The Safety Board will continue to work to ensure that accident investigations are not unnecessarily complicated by conflicting claims.

132. Establish a Safety Board Advisory Committee to follow up on the recommendations of this symposium.

As previously mentioned, members of the various industry panels at the symposium were provided the opportunity to review the draft responses to the recommendations. The Safety Board believes that it would appear to be self-serving for it to establish an advisory committee to follow up on the recommendations made to the Safety Board by industry. A possible solution would be for industry to establish an advisory committee that would comment on the Safety Board's reply to the recommendations. Such a situation would be similar to the recommendation process established between the Safety Board and the FAA.

133. Recognize postaccident sensitivities/psychological needs of surviving crew, and any other interviewees. Revise the interview techniques accordingly.

The Safety Board recognizes the inherent difficulties of interviewing crewmembers or witnesses following an accident. As previously mentioned, this issue will be addressed through a tailor-made "witness interviewing" course that will cover the techniques of interviewing, problems associated with conducting an interview, role-playing exercises, and methods of eliciting comprehensive and accurate information during an interview. This course will be offered at both the headquarters and regional office levels after it has been approved.

134. Hold symposiums a minimum of every 3 years.

The Safety Board agrees that 10 years is too long between symposiums and that similar opportunities for the Safety Board to hear industry's concerns should be held on a regular basis. Given the time that it takes to organize a large meeting such as the symposium, it may be better to hold smaller events that concentrate on specific topics or areas, such as major investigations,

international investigations, or general aviation investigations. The Safety Board will work with industry to hold meetings on a regular basis to discuss aviation accident investigation issues of concern to the industry.

- 135. Do not release CVR excerpts except to the extent necessary to complete an investigation (Otherwise, follow the Safety Board CVR policy). Provide greater security for time-line data.**

The Safety Board agrees with the intent of this recommendation and tries to protect the CVR information until the completed CVR transcript is released to the public. However, the aircraft performance group must reconstruct the airplane's flightpath and develop the sequence of events using all available information. In creating the performance group's report, certain CVR information must be utilized. Direct quotes from the CVR are avoided as much as possible. Acoustic information (sounds in the cockpit other than voices) that is used to develop the sequence of events time history is shared with all parties, in accordance with Safety Board policy. In most cases, the performance group report is released at the same time as the CVR transcript, in accordance with Safety Board policy.

- 136. Establish guidelines for size and type of investigation teams.**

The initial size and composition of an investigative team are largely determined by the information available to the Safety Board in the notification of the accident. Obviously, an accident involving a large loss of life will result in the Safety Board sending a full go-team and additional support personnel. However, for an accident in which there are no serious injuries and the initial information indicates an operational problem, only two to four investigators will normally be sent. The Safety Board takes a conservative approach in allocating its limited resources, but readily adds appropriate specialist personnel if subsequent findings reveal a need for additional areas of investigation. The Safety Board relies on the experience and judgment of its managers to ensure that sufficient personnel are assigned to each investigation.

137. Require that the human performance investigators established a separate investigative group and work as a group from the outset of an investigation.

Human performance investigators have served as both chairmen of investigative groups and as technical specialists assigned to operations, air traffic control, or other groups, as necessary. In general, the effectiveness and the efficiency of the entire investigation are considered when making a decision on whether to form a separate human performance group.

On occasion, forming a separate human performance group impedes the ability to obtain information since interviews are generally enhanced when a minimal number of persons is present. Because much human performance information is obtained from interviews with witnesses and crewmembers, people who are generally interviewed by other groups, it is often advantageous to the investigation to assign a human performance specialist to an existing group rather than to routinely form a separate group. Further, the establishment of a separate human performance group could lead to two groups asking interviewees duplicate questions. Consequently, the decision on whether to form a separate human performance group is made on a case-by-case basis, depending on the nature of the information needed during an investigation and the methods available to obtain that information.

138. Send human performance investigators on every go-team launch.

In the event of a catastrophic accident, a human performance investigator will be sent to the scene with the other members of the go-team. In other types of accidents, decisions to launch individual members of the go-team are based on the initial information received upon notification of an accident. In general, there is sufficient detail available for Office of Aviation Safety management to quickly identify the specialists who are needed to obtain necessary on-site data. As more information is received about an accident, additional specialists may be sent to the accident site while others, who are no longer necessary, may be withdrawn from the site as the investigation becomes more focused.

The Office of Aviation Safety has determined that, in general, the needs of the investigation are best met not by an automatic launch of particular specialists, but by collecting necessary information as quickly as possible, and then

dispatching investigators selectively. To this end, the Office intends to implement procedures to ensure that necessary human performance information is obtained as quickly as possible, irrespective of whether human performance or other specialists collect the information. The Office has also implemented a program to train qualified investigators in the Regional Offices to provide human performance expertise to the go-team investigations when necessary.

The Office believes that obtaining critical human performance information on each accident more closely meets the intent of this recommendation than selecting particular technical specialists to obtain given information.

139. Establish all investigative groups at the organizational meeting rather than later in the investigation.

In theory, the Safety Board agrees with this recommendation. However, in practice, it is rarely possible for all of the parties to attend the organizational meeting due to difficulties in reaching the accident site or notification problems. In many cases, a second organizational meeting is held to complete the investigative groups. Additionally, in some cases, not all of the issues are immediately apparent when the organizational meeting is held. Therefore, it is necessary to organize additional groups, as needed, to complete the investigation.

140. Do not allow the participation of FAA Principal Operations Inspectors or Principal Maintenance Inspectors in the investigation process.

The Safety Board agrees with this recommendation, and IICs have been informed that the FAA Principal Operations Inspector, the Principal Maintenance Inspector, the Principal Avionics Inspector, or the Cabin Safety Specialist will not participate in the investigative groups for an accident involving an air carrier for which they are responsible.

141. Apply a scientific approach to determine findings and conclusions in the primary cause.

The Safety Board believes that it is applying a rigorous, methodological approach to the determination of findings of the investigation and the

development of the probable cause statement that meets the criteria for objectivity established in contemporary scientific applications.

142. Invite all airport authorities to the next Safety Board symposium.

The Safety Board agrees with this recommendation and will advise the airport associations when the next symposium is held. Additionally, Safety Board members and staff periodically meet with the associations to discuss airport safety issues.

143. Establish policy and procedures under OSHA to protect employees from discrimination or punitive action for participating in Safety Board accident investigations.

The protections against recrimination in the Occupational Safety and Health Act are matters governed by law. The Safety Board could not create such protections by rule. Because any such procedures might well put the Safety Board in the middle of controversies between employees and their employers, the cooperation of both of which is vital to the team concept in investigations, the Safety Board would be reluctant to ask for statutory authority to create such a program in the absence of a well-demonstrated need. At present, there is an insufficient record to justify such an approach.

144. Restructure the Safety Board conclusion section of the report process. Write findings and conclusions in a format that will explain the accident, including human performance factors.

The Safety Board believes that the conclusions section of the final report should reflect the significant findings of the investigation and the chain of events that resulted in the accident. Human performance factors are typically contained in this section. It is not the Safety Board's intent to explain the accident in this section but rather to summarize the findings that were discussed in detail in the body of the report. Similarly, the probable cause statement serves to provide a succinct summary of the discussion contained in the analysis section.

145. Send at least one Safety Board investigator to all major foreign accidents and serious incidents.

The Safety Board agrees with the intent of this recommendation and will make every attempt to meet this goal depending on the workload and safety issue involved. However, the Safety Board cannot automatically travel to every foreign accident. In the event of a foreign accident involving a U.S.-manufactured airplane or a foreign-manufactured airplane operated in the United States, the Safety Board must request permission from the country of occurrence to participate in the investigation. Historically, the Safety Board has found that U.S. manufacturers have easier access to an investigation by virtue of their existing manufacturer-customer relationship. The Safety Board will continue to collect as much information as possible concerning all foreign accident investigations.

146. Revise the CVR policy to allow the playing of the CVR at the accident command post, at the IIC's discretion, for coordinators and group chairmen.

The Safety Board's CVR policy was established to limit the possibility of premature public release of CVR information because of congressional and industry concerns. Critical, but preliminary, information is provided to the IIC and the appropriate investigative groups on scene.

147. Require a "finding" that addresses any problems associated with the evacuation of the airplane.

The draft accident report prepared by staff for consideration by the five-member Board may contain findings that pertain to occupant safety, some of which may address an evacuation. In some cases, the findings lead to a staff-proposed safety recommendation that may or may not be adopted by the Board; and, if not adopted, the finding may be removed from the Board report. Thus, it is not possible to "require" a particular type of finding since the Board is ultimately responsible for the contents of the accident report that it adopts.

148. Develop a management factors investigation group/protocol for each go-team investigation.

The Safety Board recognizes the need to address organizational and managerial factors in every accident and has done so to the extent possible under current investigative protocols. Investigators in the Safety Board's Human Performance Division intend to continue to collect such information, as needed. In the interim, it will review the protocol in the Accident Investigation Manual to determine whether changes are needed to improve the information obtained on management-related issues. Additionally, the new changes to ICAO Annex 13 will include a section on Industry/Organizational Factors.

149. Require party signoff of group chairmen factual reports and incorporate dissent information.

As stated in the responses to similar recommendations, the Safety Board disagrees with this recommendation. It would be inappropriate for the parties to review and effectively approve the group chairmen reports since this is the responsibility of the Safety Board and its management staff. As previously stated, the Safety Board believes that the parties are provided ample opportunity to participate in an investigation and to make their positions known to the Safety Board and the general public. Parties receive and sign-off on copies of field notes, receive and comment on the group chairmen's' factual reports, and they are encouraged to attend the technical review or comment on the draft factual report, to provide submissions to the Safety Board, and to meet with the IIC or individual Board Members to discuss their positions on the facts and analysis of the accident. Additionally, all submissions and pertinent correspondence provided by the parties are entered into the public docket for the investigation. The current process provides the parties with sufficient opportunity to make their positions known to the Safety Board and the public.

150. Establish a clear Safety Board drug testing policy regarding ATC personnel to ensure the proper chain of custody for subsequent testing.

Under current requirements, ATC personnel, as employees of the U.S. Department of Transportation (DOT), must comply with DOT drug testing rules. The Safety Board policy, in accordance with DOT rules, is to formally

request that the FAA conduct postaccident drug testing of ATC personnel when circumstances of the accident suggest that is warranted. FAA personnel then determine which, if any, ATC personnel are to be tested, and pursue subsequent activities involving the testing. When ATC personnel are tested, the FAA is responsible for informing the Safety Board when such postaccident tests show evidence of drugs.

However, the Safety Board believes that in the interest of timely results, the testing should be conducted on all ATC personnel who might have been involved. The Safety Board recognizes that this is not the FAA's position on this issue. When the Safety Board and the FAA disagree on who is to be tested, the Safety Board has no authority to require testing. The Safety Board will continue request ATC personnel to be tested when their actions might have been directly involved in an aircraft accident.

151. Increase senior level management accountability in the recommendation process and in the evaluation of responses.

The Safety Board and its senior management are responsible for the evaluation and approval of all safety recommendations and responses to these recommendations.

152. Use graphic presentations to compare ATC and CVR communications to allow analysis of potentially "blocked" transmissions.

Both ATC and CVR communications are ordinarily superimposed on the graphic accident reconstructions that are developed in an increasing number of major accident investigations. Such graphic displays of information have proven useful both as an analytic tool and as a means of clearly communicating the results of analysis. The Safety Board is currently upgrading its computer graphics capabilities to expand and enhance the use of graphic analysis techniques in accident analysis and reconstruction, including the analysis of communication conflicts.

- 153. Amend/Revise Safety Board investigative procedures to allow experimental investigation procedures to be used.**

The Safety Board investigative procedures allow the IIC to utilize any new or different investigative technique that he or she believes may benefit the investigation.

- 154. Provide the Safety Board's estimate of the expected safety benefit of each of its recommendations.**

The Safety Board provides its analysis of the expected benefit of its recommendations in the report or the recommendation letter that is the preamble to the recommendation. The Safety Board believes that all of its recommendations have a safety benefit. The Safety Board does not provide a formal cost benefit analysis of its recommendations. Such an analysis would be the responsibility of the regulatory agency or organization that is the recipient of the recommendation. However, the Safety Board does consider such elements as cost in developing its recommendations.

- 155. Ensure the development of a complete scope of work for postaccident testing. Complete the scope of work and allow the manufacturer to proceed if the Board is unwilling or unable to do so.**

The development of work scopes for postaccident testing falls within the purview of the investigation group responsible for that phase of the investigation. It is the responsibility of the group chairman or IIC to determine the level of effort required to support the investigation. Additionally, testing will be accomplished based upon inputs received from the parties. A viable generic work scope cannot be created to cover all the idiosyncrasies of a particular component or the methods required to test that component. The group chairman or IIC will set work scope limits with the assistance of the parties to the investigation. The group chairman or the IIC should solicit the input of all technically qualified personnel who are available to the investigation. However, the Safety Board conducts these tests for its own purposes and not those of the parties. Product improvement investigative activities related to accident investigation activities are encouraged but cannot be supported by Safety Board staff and resources. The Safety Board will not include in its work scope tests that are not useful to the Board's investigation.

156. Delegate testing and teardown of components to the manufacturer for non-high visibility accidents.

The support of manufacturers in accident investigations provides the Safety Board with greatly expanded resources and ensures a high quality technical product. However, the Safety Board will not as a matter of policy "delegate" postaccident investigative work to manufacturers in any accident. The Board will continue to request investigative support from manufacturers to support investigations and will authorize supervised documenting and testing at manufacturer facilities.

157. Make a concerted effort to facilitate the recovery of critical parts that have been liberated in flight.

It is the Safety Board's policy to make a reasonable effort to ensure the recovery and examination of all evidence that would be critical to the determination of probable cause. Varying accident circumstance, including expected recovery costs, safety, and the likelihood of recovery, are factors that will weigh in the investigators' decisions regarding wreckage recovery. Such circumstances require discretion on the part of the investigator. Wreckage recovery will not normally be turned over to a party to the investigation, but the assistance of the parties will be solicited. In situations in which investigators are placed at abnormal risk, or the safety of the investigators cannot be assured, the value of the evidence will be weighed against the safety hazards that are present.

158. Ensure that parties are informed about the purpose or objectives of any proposed testing, and gain concurrence of the owner for any "other" parts that are impounded for testing.

Parties to the investigation should be aware of all critical elements of the investigation process. Concurrence of the parties (including the owner, when a party) for tests and testing objectives provides a level of understanding that supports cooperation in the investigation. However, the lack of concurrence can not prohibit necessary accident investigation testing activities and owners cannot veto any required testing. The lack of concurrence by any "party" should be communicated to the IIC, and alternatives should be considered when conflicts arise. It is the responsibility of the Safety Board staff to investigate thoroughly and to keep the participants in investigations informed

of the objectives. The Safety Board's staff has no responsibility to share analytical views of the accident with the parties, but the staff should provide the opportunity in every investigation for the parties to express their views regarding the analysis of the evidence, the determination of probable cause, and proposed safety recommendations that should result from the investigation.

159. Coordinate with the FAA and manufacturers to ensure the appropriate sharing of information following accidents or incidents under investigation.

Similar recommendations on this issue have been previously addressed. It is the Safety Board's position that there should be an open sharing of all information pertinent to the investigation.

160. Conduct a special study of emergency evacuations.

The Office of Aviation Safety will continue to collect information on emergency evacuations and other occupant survival issues and will consider these issues for future special investigations, safety studies, and safety recommendations.

161. Provide industry an after-Sunshine meeting opportunity to debrief and critique how the investigation went.

The Safety Board procedures allow considerable opportunity for the parties to debrief and critique the investigation. Critiques are usually provided in the initial post-on scene phase of the investigation and following the technical review. However, parties can provide debriefing or critiques of the investigation at any time to the IIC or senior Safety Board management staff. Although there is not a specific after-Sunshine meeting, parties are encouraged to meet with the IIC, senior management staff, or individual Board Members to provide their assessments of an investigation.

162. Provide administrative assistants to the IIC in the command post.

As previously stated, IICs are authorized to hire, on site, administrative support as necessary for the investigation.

- 163. Ensure the prompt release of wreckage and parts.**
- 164. Ensure the proper documentation of parts released and/or returned.**
- 165. Ensure that investigators are aware of component costs and the effects of keeping aircraft and parts out of service.**

It is the Safety Board's policy for all wreckage and parts to be released to the owner when the Safety Board has no further need for the components. The Safety Board will always try to release as much of the wreckage as possible, retaining only those items that require additional examination. The parts are then released as soon as the examination has been completed. The Safety Board will emphasize this issue in the initial and recurrent training of investigators. Documentation on the release of wreckage is provided by Safety Board form 6120.15. Safety Board investigator training will continue to emphasize the use of this form.

The associated costs to the Safety Board in retaining components is addressed in the Safety Board's accident investigator course. This issue has been and will be further addressed as an item of discussion in the Safety Board's regional directors' meetings and conference calls.

- 166. Allow full access to data by parties such as: (A) Providing a complete DFDR data package to all involved, and (B) Allowing all parties to photograph the wreckage.**

Parties are allowed full access to the wreckage and to all factual information developed during an investigation, which includes copies of the FDR data, and making photographs of the accident site. Parties are allowed to have a representative present to assist in developing a transcript of the CVR, and they receive a copy of the CVR transcript after the opening of the public docket, but they do not receive a copy of the recording. It should be noted that this factual information is eventually placed into the public docket and simultaneously made available to the general public.

167. The Safety Board should not investigate independently of the "groups."

It is the Safety Board's practice that the parties will be afforded the opportunity to participate during all fact-finding activities. There are some exclusions, such as when a witness does not want the FAA or his employer present at an interview. The Safety Board has informed all its investigators that during the fact-finding portion of the investigation, components' examinations, or follow-up activities, the parties should receive prior notice and should be allowed to be present at these investigative activities. The Safety Board believes that the corollary to this recommendation is that the parties should not investigate independently of the Safety Board.

168. Encourage the FAA to continue appointing cabin safety specialists to the Survival Factors teams.

The FAA has been consistently responsive to requests to assign Cabin Safety Specialists to Survival Factors Groups, and these specialists have contributed greatly during investigations. Furthermore, the FAA has provided experts in such fields as airport certification, aerospace medicine, crash injury mechanisms, toxicology, in-flight and postcrash fires, and explosives.

169. Install a centralized Safety Board headquarters phone system to ensure that calls are not missed and to ensure prompt responses to inquiries from parties.

The Safety Board is aware of the problems with its telephone system and is taking measures to rectify this situation.